

Virginia Preschool Initiative Plus Cost Study Final Report

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Prepared for:

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Executive Summary

In 2015, Virginia was awarded a federal Preschool Development Grant–Expansion Grant (PDG) and launched the Virginia Preschool Initiative Plus (VPI+) in 11 school divisions¹ across the Commonwealth. The goal of VPI+ was to provide high-quality preschool to children in Virginia by (1) supporting new VPI+ classrooms that meet specific quality standards and (2) enhancing the quality of existing Virginia Preschool Initiative (VPI) classrooms. This investment was intended to support positive school readiness outcomes for children. These intended benefits for children also translate to benefits for society, as improved educational outcomes for children enable them to grow into adults who make positive contributions to their communities. The potential for these positive outcomes necessitates a cost study that can help state leaders better understand the investment in and benefits of the VPI+ program. This cost study is part of a larger evaluation of VPI+ that also examined the impacts of VPI+ on children’s literacy, math, and social-emotional outcomes at kindergarten entry.

Study Questions and Approach

The descriptive analyses in this report include estimates of VPI+ expenditures in the 2017–2018 school year, as well as in the 2016–2017 school year for examining year-to-year changes.² In addition, this report includes a benefit-cost analysis (BCA) that compares the per-child expenditure estimates for VPI+ with an estimate of the per-child economic benefits resulting from the program measured in terms of increased future earnings. Through these analyses, this report examines the following evaluation questions:

- What is the comprehensive per-student expenditure of implementing VPI+ in 2017–2018?

¹ In Year 3, two additional divisions began providing VPI+ slots by opening new classrooms. These two divisions are not participating in the full evaluation, including the cost study.

² For the 2016–2017 findings, see the VPI+ Cost Study 2018 Interim Report, available upon request.

- How does the per-student expenditure of VPI+ vary by division?
- How are VPI+ expenditures allocated across different cost categories?
- How do overall and per-child VPI+ expenditures differ between the 2016–2017 and 2017–2018 school years?
- How do overall and per-child VPI+ expenditures differ between the 2016–2017 and 2017–2018 school years by division?
- What is the relationship between the expenditures of the VPI+ program and the economic benefits of the program (BCA)?

To answer the evaluation questions, the study team collected data from three sources for each of the 11 participating divisions: (1) VPI+ grant expenditures reported to VDOE by each division for reimbursement, (2) data provided by divisions on their local VPI+ expenditures that were not submitted for grant reimbursement but were counted as matching funds for the grant, and (3) data provided by divisions on other expenditures associated with VPI+ program implementation that were not reimbursed or counted as part of their matching funds. The study team aggregated and summarized these data to answer the evaluation questions and calculate totals for each cost code category, totals for divisions, and per-child expenditures. For the year-to-year analyses, these totals were compared between the two years of the study.

A BCA compares the cost of an intervention with the value of the outcomes affected by the intervention. In the case of VPI+, program costs are based on the per-child estimates that result from the above methodology. The primary outcome that we consider is the effect of VPI+ on school readiness, as measured by the companion impact study for VPI+. That study demonstrates that children who participated in VPI+ had higher levels of school readiness than their peers who did not attend the program. To attach a dollar value to the improved school readiness, we rely on well-established estimates from the research literature on the relationship between student achievement and lifetime earnings. Thus, we compare the per-child

expenditure of VPI+ with the expected per-child gain in future earnings associated with the effect of VPI+ participation on school readiness. Our estimates of per-child expenditures and per-child benefits are all measured in present-value dollars, which means that we account for the lower value of dollar costs or benefits that accrue in the future compared with those that are realized in the present. (The farther into the future that a cost or benefit is realized, the lower the value in today's dollars.) If the per-child cost is less than the per-child benefits (or the ratio of per-child benefits to per-child cost exceeds one), VPI+ would be estimated to produce a positive economic return.

The BCA findings produced by this approach should be viewed as a preliminary and partial estimate of the potential returns from VPI+. In particular, we are able to measure just one domain of impact (school readiness) from VPI+ participation and then just at the end of the VPI+ program year. Thus, we are not able to capture other domains of potentially favorable (or unfavorable) effects of program participation (e.g., on special education use) and we do not capture the potential longer-term effects on an array of outcomes (e.g., on later school performance). Thus, a full BCA accounting for VPI+ will require more time to measure a broader array of short- and longer-term outcomes.

Study Findings

The findings from the second year of the cost study include the following:

- Across all participating divisions, VPI+ program expenditures averaged \$16,210 per child.³
- More than two-thirds of the VPI+ expenditures represented salaries and benefits for classroom staff and other school personnel. The remaining one-third of expenditures includes transportation, materials and supplies, professional development, indirect costs, and other expenditures.
- The VPI+ per-child expenditures varied by division, ranging from \$12,036 to \$21,663, but this variation may partly be due to differences in divisions' ability to achieve full enrollment and differences in the specific types of expenditures that divisions included in their data.
- The VPI+ grant paid for the majority (75 percent) of VPI+ expenditures. The remaining 25 percent of expenditures were funded through local match.
- Between the two school years (2016–2017 and 2017–2018), the per-child expenditure increased by \$128.
- Between the two school years (2016–2017 and 2017–2018), the changes in total per-child expenditures for divisions ranged from \$696 to \$7,264 for increases and \$1,080 to \$11,923 for decreases.⁴

³ This figure includes all sources of expenditures. The average per-child expenditure directly covered by the VPI+ grant (i.e., without local matching funds) in public settings, without indirect costs or food included, was \$12,140.

⁴ The variability in year-to-year changes in per-child costs for each division can be partly explained by changes in spending decisions based on program needs and changes in enrollment. Details regarding spending decisions and enrollment can be found in the body of the report.

- Separate estimates of per-child expenditures and benefits for the 2016–2017 and 2017–2018 school years, as well as an estimate averaged over the two years, shows that the estimated per-child benefits in terms of projected future earnings exceeded per-child costs in each year and averaged over the two years. The average estimate, for example, shows estimated benefits of about \$23,000 per child, which exceeds the per-child cost of about \$16,000, equal to \$1.40 in benefits for every dollar invested. The benefit-cost ratio ranged from 1.28 to 1.53 across the two school years.

The key findings of this study provide important information about the costs of implementing a high-quality preschool initiative in Virginia. While the pattern of total per-child spending across divisions varied greatly, the expenditures for several divisions aligned closely with those of other known initiatives. In Virginia, four of the divisions had total per-child costs ranging from \$12,036 to \$13,720, which align with programs in Boston (\$12,390 per child) and New Jersey (\$13,350) (Karoly & Auger, 2016). These totals also align with a budget-based estimate of preschool program costs at the national level calculated by the National Academies of Sciences, Engineering, and Medicine (\$13,655) (National Academies of Sciences, Engineering, and Medicine, 2018). For divisions in which the per-child total exceeded the ranges provided by previous studies, the research team found that the variability in expenditures could be partly explained by under-enrollment in some divisions. In two of the divisions with the highest per-child expenditures, the target enrollment threshold was not met. If these divisions planned spending according to their enrollment targets, and were fully enrolled, the total per-child cost across all divisions would be \$14,051, demonstrating relative alignment with other initiatives.

The breakdown of spending for VPI+ also aligned with other state pre-K initiatives. Despite variability in total per-child spending across divisions, the salaries and benefits category was consistently the top spending category for divisions and amounted to more than two-thirds

of VPI+ spending overall for divisions participating in the study. The results of other analyses show that spending on personnel is typically between 79 and 88 percent of total expenditures, even higher than the 68 percent found in this study (Pierson, Karoly, Zellman, & Beckett, 2014).

The BCA findings for VPI+ are consistent with findings of positive economic returns for other high-quality preschool programs implemented by school districts and states. For example, estimates of the benefit-cost ratio for Oklahoma's universal preschool program, likewise based on projected future earnings, range from 2.82 to 3.45 depending on the student's income level. Again, the estimates reported in this study indicate the potential for VPI+ to produce a positive economic return. To the extent that VPI+ produces other favorable short- and longer-term benefits for participants and the rest of society, the estimated overall return would be expected to be even higher.

Introduction

In a landscape of limited resources and extensive need, it is crucial to understand whether public investments are making effective use of public and private dollars. Drawing from a federal Preschool Development Grant–Expansion Grant (PDG), in 2015 the Virginia Department of Education (VDOE) launched the Virginia Preschool Initiative Plus (VPI+), a four-year high-quality public preschool initiative. VDOE contracted with SRI International and subcontractors School Readiness Consulting (SRC) and RAND Corporation to evaluate the VPI+ program. VDOE is interested in the value of the investment in VPI+ relative to the magnitude of its impact on children’s school readiness outcomes and therefore included a cost study as part of the VPI+ evaluation.

The investment in VPI+ can be quantified using available expenditure data. The goal of this financial investment is to support higher-quality preschool classrooms and instruction, which in turn are expected to have a positive effect on school readiness and future outcomes for children. While intrinsically worthwhile, these outcomes also generate monetary benefits for the school division and society as a whole. This cost study report describes the expenditures by participating school divisions and analyzes these expenditures in relation to the economic value of children’s developmental outcomes that can be attributed to participation in VPI+.⁵

⁵ As noted in Steuerle & Jackson (2016), a cost analysis is designed to estimate “the full economic value of the resources used to implement the intervention of interest over and above the baseline scenario” (p. 40). Ideally in a cost analysis, we would measure the quantity of each type of resource required (e.g., time from staff with various roles, amount of materials and supplies, etc.) and then attach the economic value for each resource used based on willingness to pay. In perfect markets, market prices are a good estimate of willingness to pay. Thus, for many cost analyses, information on expenditures (quantities times prices) is used to estimate the value of the resources used. For resources provided in-kind, the value of those resources are estimated using available information on prices or other estimates that reflect willingness to pay. Throughout this report, we use “cost” when referencing the concept designated earlier of the value of the required resources. We then refer to “expenditures” in the context of the information we gathered to generate an estimate of cost.

Background

The experiences children have during their first years of life can determine the course of their cognitive, emotional, and physical development. The period of life between birth and age five is characterized by the fundamental development of capabilities on which subsequent development builds, including linguistic, cognitive, emotional, social, regulatory, and moral capacities (Shonkoff & Phillips, 2000). If these critical early experiences are positive, children are more likely to thrive throughout their development and see favorable academic, economic, and social outcomes later. Given the lasting effects of high-quality programming for young children, investment in these programs can generate positive economic returns (Heckman, 2006).

Researchers have established the benefits of several early childhood programs from the 1960s and 1970s. Temple and Reynolds (2007) examined data across three studies of early childhood programs that followed participants into adulthood, and the researchers found all three programs resulted in net benefits for society. For each dollar spent on the early childhood program, these researchers found that the HighScope Perry Preschool program saved or earned \$7.16, the Chicago Child-Parent Centers program saved or earned \$6.87, and the Abecedarian Project saved or earned \$2.69. While all three studies found significant effects on future outcomes, only the HighScope Perry and Chicago Child-Parent Centers studies found effects on future crime, perhaps because the frequency of crime was low across all participants in the Abecedarian Project. The Abecedarian Project also had a significantly higher cost, which resulted in a lower benefit-cost ratio (Schweinhart, 2007; Schweinhart, 2010).

Nearly 60 years have passed since these programs began, and early childhood intervention models have evolved. Consequently, benefit-cost findings from these earlier programs may not be generalizable to current state preschool programs. Policy makers in Virginia and other states need information about the value of investments in their own state preschool programs to guide future funding decisions, and they cannot wait to track participants

through adulthood. Studies have examined economic benefits of current state preschool programs by projecting the estimated long-term impacts based on observed school readiness outcomes (Karoly & Auger, 2016), and a meta-analysis of recent benefit-cost studies of state preschool initiatives found that these contemporary programs saved or earned \$4.20 per dollar invested (Washington State Institute for Public Policy, 2014). State preschool initiatives vary by state in terms of the program model and per-child expenditures, and may also vary within state when different initiatives are implemented (Friedman-Krauss, Barnett, Weisenfeld, Kasmin, DiCrecchio & Horowitz, 2018), so program-specific information on preschool investments is needed.

The VPI+ Program

Since 1995, Virginia has offered public preschool to eligible four-year-olds through the Virginia Preschool Initiative (VPI), serving approximately 18 percent of four-year-olds in 2015 (Barnett, Friedman-Krauss, Gomez, Horowitz, Weisenfeld, Clarke Brown & Squires, 2016). In 2015, Virginia was awarded a federal Preschool Development Grant–Expansion Grant and launched VPI+. The grant enhanced Virginia’s existing state-funded VPI, which supported high-quality preschool programs for four-year-olds in the Commonwealth who were identified as at risk. The PDG funds support two types of preschool classrooms within 11 school divisions⁶ across the Commonwealth: (1) VPI+ classrooms (i.e., newly opened classrooms that implement all the VPI+ grant requirements) and (2) VPI Improved classrooms (i.e., existing state-funded VPI classrooms that enhance their quality by implementing at least one of five program improvements: raising private providers’ teacher and/or assistant compensation to align with that of K–12 school division teachers, moving from a half-day program to a full-day program, reducing class size and student-teacher ratio, providing evidence-based professional

⁶ In Year 3, two additional divisions began providing VPI+ slots by opening new classrooms. These two divisions are not participating in the full evaluation, including the cost study.

development and/or coaching, or making comprehensive services available to children and their families).

All VPI+ classrooms were expected to address certain implementation components consistent with a high-quality preschool program, as set forth by the Preschool Development Grant–Expansion Grant. The PDG expectations for VPI+ classrooms included:

- VPI+ teachers had a bachelor’s degree or higher.
- VPI+ classes were full-day programs.
- Average VPI+ teacher salaries were in parity with K–12 teachers in Virginia.
- VPI+ classrooms used the state-procured, developmentally appropriate, evidence-based curriculum (The Creative Curriculum®) or continued to use a curriculum that was vetted through a rigorous review process with VDOE and the University of Virginia Center for Advanced Study of Teaching and Learning (CASTL).
- Divisions used the Teaching Strategies GOLD® formative assessment system to inform instruction.
- Divisions participated in ongoing program evaluation, monitoring, and improvement support through the Virginia Quality Rating Improvement System (QRIS).
- Divisions participated in a comprehensive external program evaluation that included a summative and formative evaluation and a cost study.
- VPI+ teachers had access to data-driven professional development and coaching based on needs of students and teachers.
- Divisions employed a family engagement coordinator who worked with families on enrollment, needs assessments, and engagement in program activities and planning.
- VPI+ children and their families had access to a range of comprehensive services, such as vision and hearing screenings, mental health support, nutrition support, adult education, and referrals to additional community-based services.

- VPI+ classrooms had access to additional resources (e.g., instructional technology for classrooms, curriculum support with training, classroom libraries and curriculum-based literacy materials, curriculum-based hands-on materials and learning center supplies).

Each division received a yearly grant award from VDOE. To utilize the grant funds, divisions paid for grant-related expenditures using local school division funds and were later reimbursed for documented allowable expenditures, which included staff salaries and benefits; instructional supplies, food, transportation, and building operations; in-service training and professional development; individualized accommodations and supports for eligible children with disabilities; comprehensive services; and program administration. In addition, to supplement grant funding, divisions covered local grant-related expenditures with what were considered matching funds. Divisions submitted expenditure reports for these matching funds twice a year, documenting local, division-funded expenditures on VPI+. Some divisions also provided data on expenditures associated with the program that were not covered by the grant or considered as part of their local match. These were usually in-kind resources, donations, or other funds. For the purposes of this report, we combined data from the local match and in-kind resources, with the goal of creating a simple comparison between grant and non-grant expenditures.

The VPI+ Evaluation

VDOE contracted with SRI International and its partners School Readiness Consulting and the RAND Corporation to conduct an evaluation of the VPI+ initiative. While Virginia's PDG initiative includes both VPI+ and VPI Improved, this evaluation focuses exclusively on VPI+

classrooms and does not examine investments or outcomes associated with VPI Improved classrooms.⁷

The evaluation of VPI+ includes a formative evaluation, a summative evaluation, and a cost study. The VPI+ study team designed the formative evaluation to understand the development of the supports for implementation of the VPI+ program and to understand the facilitators and barriers to full program implementation. The summative evaluation examines the impacts of VPI+ on child outcomes and includes a rigorous study using a regression discontinuity design. The cost study provides a comprehensive per-child expenditure estimate for VPI+ preschool and a benefit-cost analysis (BCA), with the goal of helping state leaders understand the investment in, and benefits of, the VPI+ program. Both the cost study and the BCA align with the summative evaluation. In particular, the study team designed the cost study to capture the cost of implementing the initiative to the extent possible with available data⁸ from the same 11 school divisions during the same program years (2016–2017 and 2017–2018) as the summative evaluation. The BCA estimates the value of the VPI+ investment by comparing program expenditures to the economic value of the VPI+ outcomes for student learning examined in the summative evaluation.

Though the cost study examines two years of data (2016–2017 and 2017–2018), the descriptive findings of this report focus on the findings from Year 3 of the VPI+ evaluation (2017–2018). The analyses included in this report examine per-child expenditures⁹ across divisions and how divisions distributed expenditures across different cost categories and across

⁷ To the extent possible, the study team included only new VPI+ classrooms in data collection for the evaluation. The “Methodology” section provides additional information.

⁸ The study team collected all available data on expenditures and nonmonetary resources for 2016–2017 and 2017–2018 program years, but there were some limitations in the available data (described in the “Methodology” section) that limit the extent to which the estimates represent the VPI+ program’s expenditures incurred.

⁹ The data collected for this study included information about expenditures associated with VPI+ program implementation. Because of the data idiosyncrasies described later in this report, a complete measure of the cost to implement the VPI+ program was not possible. Therefore, the term “expenditure” is used throughout this report to refer to the findings.

funding sources, including state grant reimbursements, local expenditures, and nonmonetary resources used for VPI+ (such as volunteer time). Detailed information regarding 2016–2017 expenditure data can be found in the VPI+ Cost Study 2018 Interim Report.¹⁰ This report also includes a comparison between expenditures in the 2016–2017 school year (Year 2 of the initiative) and the 2017–2018 school year (Year 3 of the initiative), to help better understand the reliability of the data and the pattern of spending decisions across divisions. Finally, this report presents the findings from the BCA. The evaluation questions addressed in this report include the following:

- What is the comprehensive per-student expenditure for implementing VPI+ in 2017–2018?
- How do VPI+ per-student expenditures vary by division?
- How are VPI+ expenditures allocated across different cost categories?
- How do overall and per-child VPI+ expenditures differ between the 2016–2017 and 2017–2018 school years?
- How do overall and per-child VPI+ expenditures differ between the 2016–2017 and 2017–2018 school years by division?
- What is the relationship between VPI+ program expenditures and the economic benefits of the program (BCA)?

In the following section, the 11 school divisions are described, as well as the methodology for this study.

¹⁰ Report available upon request.

Methodology

The study team used a comprehensive approach to estimate the expenditures of VPI+ in program year 2017–2018.¹¹ As a first step, the study team collected information from VDOE about the expenditure data that were available from the state for VPI+. The team determined that additional data, such as information on expenditures covered using other local funds, were needed from each division to capture the expenditures incurred in implementing VPI+. The study team then conducted interviews with representatives from each division to determine which types of expenditures were submitted to VDOE for grant reimbursement and which types of expenditures incurred by the division were reported or unreported matching and in-kind expenditures. The study team collected detailed expenditure data for each division specific to (1) VPI+ grant expenditures reported to VDOE for reimbursement, (2) additional local expenditures on the VPI+ program that were counted by the division as part of matching funds, and (3) other expenditures associated with VPI+ program implementation that were not counted as part of the division’s match. Below we provide a description of the participating divisions, followed by a description of the cost categories for the study and the approach to collecting and analyzing the information on expenditures. In addition, we provide a description of idiosyncrasies identified in the expenditure documentation. Lastly, we describe our approach to the benefit-cost analysis (BCA).

Participating Divisions

The 11 participating divisions (composed of both counties and cities in Virginia) varied greatly in size and VPI+ enrollment. Table 1 shows the number of classrooms in public school-based settings and the number of classrooms in private, community-based partner programs for each division and overall. While most of the VPI+ classrooms were located in the division’s

¹¹ The same methodology was used for the VPI+ Cost Study 2018 Interim Report.

public school system, three of the participating divisions (Fairfax, Norfolk, and Richmond) had some VPI+ classrooms operating in local community-based partner programs as well.¹² As part of the grant, Virginia used its PDG funding to expand preschool by increasing the number of preschool slots in “high-need communities.” With the increased number of classroom slots, participating VPI+ divisions each had a target number of slots to recruit for and fill for the school year. Table 1 also shows the target number of VPI+ slots in public settings and private partner program settings and the total enrollment to describe which divisions met their target enrollments, which were under-enrolled, and which exceeded their enrollment. Four of the 11 divisions (Chesterfield, Giles, Petersburg, and Sussex) met their target student enrollment; five did not meet target student enrollment numbers; and the remaining two exceeded enrollment targets.

¹² Data from these classrooms are not specifically included in the cost study, as the study focuses on classrooms in public settings only. This is a result of the variability in how these divisions provide funding to their partner program classrooms. More details are provided in the discussion of expenditure data idiosyncrasies.

Table 1. Number of VPI+ Slots and Classrooms and VPI+ Enrollment in Public and Partner Program Settings in 2017–2018, by Division

Division ^a	Classroom Data			Enrollment Data					Class Size
	VPI+ Classrooms in Public Settings	VPI+ Classrooms in Partner Programs in 2017–2018	Total VPI+ Classrooms	Target Number of VPI+ Slots in Public Settings	VPI+ Enrollment in Public Settings	Target Number of VPI+ Slots in Partner Programs ^c	VPI+ Enrollment in Partner Programs in 2017–2018	Total VPI+ Enrollment	Average VPI+ Classroom Size in Public Settings
Brunswick	2	--	2	36	29	--	--	29	15
Chesterfield	10	--	10	160	160	--	--	160	16
Fairfax	3	2	5	34	51	36	36	87	17
Giles	2	--	2	36	36	--	--	36	18
Henrico ^b	10	--	10	180	177	--	--	177	18
Norfolk	7	1	8	180	97	18	9	106	14
Petersburg	4	--	4	72	72	--	--	72	18
Prince William	12	--	12	208	214	--	--	214	18
Richmond	7	4	11	198	116	72	49	165	17
Sussex	2	--	2	27	27	--	--	27	14
Winchester	6	--	6	108	95	--	--	95	16
Total	65	7	72	1,239	1,074		94	1,168	17

Sources: VDOE provided VPI+ target slot data. Divisions provided data about VPI+ classrooms in public and partner program settings and partner program enrollment. SRI provided data about VPI+ enrollment as of December 2017.

^a Divisions include counties and cities. Norfolk, Petersburg, Richmond, and Winchester are cities, while the remaining divisions are counties.

^b Henrico Public Schools served additional children in blended VPI+ classrooms through Title I, Head Start, and VPI Improved funding. The children in blended classrooms are not included in enrollment counts in this report. More information is in Appendix A.

^cThe target partner program slots were calculated by multiplying the number of partner program classrooms by 18, per guidance from VDOE.

Data Collection and Processing

To capture the expenditures of the VPI+ program, the study team collected three types of expenditure information: (1) VPI+ grant expenditures reported to VDOE for reimbursement, (2) additional local expenditures on the VPI+ program that were counted by the division as part of matching funds, and (3) other expenditures associated with VPI+ program implementation that were not counted as part of the division's match. The study team then coded the expenditures into specific cost categories.

Data Sources

Data on expenditures reported for reimbursement through the VPI+ grant were recorded in the state reimbursement system used by VDOE. Representatives from VDOE provided the study team a data file that included information about every expenditure submitted for reimbursement through the VPI+ grant. The file contained all reimbursement requests submitted by all 11 divisions. The file included information such as division ID, expenditure start and end date, expenditure description, expenditure status, and expenditure amount. For this report, the study team was interested in analyzing the entries pertaining to the 2017–2018 school year. Because of the variability in divisions' school year start and end dates, in addition to summer school programs hosted by some divisions, the team selected a specific date range for expenditure inclusion. The study team determined that the 2018 fiscal year dates would best capture expenditures for the 2017–2018 program year; thus, the team included only expenditures dated between July 1, 2017, and June 30, 2018, in the analysis presented in this report, with the acknowledgement that a few expenditures incurred in the 2017–2018 school year might not be captured if they were outside this date range and that some of the expenditures included in this date range may have pertained to the school years before or after 2017–2018. In addition, team members included only expenditures with a status of "paid" in the

final analysis file. The study team carefully reviewed expenditure entries that met the inclusion criteria and included them in the analysis file.

The study team gathered information on additional local expenditures on the VPI+ program that the division counted as part of its match and other expenditures associated with VPI+ program implementation through interviews with division representatives familiar with VPI+ program expenditures (such as VPI+ coordinators, division finance directors, or division accountants). The format of local division data varied by division and included matching cost reports prepared for VDOE, school division expense documentation (such as food services expense files), external vendor invoices, spreadsheets containing estimated expenditures using calculations performed by division representatives, and email messages containing clarifications or follow-up information. Reported matching and other expenditure data differed from division to division but typically included calculations performed to estimate the amount of effort contributed by school staff and corresponding dollar amounts or calculations performed to estimate the percentage of school-level services attributable to VPI+ (such as bus transportation and maintenance expenditures). Information on local resources and expenditures not reported to VDOE (i.e., expenditures that divisions were not required to report to VDOE as part of their match) typically came from volunteer timesheets or estimates of number of hours donated by professionals providing comprehensive services, such as vision or dental screenings.

The study team also collected information from VDOE about state-level spending on VPI+. Team members reviewed and cleaned the data file provided by VDOE to ensure that entries were included only if they had the appropriate project code (indicating state-level spending for VPI+) and pertained to the 2017–2018 fiscal year. However, state-level spending was not included as part of the calculations for this study and is discussed separately in the “Additional Expenditures for the VPI+ Program” section.

Expenditure Categorization

After collecting the expenditure data, the study team used a coding process to categorize expenditures into specific cost categories. The study team created a list of cost categories for this evaluation, drawing from previous cost studies of preschool initiatives and information about the VPI+ initiative. The list of categories included the types of inputs typically necessary to operate a preschool program. To code the expenditures data, a study team member reviewed each grant reimbursement request, as well as each reported local expenditure on VPI+ that was not reimbursed by the grant, and assigned a cost category to that expenditure. Another team member reviewed the coded data files to ensure that cost categories were applied with consistency. The study team held regular team meetings to ensure that all data coders were applying codes in a similar manner and to discuss any areas of uncertainty or disagreement.

Table 2 outlines the categories used to organize expenditure data collected for the VPI+ cost study.

Table 2. Cost Categories and Descriptions

Cost Category	Description
Salaries and Benefits	Expenditures for labor hours for school/division staff and other adults contributing to the operation of the VPI+ program.
Materials and Supplies	Expenditures for any materials and/or supplies associated with VPI+ (including summer school), regardless of whether used in the classroom or school office.
Transportation	Expenditures for transporting children, including daily busing and field trips. This category may include both personnel and nonpersonnel expenditures (e.g., fuel, vehicle maintenance and repair).
Professional Development	Expenditures for professional development activities for any VPI+ staff, including teachers and coaches (also for summer school where applicable). This category may include payments to trainers and experts, as well as associated expenditures such as travel and lodging.
Indirect Cost	Expenditures <i>paid to the school division</i> by VDOE with the intention of covering costs incurred for common or joint purposes in the operation of VPI+.

Other	Other expenditures associated with the operation of VPI+, including comprehensive services (e.g., dental, vision, and hearing screenings), occupancy costs ¹³ (e.g., lease/rent, building maintenance ¹⁴), professional or internal printing and advertising expenditures, other field trip fees, other local mileage/travel, expenditures associated with QRIS ratings, laundry, cell phone service, interpretation services, family engagement efforts, and summer school expenditures outside of materials and supplies and professional development.
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In all divisions, the salaries and benefits category included labor hours for teaching staff, including lead teachers and instructional assistants, as well as VPI+ support staff, such as VPI+ coordinators and coaches. Expenditures in this category varied by division and included full-time school-level staff as well as those who dedicated some time to VPI+, such as principals, assistant principals, janitorial staff, and nurses. In addition, volunteer hours were also included in this category; they were valued using an hourly rate the division supplied or an hourly rate the study team obtained that corresponded to the type of labor performed.

The materials and supplies category included classroom and office materials and supplies for the VPI+ program. Furniture, technology materials (e.g., iPads and computers), and curriculum purchasing expenditures were also included. The transportation category included daily transportation for children as well as transportation for field trips. The professional development category included all expenditures associated with professional learning opportunities: for example, payments to trainers and experts, conference fees, and associated expenses such as travel, lodging, and materials. The indirect cost category included payments to the school division intended to cover expenditures that were incurred for common or joint purposes. All divisions were assigned an indirect rate based on actual Annual School Report (ASR) data and carry-forward adjustments based on U.S. Department of Education (DOE) rate agreements,¹⁵ but only seven of the 11 divisions elected to claim an indirect rate. These rates

¹³ Occupancy costs were estimated using the Provider Cost of Quality Calculator.

¹⁴ Building maintenance expenditures were always funded through matching and other local sources.

¹⁵ More information regarding indirect rates is available here:
http://doe.virginia.gov/school_finance/budget/index.shtml.

might not have represented total overhead expenditures; actual overhead expenditures might have been higher or lower than what was reported in this category. The other category of costs included a variety of expenditures required to operate the VPI+ program, such as comprehensive services (e.g., dental, vision, and hearing screenings), occupancy costs (e.g., lease/rent, building maintenance), professional or internal printing and advertising expenditures, other field trip fees, other local mileage/travel, expenditures associated with QRIS ratings, cell phone service, language interpretation services, family engagement efforts, and other summer school expenditures not included in materials and supplies or professional development. In addition, expenditures that the team was unable to code into one of the other categories shown in Table 2 were coded into this category.

Although the study team collected data regarding expenditures associated with partner programs and food, these expenditures were not included in the main estimates. Data coded as pertaining to partner programs included payments made to community partner programs operating VPI+ classrooms. We reported partner program expenditures separately from the main expenditure estimates because the study team had concerns that the information for this category might not reflect full expenditure. Divisions paid partner programs a per-child reimbursement for the costs of operating VPI+ classrooms. However, these private programs might have invested additional resources in supporting their VPI+ classrooms that were not captured in the division expenditures for partner programs, so these figures might underestimate the expenditures of VPI+ in partner programs. In addition, partner programs might have benefited from other division resources, such as materials and supplies and professional development, and those expenditures were embedded in the totals for those categories, rather than within the partner programs category. Data coded for the food category included expenditures for meals and snacks for children enrolled in VPI+ (including breakfast, lunch, and snacks), as well as food consumed by children during field trips. Food expenditures

are not included in the main expenditure estimates in this report because of uncertainty about the accuracy of these data.

Expenditure Calculations

Following the collection, review, and coding of expenditure data, the study team assessed the need for adjustments or additional calculations required to monetize inputs. For example, some of the matching documentation included the total expenditures incurred by an entire school or an entire division and required adjustments or proration to accurately reflect expenditures representative of only the VPI+ program. These calculations often involved allocating a prorated share of the total division expenditure based on VPI+ student enrollment as a share of the division enrollment.

In some cases, it was necessary to monetize inputs identified by the division that did not already have a calculated monetary value. For example, some divisions did not have a way to convert volunteer hours into dollar amounts. The study team considered the activities and roles performed by these volunteers and assigned a per-hour rate that corresponded to the type of labor performed (using information from the Bureau of Labor Statistics). The Commonwealth's minimum wage was used as the hourly rate when a more suitable rate was not available; this rate was \$7.25 per hour.¹⁶

Data Management and Calculations

The study team combined all expenditure data sources for each division—including state administrative data on grant reimbursements, matching and other local expenditure data, and any additional expenditures—using Stata statistical analysis software. Once study team members created complete data files for each division, they used Stata to calculate total

¹⁶ The source for this data is <http://www.ncsl.org/research/labor-and-employment/state-minimum-wage-chart.aspx>.

expenditures for the cost categories. Team members then transferred these total expenditures to a cost capture tool they developed in Excel. The cost capture tool can be found in Appendix B. The cost capture tool includes separate tabs for each of the 11 participating divisions and a statewide totals tab that summed data across divisions. The cost capture tool also contains estimated expenditures for each of the cost categories that are broken out by source (i.e., direct VPI+ grant reimbursement, matching funds, and other local funding). Division staff reviewed each division's cost capture tool for accuracy.

Cost Interviews

In spring 2019, the study team members conducted telephone interviews with division representatives who were familiar with their division's 2017–2018 VPI+ expenditure documentation. The goal of the interviews was to determine the accuracy of the calculated 2017–2018 expenditure totals, gauge whether the information gathered reflected the division's VPI+ program expenditures, and to review and provide context to any categorical differences in total expenditures between program years 2016–2017 and 2017–2018.

Prior to each interview, the study team requested and received each division's cost data via email and used these data to complete the cost capture tool. Additionally, for each division, the study team completed a table displaying total and categorical cost differences between program years 2016–2017 and 2017–2018. Following the completion of the capture tool and year-to-year differences table, the tool and table were sent to the division representatives for their review.

During the first half of the call, the interviewer guided participants through the format and contents of the cost tool and asked a general series of questions that were standard for every division (e.g., "How do these ballpark figures look? Do they seem accurate?"). The latter half of the interview consisted of division-specific questions designed to investigate any gaps in the data and any items that needed clarification. Questions might include, for example, "Are the

total dollar amounts we have in our documentation for materials and supplies shared across other preschool classrooms, or are those amounts only for VPI+?” Division representatives were able to provide clarification for some questions, but in some cases, they indicated that they needed to investigate a matter further or gather additional information. In these cases, team members conducted follow-up conversations over telephone and email after the initial interview. The divisions were also asked to review the year-to-year cost differences table and provide any context, if known, to explain any year-to-year cost differences that exceeded \$10,000.

Following each division’s interview(s), the study team organized and reviewed additional expenditure information. The study team completed any necessary expenditure calculations and adjustments and updated the cost capture tool as appropriate. After the interviews, the study team engaged in additional communications with divisions as needed and performed additional checks to ensure that the expenditure data were as complete and accurate as possible. Team members documented areas of uncertainty or missing information.

The team aggregated data across divisions to reflect total expenditures of operating the VPI+ program in 2016–2017 and 2017–2018. The team then divided total VPI+ expenditures by the total VPI+ enrollment in public settings as of December 2016 (2016–2017) and December 2017 (2017–2018) to estimate an overall per-child expenditure across all divisions. The team also disaggregated total VPI+ expenditures by cost category and by division to estimate the per-child expenditures by cost category and by division. Finally, the team examined total VPI+ expenditures by source of funding (VPI+ grant or matching and other local expenditures) to understand how the type of funding was distributed across different cost categories.

Expenditure Data Idiosyncrasies

During data analysis, the study team identified a few idiosyncrasies that may impact interpretation of the results. These are described below.

Shared Resources for VPI+ and VPI Improved Classrooms

Participating divisions were allowed to use VPI+ grant funding for some expenditures associated with improving existing VPI classrooms (referred to as VPI Improved), in addition to the expenditures for operating new VPI+ classrooms. Eight divisions reported using some of their VPI+ grant funds for VPI Improved classrooms in 2017–2018. Therefore, some of the expenditures benefited both VPI+ and VPI Improved classrooms by covering costs related to professional development and comprehensive services, for example. When possible, the study team adjusted any shared expenditures to account only for children enrolled in VPI+ classrooms in that division. However, this was a challenging task and not always possible because divisions did not always maintain detailed information about the share of expenditures that were applicable to VPI+ versus VPI Improved. For example, divisions sometimes held schoolwide trainings that were open to all teachers, regardless of classroom type (VPI+ or VPI Improved); in these instances, it was not possible to determine what percentage of the cost of providing such trainings was attributable only to VPI+. When it was possible to separate shared expenditures to account only for children enrolled in VPI+, team members adjusted both VPI+ grant expenditures and matching or other local expenditures using guidance provided by division representatives. For instance, for some divisions, study team members prorated expenditures using a ratio based on the percentage of classrooms that were VPI+ out of the total number of VPI+ and VPI Improved classrooms. Sometimes division staff also provided percentages based on their calculations for how much of an expenditure was specifically related to VPI+ only.

Indirect Expenditures

Grant funds reimbursed seven divisions for indirect costs at a rate based on actual ASR data and carry-forward adjustments according to U.S. DOE rate agreements. Indirect costs are defined by the U.S. DOE (2009) as “costs that have been incurred for common or joint purposes.

Indirect costs benefit more than one cost objective and cannot be readily identified with a particular final cost objective.” The (seven) divisions claiming an indirect rate were allowed to claim the assigned rate against only the first \$25,000 of any contracted service or subgrant with third-party vendors; therefore, for contracted services that exceeded the \$25,000 limit, indirect costs may not be reflected in the estimates presented in this report. The remaining four divisions did not claim an indirect rate and instead used grant funds for other purposes, such as to purchase materials and supplies for VPI+ classrooms. In an effort to estimate overhead expenditures for the four divisions that did not use the indirect rate, the study team calculated an indirect cost by applying the division’s indirect rate to the division’s total VPI+ expenditures. However, for all divisions, given that the figures reported in the indirect rate category are based on assigned rates, these are only estimates and may not reflect true overhead expenditures. Furthermore, some divisions were able to provide specific information about overhead facilities expenditures (e.g., building leases, insurance, maintenance, and utilities expenditures), and the study team included these expenditures in the other category.

Partner Program Expenditures

As previously described, three divisions (Fairfax, Norfolk, and Richmond) operated VPI+ classrooms in community partner programs in 2017–2018. Each division handled expenditures associated with operating VPI+ classrooms in partner programs differently. However, all divisions reported that they typically made monthly payments in the form of lump sums to their partner programs. In addition to the lump sum payments, divisions indicated that classrooms in the partner programs could receive additional resources, such as food, materials and supplies, participation in field trips, and comprehensive services, that might or might not be reflected in the total expenditures for each of those categories. It was not possible for the study team to confirm that all the expenditures of operating VPI+ in partner programs in those three divisions were accurately captured in the expenditure documentation. Therefore, in the findings section of

this report, we presented total and per-child expenditure estimates without the partner program category expenditures, and we based per-child expenditure estimates on enrollment in public settings only.

Food Expenditures

For both study years, nine divisions indicated that food expenditures are typically paid for by their school division, and the U.S. Department of Agriculture (USDA) later reimburses the school division for some of these expenditures. In these divisions, some leftover food expenditures that were not reimbursed through the USDA are submitted for reimbursement through the VPI+ grant. However, some divisions were not able to document the expenditures incurred by providing food to VPI+ children, and in many cases, divisions that received USDA reimbursement were unable to describe what proportion of total food expenditures were paid using each of these funding sources. Therefore, these data may not always reflect the full expenditures of providing food to children in VPI+, and in many cases the total expenditures for that category may be underreported. In the findings section of this report, total and per-child expenditure estimates are presented without the food category expenditures. Appendix C presents additional information regarding food data available.

Salaries and Benefits Expenditures

Detailed salary information by staff member title/role, name, or both was not available in the grant reimbursement information reviewed by the study team. Some divisions were able to provide more details in their matching and other local expenditure data, and during interviews with divisions, the study team asked for more information about which staff salaries and benefits were reimbursed by the grant. In addition, volunteer labor hours may not have been valued consistently from division to division. Volunteers typically included parents, other family members, or university students who spent time in classrooms engaging in activities with the

children. Only some divisions had a method for valuing volunteer labor hours; therefore, the hourly rates that were applied by division representatives and the calculations performed by the study team may have varied from division to division.

Occupancy Expenditures

The study team did not obtain comprehensive information regarding the expenditures for building space used by VPI+ classrooms. Most VPI+ classrooms were housed in division school buildings that did not carry a cost to the VPI+ program, and the divisions were not charged for use of this space. Divisions reported a variety of occupancy-related expenditures (such as use of space, utilities, janitorial or custodial staff, cleaning supplies, maintenance, school site management, renovation, and operations), but divisions did not report these expenditures consistently. Therefore, we removed occupancy-related expenditures reported by divisions from the main estimates presented in the findings section of this report. Instead, an estimated occupancy cost of \$1,424 per child was applied to all divisions. This estimated occupancy cost accounts only for annual facilities costs and not for any services provided. This estimate was generated using the Provider Cost of Quality Calculator (PCQC)¹⁷ and accounted for expenditures such as rent or lease; utilities; building insurance; and maintenance, repair, and cleaning. Additional information about the actual occupancy-related expenditures reported by divisions is in Appendix D.

Benefit-Cost Analysis (BCA)

BCA is an economic evaluation tool that can be used to determine whether the total value of the array of impacts from an intervention, policy, or program exceeds its up-front cost. Guided by the best practices for high-quality BCA disseminated by the National Academies of Sciences, Engineering, and Medicine (Steuerle & Jackson, 2016), a BCA requires (1) a well-

¹⁷ The PCQC can be accessed here: <https://www.ecequalitycalculator.com/Login.aspx>.

defined intervention with causal evidence of program impacts relative to a baseline or status quo condition; (2) a comprehensive estimate of the cost of the intervention relative to the baseline; (3) valuations of the outcomes of the intervention that reflect the economic value of those outcomes using market prices or, when not available, shadow prices that capture the economic value; and (4) other key assumptions, such as the discount rate that is applied to convert future dollars to their present value.¹⁸ A BCA may be performed retrospectively for a program or intervention that has already been implemented and evaluated, or the BCA may be performed prospectively for a potential future intervention. In the case of the BCA for VPI+, the intervention is the preschool model described earlier as implemented in 2017–2018 in the 11 Virginia school divisions. We perform a retrospective analysis of the estimated economic returns to the program from the societal perspective, meaning the program costs and benefits are measured for society as a whole, inclusive of costs and benefits for participants and nonparticipants, as well as the public sector. As noted earlier, to account for the fact that the benefits are in the future and that future dollars are worth less than present dollars, we apply a discount rate to dollar benefits that occur downstream. We use a 3 percent real discount rate, which is within the range recommended by Steuerle and Jackson (2016).

A BCA compares the present discounted value cost of an intervention with the present discounted value of the outcomes affected by the intervention, where ideally all outcomes are valued in monetary terms (whether favorable or unfavorable). The challenge in the case of early childhood programs, such as the VPI+ intervention, is that the short-term impacts measured are typically indicators of child development, which are not readily valued in monetary terms (Karoly, 2012). Indeed, prior benefit-cost analyses of preschool programs have been based on

¹⁸ The present value of a stream of dollar values to be realized in the future is calculated using a discount rate to convert future dollars into current dollars, recognizing that a dollar in the future is worth less than a dollar today. A typical discount rate for benefit-cost analyses of social programs is in the 3–4 percent range (National Academies of Sciences, Engineering, and Medicine, 2018).

evaluations that measured the impact of the program on other outcomes such as use of special education services, grade retention, and eventually high school graduation rates and later adult outcomes (e.g., involvement with the criminal justice system, adult earnings) (see Karoly, 2012). The BCAs in these cases, such as those mentioned in the introduction, are for early childhood programs with long-term evaluations, typically into adulthood. For this analysis, as discussed next, we follow the method employed as part of the benefit-cost model developed by the Washington State Institute for Public Policy (WSIPP) (2018). A similar approach is adopted by Bartik, Gormley, and Adelstein (2012) in a retrospective BCA of the Oklahoma universal preschool program, also evaluated in terms of its effects on school readiness measures using a regression discontinuity design.

Valuing the Effects of VPI+ on School Readiness

When the outcomes of an intervention cannot be directly monetized (i.e., expressed in a monetary unit such as a market price), one strategy is to link the measure's outcome to another outcome that can be valued in monetary terms such as educational attainment or adult earnings (Steuerle & Jackson, 2016). However, linking early measures of child development or academic achievement to later outcomes requires causal estimates—that is, not just correlations—preferably for the same population that received the intervention (e.g., low-income children). The WSIPP model uses an estimate from the research literature, consistent with multiple longitudinal studies, that a standard deviation change in a test score results in a 9.78 percent increase in earnings.¹⁹

¹⁹ The BCA of the Tulsa, Oklahoma, universal preschool program conducted by Bartik, Belford, Gormley, and Adelstein (2016) uses an alternative estimate, one derived from an experimental evaluation of the Tennessee Class-Size Study (also known as Project STAR for Student-Teacher Achievement Ratio), which provides an estimate of the effect of a percentile change in a kindergarten test score on adult earnings (Chetty et al., 2011). The earnings effect estimated by Bartik, Gormley, and Adelstein (2012) for Oklahoma's preschool program based on Chetty et al. (2011) would have been similar had the researchers instead used the parameter estimate employed by WSIPP (2018).

We apply this estimate to cross-sectional annual earnings data for 2016 and 2017 from the Current Population Survey for individuals in Virginia ages 22 to 66. First, earnings at each age are increased by 9.78 percent. Second, that stream of earnings increases is then discounted to age four using a 3 percent discount rate. The result is an estimate of a \$64,765 gain in present-value lifetime earnings for a change of one standard deviation in an achievement score. This can be viewed as a conservative estimate of the potential benefit to VPI+ participants from improved test scores, as the estimate does not account for the increased value of fringe benefits that would be expected to accompany higher lifetime earnings. In addition, it is a conservative estimate because it assumes that the earnings gain is a constant percentage at each age, whereas findings from longer-term studies of preschool program impacts suggest that the percentage gain in earnings from a higher test score may grow over time (Bartik, Gormley & Adelstein, 2012). As a conservative estimate of the lifetime earnings benefit from a test score improvement, we may be understating the potential benefit-cost ratio.

Computing Net Present-Value Benefits and Benefit-Cost Ratio

The BCA proceeds by using the estimated cross-division average per-child expenditure reported in the next section. The estimates of impact from the regression discontinuity design, measured in effect sizes (or standard deviation units), are multiplied by the estimate of the present-value lifetime earnings gain for a standard deviation change in the test scores.²⁰ The difference between this estimated per-student present-value benefit and the per-student cost is the estimated net present-value benefit per student. The benefit-cost ratio is computed as the ratio of present-value benefits to present-value costs.

²⁰ For example, if VPI+ produced an effect size of 1 (i.e., an increase in the test score of one standard deviation), we would estimate that this would lead to a present-value gain in lifetime earnings of \$64,765. If the effect size was 0.5 (i.e., one-half of a standard deviation increase in the test score), we would estimate that this would lead to a present-value gain in lifetime earnings of \$32,383 (i.e., 0.5 times \$64,765).

Ultimately, this estimate of present-value benefits and the benefit-cost ratio should be viewed as a preliminary and partial estimate of the potential returns from VPI+. The estimate is preliminary because it is based on projecting an observed outcome into the future, which is done with the recognition of the uncertainty that such projections entail. At the same time, the estimate should be viewed as partial. As noted earlier, evaluations of high-quality preschool programs with longer-term follow-up demonstrate favorable effects in other areas of school performance (e.g., grade retention, special education use) and on other outcomes through adolescence and into adulthood. Such potential benefits have not yet been observed for VPI+, and it is not feasible to project all future benefits in those areas, as we do for lifetime earnings. Thus, our estimate is likely to be a lower bound of the potential longer-term return for VPI+ if the program generates favorable effects that are sustained through the school-age years and into adulthood.

Findings

First, we share descriptive findings for 2017–2018 in terms of total expenditures and per-child expenditures. Next, we present year-to-year changes in expenditures across divisions and provide context for these changes.²¹ Lastly, we include the results of a BCA exploring the relationship between 2016–2017 and 2017–2018 expenditures and child outcomes.

Descriptive Analysis of 2017–2018 Expenditures

Below we provide the results of our descriptive analysis of 2017–2018 expenditures. First, we provide estimates of the total and per-child expenditures aggregated across divisions, excluding some categories of expenditures. Next, we present the per-child expenditures by division, highlighting the significant variability in total per-child expenditures and in cost categories. We also provide a summary of the distribution of expenditures across state and local funding sources, followed by additional state- and division-level expenditures on the VPI+ program.

Total and Per-Child Expenditures Across Divisions

Across all participating divisions, VPI+ program expenditures averaged \$16,210 per child from state and local funding sources, an increase from \$16,082 in 2016–2017. More than two-thirds of the expenditures represented salaries and benefits for classroom staff and other school personnel.

Across all 11 divisions included in the study, a total of \$17,409,033 was spent on providing the VPI+ preschool program in public settings in 2017–2018. This amount includes expenditures for salaries and benefits, materials and supplies, professional development,

²¹ For additional detail regarding findings for 2016–2017, please refer to the VPI+ Cost Study 2018 Interim Report.

indirect costs, transportation, and other costs.^{22,23} These total expenditures amounted to \$16,210²⁴ per child (Table 3). These figures include expenditures paid for directly through the VPI+ grant as well as expenditures that were covered through matching and other local resources. However, because of variation in the ways each division reported expenditures, the aggregated per-child expenditures may be less informative than the separate estimates for each division.

Table 3. Total and Per-Child Expenditures and Distribution of Expenditures by Cost Category in the 2017–2018 Academic Year, All Divisions

	Total Expenditures, 2017–2018 (1,000s of \$)	Per-Child Expenditures, 2017–2018 (\$)	Percent Distribution of Spending (%)
Salaries and Benefits	11,825	11,010	68
Transportation	1,422	1,324	8
Materials and Supplies ^a	1,129	1,051	6
Indirect Costs ^b	372	346	2
Professional Development ^a	358	334	2
Other ^{a,c}	2,304	2,145	13
Total^d	17,409	16,210	100

Sources: Expenditure data include state grant reimbursement data and data provided by divisions on matching and other local expenditures.

^a Some of these resources may have been shared with partner programs in the divisions that operated VPI+ classrooms in community programs.

^b Indirect costs were estimated by the study team for Prince William, Giles, Brunswick, and Winchester.

^c Occupancy-related expenditures for all divisions were estimated by the study team using the Provider Cost of Quality (PCQC) tool.

^dThe total per-child expenditures exclude expenditures in the food and partner programs cost categories.

²² The division expenditure data throughout this report exclude the costs of this evaluation, which divisions were required to include in their grant expenditures as part of VPI+ participation but which is not considered a cost of implementing VPI+. Partner program and food expenditures are also excluded as a result of caution about the quality of these data (this exclusion is described in more detail later in this report).

²³ The expenditure data throughout this report use occupancy-related expenditures that were estimated by the study team, rather than those submitted by the division. The study team used the Provider Cost of Quality Calculator (PCQC) tool to estimate occupancy costs for all divisions.

²⁴ The average per-child expenditure directly covered by the VPI+ grant (i.e., without including local matching funds or other local expenditures) in public settings and not including program evaluation, partner programs, or food is \$12,132.

More than two-thirds (68 percent) of expenditures were for salaries and benefits, including salaries and benefits for classroom teaching staff, other dedicated VPI+ staff (e.g., division VPI+ coordinators, coaches, and family engagement coordinators), and school personnel such as guidance counselors and nurses. Salaries and benefits for all positions were prorated based on the amount of time dedicated to VPI+. The substantial investment in salaries and benefits makes sense, as preschool classrooms typically require at least two teaching staff members in the classroom at all times as well as support from administrative and other staff, which makes preschool a labor-intensive program. In addition, the salaries and benefits category included the estimated value of any time donated by volunteers, including family members, university students, and other professionals in the community. This time was included because volunteers might have been performing services that would have otherwise been done by paid staff.

Transportation expenditures made up about 8 percent of total VPI+ expenditures. All divisions provided children with transportation to their VPI+ programs to increase access to preschool for families with limited transportation options. All divisions reported the bulk of transportation expenditures as part of their local match. This category also included transportation expenditures for field trips and other special events.

Materials and supplies made up about 6 percent of total expenditures. Divisions varied in terms of what kinds of materials and supplies they purchased for the VPI+ program. Most divisions purchased classroom supplies, such as bulletin boards, art paper, markers, paints, and books, but some divisions made large purchases such as classroom furniture, curricular materials and licenses, tablets, and software. This category does not include the expenditures associated with existing materials and supplies (such as classroom furniture or books) that were already in place before the fiscal year began and, thus, did not need to be purchased. Additionally, while most start-up expenditures for participating divisions took place in the first year of the initiative (2015–2016), some divisions added new classrooms in the 2017–2018

academic year, and some of those start-up expenditures are likely reflected in these estimates.²⁵

The indirect costs category made up about 2 percent of total spending. The indirect rate was based on actual Annual School Report (ASR) data and carry-forward adjustments based on U.S. DOE rate agreements. These funds were intended to reimburse divisions for expenditures incurred for common or joint purposes, such as overhead expenditures in the operation of the VPI+ initiative. The figures presented here reflect division-reported indirect expenditures for seven divisions. Four divisions did not submit grant reimbursement requests for indirect costs, so the study team calculated estimated indirect expenditures by multiplying each division's total grant reimbursement by the indirect rate.

Professional development made up about 2 percent of total spending. Expenditures in this category were relatively low, but they largely represent professional development expenditures associated with the VPI+ program, such as trainings on the Teaching Strategies GOLD® assessment system, attending meetings held by CASTL, and conferences for coaches and teachers. In most divisions, the matching and other local expenditure data did not include any professional development expenditures. Generally, the professional development expenditures are lower than the study team expected. It is possible that VPI+ classroom staff and other school personnel participated in some other professional development offered by the division that is not captured in these estimates. Furthermore, some costs of providing professional development opportunities may have been coded under the other category when the expenditure was not clearly described in the documentation.

²⁵ The evaluation did not examine cost data from the first year of the initiative, 2015–2016, because the study team expected that expenditures from the second (2016–2017) and third (2017–2018) years would be more stable and reflective of normal program operation. The study team attempted to exclude any costs associated with opening new classrooms but were only able to remove large start-up costs coded under the “8000” code (capital equipment) per guidance from VDOE. In other cases, large one-time costs were harder to discern in the data, and so these costs remained as part of the total. Ideally all such costs would be considered separately from the ongoing cost of materials and supplies needed to maintain the program.

The other cost category made up about 13 percent of total spending. This category included a number of different types of expenditures, such as comprehensive services, family engagement efforts, printing and advertising, local travel, and cell phone services for VPI+ leadership staff. This category also included occupancy expenditures that the cost study team estimated using the Provider Cost of Quality (PCQC) tool.

The per-child expenditure estimates in Table 3 exclude expenditures in the food category. The study team had concerns that the expenditures reported by the divisions for food might not reflect the full cost of providing meals to children in VPI+. Most divisions indicated that the USDA reimbursed part of their food expenditures and the remaining food expenditures were paid for by their local school division or reimbursed through the VPI+ grant. However, most divisions were unable to provide information about their total food expenditures and the proportion of the expenditures covered by each source. Additional information about food expenditures is in Appendix C.

The per-child expenditure estimates in Table 3 also exclude partner programs to the extent possible (three of the divisions had partner programs). Divisions had data only on total payments to partner programs to reimburse them for VPI+ services through the grant, and no data were available on additional expenditures or resources used by the partner programs for the VPI+ program.²⁶ Including the partner program category would lead to inaccurate per-child expenditure estimates in the three divisions with partner programs. Therefore, we excluded the expenditures reimbursed to partner programs, as well as the enrollment in those settings, from the cost calculations. However, divisions may have shared resources with partner programs for some cost categories, such as professional development and materials and supplies, so

²⁶ The participating divisions varied in the amount of per-child grant dollars they spent on operating VPI+ classrooms in partner programs: Fairfax spent \$14,940 per child; Richmond spent \$10,463 per child; and Norfolk spent \$5,386 per child. However, no information is available on additional contributions from the partner programs or the total cost per child.

expenditures in these cost categories may be overestimated in these divisions, and the study team did not have the information necessary to prorate these expenditures.

Expenditures related to the program evaluation are also excluded from the study. The decision to exclude this category was made because the program evaluation expenditures are not necessarily reflective of the costs associated with operating a program like VPI+. Overall, a total of \$1,259,914 was sent on program evaluation in 2017–2018.

Per-Child Expenditures by Division

VPI+ per-child expenditures varied by division, ranging from \$12,036 to \$21,663, but this variation is impacted by differences in the extent to which divisions achieved full enrollment. Generally, divisions that achieved full enrollment had lower per-child expenditures. Differences across divisions may also have been affected by which specific expenditures were documented and included in the division’s grant reimbursement requests and local expenditure data. Significant variation in spending by division occurred in the salaries and benefits, materials and supplies, and transportation categories.

When looking individually at each of the 11 participating divisions, there was a large amount of variability in per-child expenditures. Table 4 presents the per-child expenditures in each division in 2017–2018, in total and by cost category, excluding food and partner program expenditures.²⁷ The table is organized from highest to lowest per-child expenditures. Brunswick (\$21,663) and Richmond (\$19,867) had the highest total per-child expenditures, which were considerably higher than in other divisions. The high per-child expenditures for both divisions seem to be driven by lower-than-expected enrollment rates (as described below and in Table 5).

²⁷ Table D12 in Appendix D contains per-child expenditures for the VPI+ grant only (exclusive of local matching funds) by category and by division. These figures do not include any local match or in-kind data and provide per-child expenditures based purely on grant reimbursement for additional context.

Petersburg (\$12,632) and Giles (\$12,036) had the lowest total per-child expenditures.

Expenditures in other divisions ranged from about \$13,000 to \$16,000 per child.

Table 4 also provides data on potential cost drivers that may help to explain additional variation in per-child expenditures by division. Cost drivers include VPI+ enrollment in public settings, starting K–12 teacher salary in 2017–2018, average teacher salary in 2017–2018, total division pre-K enrollment in 2017–2018, and whether VPI+ summer school was provided.²⁸

Each division's enrollment is also shown as a percentage of target enrollment and a percentage of full enrollment. These percentages provide more detail regarding the extent to which divisions met enrollment goals, which could impact per-child spending. We discuss the impact of enrollment on per-child expenditures further below. The starting and average K–12 teacher salaries in the 2017–2018 school year are potential cost drivers that may impact the salaries and benefits category in particular. While the starting K–12 teacher salary presented in the table is not necessarily reflective of the compensation rates for VPI+ teachers, variations in division starting and average teacher salaries could have resulted from factors such as location, proximity to urban centers, or division size, and could be an indicator of the cost of living in these areas. Total pre-K enrollment provides information about the scale and size of the entire pre-K program in each division. Provision of summer school may have increased the amount spent on salaries and benefits and materials and supplies as a result of the longer program year.

Table 4 also includes the composite index of local ability to pay provided by VDOE, which is used to allocate state funding for K–12 education. The index of local ability to pay is calculated using three indicators of a locality's ability to pay: (1) true value of real property (weighted 50 percent), (2) adjusted gross income (weighted 40 percent), and (3) taxable retail

²⁸ An important component of a high-quality preschool program is the provision of wraparound, extended, yearlong services. Most VPI+ divisions provided these extended summer services to children, and, as a result, expenditures in several categories, such as materials and supplies, were higher.

sales (weighted 10 percent). The index measures the ability of each division to raise funds to cover the cost of education. For instance, a division with low property values, low income, and low retail sales has a lower tax base from which to raise revenue to pay for K–12 education costs. Those divisions would have a larger share of their education costs paid for by the state relative to a wealthy division, which could afford to raise more funds. Consequently, we would expect that divisions with low composite indices would have higher per-child expenditures. This is evident for Brunswick, which has among the lowest indices (0.281) and the highest per-child expenditure.

Table 4. Per-Child Expenditures by Cost Category in the 2017–2018 Academic Year and Potential Cost Drivers, by Division

Expenditures Per Child, 2017–2018, From Highest to Lowest Per-Child Expenditures											
Category	Brunswick	Richmond	Fairfax	Prince William	Norfolk	Sussex	Henrico	Chesterfield	Winchester	Petersburg	Giles
Salaries and Benefits	10,950	13,461	13,442	11,399	11,298	12,357	9,673	10,355	11,041	9,600	7,843
<i>Salaries and Benefits, Teaching and Administrative Staff</i>	7,410	11,074	11,486	10,251	10,869	9,525	9,559	9,678	9,652	8,918	7,756
<i>Salaries and Benefits, Other Staff</i>	3,539	2,388	1,956	1,148	429	2,832	114	677	1,388	682	87
Materials and Supplies ^a	3,537	1,523	1,078	710	1,080	424	1,719	886	379	171	882
Professional Development	769	185	957	297	182	92	640	117	89	515	121
Indirect Costs ^b	141	148	234	733	459	310	195	210	409	259	85
Transportation	3,804	946	699	3,128	1,469	1,530	902	584	109	459	453
Other ^c	2,462	3,603	2,602	1,762	2,254	1,548	2,425	1,567	1,596	1,627	2,652
Total ^d	21,663	19,867	19,013	18,028	16,743	16,260	15,555	13,720	13,622	12,632	12,036
Cost Drivers											
Enrollment (N)	29	116	51	214	97	27	177	160	95	72	36
<i>% of Target Enrollment^e</i>	81%	59%	150%	103%	54%	100%	98%	100%	88%	100%	100%
<i>% of Full Enrollment^f</i>	81%	92%	94%	99%	77%	75%	98%	89%	88%	100%	100%
Starting Teacher Salary (\$)	39,011	44,525	48,012	47,724	43,622	41,350	44,660	44,037	41,400	43,531	35,000
Average Teacher Salary (\$)	40,655	49,079	68,883	65,902	50,235	50,720	50,743	48,696	55,152	46,387	42,168
Total Pre-K Enrollment (N)	51	1,626	3,973	1,455	1,929	42	1,104	745	159	390	84
VPI+ Summer School Provided	Yes	Yes		Yes			Yes		Yes	Yes	
Partner Program (% of Enrollment)	--	30	41	--	8	--	--	--	--	--	--

Composite Index of Local Ability to Pay

Final 2016–2018 Composite Index	0.281	0.476	0.684	0.385	0.299	0.348	0.416	0.351	0.433	0.237	0.274
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Sources: Expenditure data include state grant reimbursement data and data provided by divisions on matching and other local expenditures. Starting teacher salary data were collected from http://www.doe.virginia.gov/teaching/workforce_data/salaries/2017-2018-salary-report.pdf. Total pre-K enrollment data were collected from <http://schoolquality.virginia.gov/> and reflect the number of pre-K students counted in membership by the school, school division, or state. VPI+ summer school and VPI+ enrollment data were provided by divisions. Data for local ability to pay were collected from http://www.doe.virginia.gov/school_finance/budget/compositeindex_local_abilitypay/.

^a Some of these resources may have been shared with partner programs in the divisions that operated VPI+ classrooms in community programs.

^b Indirect costs were estimated by the study team for Prince William, Giles, Brunswick, and Winchester.

^c Occupancy-related expenditures for all divisions were estimated by the study team using the Provider Cost of Quality (PCQC) tool.

^d The total per-child expenditures exclude expenditures in the food and partner program cost categories.

^e The percentage of target enrollment was calculated by dividing the actual enrollment by the division's target enrollment (target, set by the division, was not always 18 children).

^f The percentage of full enrollment was calculated by dividing the actual enrollment by the division's full enrollment (if every classroom had 18 children enrolled).

Two important factors that may help explain higher per-child expenditures in some divisions is the difference between actual division enrollment and target enrollment numbers. Each division had a set target enrollment number and presumably prepared to enroll the target number of children and fill all of its newly opened VPI+ classrooms and slots. In preparing for the school year, divisions likely invested a higher portion of their funds in fixed expenses, such as hiring teachers and assistants to serve the anticipated number of children (and therefore also had to provide professional development opportunities to these classroom staff members) and purchasing furniture, curricular materials, and other supplies for these new classrooms. The divisions with classrooms in which target enrollment numbers were not met had higher per-child expenditures because the total expenditures were spread across a smaller number of children. Table 5 illustrates the impact of these higher classroom costs in some divisions that did not meet their target enrollment rates.²⁹ If the target number of slots had been filled in each division, the projected per-child expenditure would be \$14,051, compared with the actual per-child expenditure of \$16,210 with reported enrollment. The per-child estimate for Brunswick, one of the divisions with the highest estimated per-child expenditures, would be reduced from \$21,663 to \$17,451 with full target enrollment. Interestingly, Prince William and Fairfax had enrollments that were higher than expected. Prince William's target was 208 versus an actual enrollment of 214. Fairfax had a target enrollment of 34 versus an actual enrollment of 51. For both divisions, the actual per-child expenditure was lower than expected because of the higher enrollments.

²⁹ The calculations presented here assume that there would be no additional expenditures in moving from actual enrollment to target enrollment. In reality, not all costs are fixed, and there would be some additional expenditures, such as additional food for children and additional costs in a few other categories. However, expenditures such as staff salaries and benefits, occupancy costs, transportation, and indirect costs would be considered "sunk costs" and would likely not change. Furthermore, since the estimates presented here do not include food expenditures, this analysis is likely accurate.

Table 5. Estimated Per-Child Expenditures If Divisions Had Target or Full Enrollment in 2017–2018, by Division

Projected or Estimated Expenditures with Target or Full Enrollment in 2017–2018 ^{a,b,c,d}							
Division	Total Expenditures (\$)	Target Number of VPI+ Slots in Public Settings	Projected Per-Child Expenditures with Target Slots (\$)	Potential (Full) Enrollment in Public Settings	Projected Per-Child Expenditures with Potential (Full) Enrollment (\$)	Actual Enrollment in Public Settings	Actual Per-Child Expenditures (\$)
Brunswick	628,232	36	17,451	36	17,451	29	21,663
Chesterfield	2,195,264	160	13,720	180	12,196	160	13,720
Fairfax	969,659	34	28,519	54	17,957	51	19,013
Giles	433,298	36	12,036	36	12,036	36	12,036
Henrico	2,753,218	180	15,296	180	15,296	177	15,555
Norfolk	1,624,043	180	9,022	126	12,889	97	16,743
Petersburg	909,532	72	12,632	72	12,632	72	12,632
Prince William	3,858,095	208	18,549	216	17,862	214	18,028
Richmond	2,304,586	198	11,639	126	18,290	116	19,867
Sussex	439,033	27	16,260	36	12,195	27	16,260
Winchester	1,294,075	108	11,982	108	11,982	95	13,622
All Divisions	17,409,033	1,239	14,051	1,170	14,880	1,074	16,210

Sources: Expenditure data include state grant reimbursement data and data provided by divisions on matching and other local expenditures.

^a The total per-child expenditures exclude expenditures in the food and partner programs cost categories.

^b Indirect costs were estimated by the study team for Prince William, Giles, Brunswick, and Winchester.

^c Occupancy-related expenditures for all divisions were estimated by the study team using the Provider Cost of Quality (PCQC) tool.

^d Full enrollment was calculated by multiplying the number of classrooms in public settings by 18, which is the maximum class size for VPI+.

Classroom size may also explain why divisions vary in terms of per-child expenditures. Theoretically, divisions would develop target enrollment goals assuming that classrooms would be full, with 18 children per classroom. Chesterfield, Fairfax, Prince William, and Sussex, however, developed target enrollments that assumed fewer than 18 children per classroom, as seen in Table 1. Of these divisions, Fairfax and Prince William had among the highest per-child expenditures. Interestingly, Chesterfield had among the lowest per-child expenditures, which may be the result of other factors that mitigated expenditures in this division. In terms of average classroom size, Brunswick, Norfolk, and Sussex had the lowest averages: 15, 14, and 14, respectively. These divisions had fairly high total per-child expenditures, ranging from \$16,260 to \$21,663, and Brunswick had the highest total per-child expenditure of all divisions. These patterns suggest that classroom size (including planning for classroom size) may help explain the variability in per-child expenditures, although there may be other factors as well.

Across divisions, as shown in Table 4, the salaries and benefits category was consistently the top per-child spending category, but a lot of variability occurred between divisions in this category. The per-child expenditures for salaries and benefits ranged from \$7,843 (Giles) to \$13,461 (Richmond). The average starting teacher salary was the lowest in the division with the lowest per-child spending on salaries and benefits, Giles. Fairfax, which had the highest starting teacher salary, had among the highest spending on salaries and benefits. Urbanity may also be an important consideration for interpreting the variations across divisions. For example, Giles is a small, rural division located in the western region of the Commonwealth, without close proximity to any major metropolitan areas, so the lower salaries and spending in this category may be partly explained by geographic factors.³⁰

³⁰ Additionally, Table 4 shows salaries and benefits broken out by expenditures for teaching and administrative staff reimbursed through the grant, and for other staff covered through local funds. For more information regarding the expenditures and roles included in the other staff category, see Table D2 in Appendix D.

Per-child spending on materials and supplies also varied widely. Expenditures ranged from \$171 per child (Petersburg) at the low end to \$3,537 per child (Brunswick) at the high end. Variation in this category is likely driven by division-specific needs for higher-cost long-term investments versus lower-cost, more consumable investments. Higher-cost long-term investments include items like software subscriptions and curriculum kits, while lower-cost items include basic classroom supplies like paper and pencils. Brunswick, the division with the highest per-child expenditures on materials and supplies, reported that in 2017–2018 it invested additional dollars in various classroom materials and supplies following recommendations from the division’s QRIS rating from the state, including items like new learning centers and tablets. Petersburg, at the lowest end of the range in this category, did not invest in as many high-cost materials; instead, the division’s expenditures in this category primarily included consumables and any classroom materials that needed to be replaced.

Expenditures for providing transportation to children in the VPI+ program also varied and ranged from \$109 per child (Winchester) to \$3,804 per child (Brunswick). This cost category included expenditures for providing daily bus transportation to and from school and other transportation expenditures for children, such as field trips. Variation in this category may result from differences in how divisions chose to provide transportation to students and other costs related to transportation, such as maintenance of buses.

Spending in the professional development category was fairly low across divisions, ranging from \$89 (Winchester) to \$957 (Fairfax) per child. In this category, divisions included registration, travel, and lodging expenditures associated with attending conferences, such as the National Association for the Education of Young Children Professional Learning Institute and the Virginia Head Start Association annual conference. Fairfax was the division that invested most heavily in this area, spending about \$957 per child. In Fairfax, staff and coaches participated in a number of trainings that carried higher costs (more than \$1,000), such as

professional development for the Early Childhood Environmental Rating Scale and a Pre-K CLASS feedback session.

Expenditures in the indirect costs category ranged from \$85 (Giles) to \$733 (Prince William) per child. The differences in indirect costs reflect differences in each division's indirect rates with the state. The expenditures may also reflect differences in grant budgets to which the indirect rate was applied as well as a variation in the number and size of third-party contracts (because of a set limit that did not allow divisions to apply the indirect formula to contracts for contracted services greater than \$25,000). Furthermore, the study team estimated indirect costs for four divisions that did not claim an indirect rate.

There was variation by division in expenditures in the other cost category and also in the types of costs they reported in this category. Expenditures in the other category ranged from \$1,548 to \$3,603. Giles and Richmond were at the very top of the range, spending \$2,652 and \$3,603 per child, respectively. For Giles, this might have been in part the result of the division having to pay for more expensive items such as swim lessons, an audiometer, and web design for a web page that provides local families with information specifically regarding the Giles program. Chesterfield and Sussex were at the low end of the range, spending around \$1,600 per child. Expenditures in this category included comprehensive services (such as vision and hearing screenings); printing; cell phone service for VPI+ leadership who move between facilities; family engagement efforts; and occupancy costs estimated by the study team, such as rent or lease, utilities, building insurance, maintenance, repair, and cleaning. Expenditures that could not be coded into any of the other cost categories or whose descriptions were ambiguous were also included in the other category (Appendix D, Tables D4–D11). It is difficult to identify the causes of variation in the other category because it includes many types of expenditures that differ by division. It is possible that divisions with high expenditures in the other category submitted more comprehensive data on all expenditures associated with the VPI+ program, or

these divisions may have submitted less detailed descriptions of their expenditures leading to more expenditures being coded into the other category.

Appendix D includes a series of tables (Tables D4–D11) with detailed information regarding data sources for each cost category by division, either via the grant reimbursement or local match documentation. The tables also describe additional steps—for example, if the study team needed to add data, obtain additional estimates, or perform calculations to ensure the data accurately reflected each division’s expenditures. This contextual information may provide additional insight into variation in division expenditures on the VPI+ program by category and in total.

As shown in Table 6, the percentage distribution of expenditures across categories reveals variability in how divisions spent funds, particularly in the categories of salaries and benefits and other costs. The highest amount of variation in percentage distribution of expenditures for the VPI+ program was in the salaries and benefits category. Brunswick reported spending the lowest percentage of funds in this area, perhaps because Brunswick had among the lowest starting teacher salaries in 2017–2018. Winchester reported the highest percentage spent in this category, perhaps because Winchester had among the highest average teacher salaries in 2017–2018. Winchester staff also shared that they implemented a cost of living increase and an additional competitive salary increase in order to attract and retain teachers. Chesterfield, Sussex, and Petersburg also reported relatively high percentage spending in this category, over 70 percent. Spending on salaries and benefits in Chesterfield may have been particularly high because in addition to funding positions common in other divisions—such as classroom teaching staff, a VPI+ coordinator, a family engagement coordinator, office support staff, and instructional coaches—Chesterfield invested in additional professional services, such as translators and interpreters, as well as personnel to help with registration events. Chesterfield also offered stipends for teachers who completed home visits. Sussex reported that most of these funds were used to pay salaries and benefits for the VPI+

coordinator, instructors, and paraprofessionals through direct grant reimbursement, and a smaller portion was claimed as part of local matching funds and used to fund time for other school staff, including the principal and assistant principal; secretary; guidance counselor; and kitchen, custodial, and maintenance staff. Similarly, Petersburg reported that most of the salaries and benefits expenditures covered the VPI+ coordinator, teachers, assistants, and substitutes through grant reimbursement. This division also reported that the grant covered the coach, family engagement specialist, interpreter, bus monitors, and bus drivers. Petersburg also covered some costs related to retirement and disability through local match.

There was also quite a bit of variation in percentage distribution of expenditures in the other category. This variation is to be expected, as divisions differed greatly in terms of what was included in this category. In addition, many of the expenditures included in this category involved donated goods or services (e.g., comprehensive services, books, etc.) and were likely documented and/or monetized in different ways by divisions. Sussex and Prince William had the lowest spending in this category (both 10 percent), as most of the expenditures contained under this category consisted of small print jobs, cell phone service for VPI+ leadership, local travel expenditures for family service specialists, and reimbursement for parent travel to advisory council meetings.

Table 6. Percentage Distribution of Expenditures by Cost Category in the 2017–2018 Academic Year, by Division

Category	Percentage of Expenditures in Each Cost Category (%)											
	All Divisions	Brunswick	Prince William	Sussex	Henrico	Norfolk	Richmond	Chesterfield	Winchester	Petersburg	Giles	Fairfax
Salaries and Benefits	68%	51%	63%	76%	62%	67%	68%	75%	81%	76%	65%	71%
Materials and Supplies ^a	6%	16%	4%	3%	11%	6%	8%	6%	3%	1%	7%	6%
Professional Development ^a	2%	4%	2%	1%	4%	1%	1%	1%	1%	4%	1%	5%
Indirect Costs ^b	2%	1%	4%	2%	1%	3%	1%	2%	3%	2%	1%	1%
Transportation	8%	18%	17%	9%	6%	9%	5%	4%	1%	4%	4%	4%
Other ^{a,c}	13%	11%	10%	10%	16%	13%	18%	11%	12%	13%	22%	14%
Total ^d	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Sources: Expenditure data include state grant reimbursement data and data provided by divisions on matching and other local expenditures.

^a Some of these resources may have been shared with partner programs in the divisions that operated VPI+ classrooms in community programs.

^b Indirect costs were estimated by the study team for Prince William, Giles, Brunswick, and Winchester.

^c Occupancy-related expenditures for all divisions were estimated by the study team using the Provider Cost of Quality (PCQC) tool.

^d The total per-child expenditures exclude expenditures in the food and partner programs cost categories.

Sources of Funding for the VPI+ Program

The VPI+ grant directly covered the majority of total VPI+ expenditures and the majority of most cost categories, with the exception of expenditures in the categories of transportation and other expenditures.

Seventy-five percent of VPI+ expenditures were covered by the grant. Of the \$17,409,033 spent by divisions on VPI+ in 2017–2018, \$13,038,049 was reimbursed through the VPI+ grant, and \$4,370,984 was contributed by local funds.³¹ As shown in Table 7, VPI+ grant funds almost entirely supported salaries and benefits (90 percent) and professional development (98 percent) expenditures. For professional development this is likely because divisions generally reported only professional development expenditures associated with VPI+ staff. It is possible that VPI+ teachers participated in additional school- or division-provided professional development opportunities that were not captured in the expenditure data submitted for this study. For salaries and benefits, this is likely the result of the goals of the program, which required full-day programming provided by licensed and credentialed teachers, as well as salary parity, which likely impacted compensation.³²

³¹ For the purposes of this report, we combined the match and other local sources to form a matching and other local source category, with the goal of simplifying comparisons against expenditures covered directly by the VPI+ grant.

³² The source for this statement is here: <http://www.doe.virginia.gov/early-childhood/preschool/vpiplus/index.shtml>.

Table 7. VPI+ Grant, Matching and Other Local Funds, and Total Spending for All Divisions in the 2017–2018 Academic Year

Category	VPI+ Grant (%)	Matching and Other Local Funds (%)	Total Spending (1000s of \$)
Salaries and Benefits	90	10	11,825
Transportation	27	73	1,422
Materials and Supplies ^a	75	25	1,129
Indirect Costs ^b	95	5	372
Professional Development ^a	98	2	358
Other ^{a,c}	19	81	2,304
Total^d	75	25	17,409

Sources: Expenditure data include state grant reimbursement data and data provided by divisions on matching and other local expenditures.

^a Some of these resources may have been shared with partner programs in the divisions that operated VPI+ classrooms in community programs.

^b Indirect costs were estimated by the study team for Prince William, Giles, Brunswick, and Winchester.

^c Occupancy-related expenditures for all divisions were estimated by the study team using the Provider Cost of Quality (PCQC) tool.

^d The total per-child expenditures exclude expenditures in the food and partner program cost categories.

Divisions funded most of their transportation expenditures through matching funds and other local efforts (76 percent). Transportation expenditures included both daily busing to and from school and transportation for field trips. VPI+ children benefited from transportation structures that were already in place in their local school division, as they rode buses to and from school with the rest of the pre-K or older school population.³³ A substantial portion (81 percent) of other expenditures were also funded through matching and other local funds. Expenditures included in this category were facilities expenditures (e.g., building leases,

³³ Transportation reimbursement to and from school could be submitted for grant reimbursement as long as the cost was supplemental to existing transportation requirements and was attributed to VPI+ eligible children. Most divisions cited any supplemental transportation costs as part of their local match.

insurance, maintenance, and utilities); comprehensive services, such as vision, hearing, and dental screenings; local travel expenditures for VPI+ staff (when the purpose of the travel was not attributable to categories such as professional development); and family engagement efforts, among other more minor expenditures.

Additional Expenditures for the VPI+ Program

The state and the divisions made additional investments to support implementation of the VPI+ program as required by the federal grant. The following are not expenditures of operating the program at the local level, but rather additional expenditures incurred at both the state and division level to support this new initiative.

State-level expenditures for the VPI+ program in the 2017–2018 academic year totaled about \$852,948, or about \$794 per child, according to data provided by VDOE³⁴. Expenditures in this figure include a grant awarded to CASTL to provide coaching, professional development, and technical assistance to the VPI+ divisions. This figure also includes a proportion of the salaries and benefits for state-level staff that supported the VPI+ program, expenditures for training and travel costs for state-level staff, and office supplies. This figure does not reflect any expenditures that divisions reported in grant reimbursement requests in matching and other local funding documentation. In addition, each division was required to dedicate some grant funds to supporting the cost of this VPI+ program evaluation, which included the formative and summative evaluation and the cost study. Division expenditures on program evaluation totaled \$1,259,914, or about \$1,173 per child, in addition to the state-level expenditures described above.

³⁴ During the 2017-2018 academic year, a supplemental VPI+ award was received starting January 2018. Through June 2018, \$48,973.80 of the supplemental award was expensed; however, it was not reported as part of the state-level expenditure, since it was not typical of the VPI+ program.

*Overview of Year-to-Year Differences*³⁵

This section of the report includes descriptive analysis of year-to-year changes in expenditures. First, we provide an overview of differences in the total and per-child expenditures across divisions, along with context for these differences that was provided by division staff during their spring 2019 interviews with the cost study team. Next, we present year-to-year differences in per-child expenditures by division, highlighting large differences between the two years. We also provide a summary of changes in program size, enrollment, and classroom size that may provide further context for differences between the two years.

Total Year-to-Year Differences Across Divisions

Across all participating divisions, VPI+ program expenditures decreased by \$618,498 between 2016–2017 and 2017–2018. Overall per-child expenditures increased by \$128. Division staff provided context for these changes, including factors such as increased or decreased spending on one-time investments and more intentional spending for specific categories.

Across all 11 divisions included in the study, the total expenditures for the VPI+ preschool program in public settings decreased by \$618,498 between 2016–2017 and 2017–2018, excluding expenditures in the food and program partner cost categories (Table 8), from \$18,027,532 to \$17,409,033. The year-to-year difference in total per-child expenditures amounted to \$128 (Table 8), from \$16,082 per child to \$16,210 per child. The materials and supplies category saw the largest change from year to year: a decrease of \$453,604 (\$361 per child). Generally, divisions described spending less on big long-term expenses, which may account for this decrease. More details regarding changes in the materials and supplies category are provided later in this report. These figures include expenditures paid for directly

³⁵ For additional detail regarding findings for 2016–2017, please refer to the VPI+ Cost Study 2018 Interim Report.

through the VPI+ grant as well as expenditures that were covered through matching and other local resources.

Table 8. Differences in Total and Per-Child Expenditures by Cost Category Between 2016–2017 and 2017–2018

Overall Total and Per-Child Year-to-Year Differences						
Categories	2016–2017 Expenditure	2017–2018 Expenditure	Difference	2016–2017 Per-Child Expenditure	2017–2018 Per-Child Expenditure	Difference
Salaries and Benefits	11,498,752	11,824,817	326,066	10,258	11,010	752
Materials and Supplies	1,582,305	1,128,701	(453,604)	1,412	1,051	(361)
Professional Development	508,328	358,230	(150,099)	453	334	(120)
Indirect Costs	339,722	371,711	31,989	303	346	43
Transportation	1,436,920	1,421,725	(15,195)	1,282	1,324	42
Other	2,661,505	2,303,849	(357,656)	2,374	2,145	(229)
Total	18,027,532	17,409,033	(618,498)	16,082	16,210	128

Per division, the year-to-year differences varied greatly. Brunswick, Chesterfield, Fairfax, Henrico, Prince William, Sussex, and Winchester saw increases in total expenditures. The smallest increase in total expenditure was a change of \$5,518 in Sussex, and the largest increase was a change of \$494,604 in Prince William. Giles, Norfolk, Richmond, and Petersburg saw decreases in total expenditures. The smallest decrease in total expenditure was a change of \$51,379 in Giles, and the largest decrease was a change of \$1,045,692 in Norfolk. Year-to-year differences also varied across divisions for the individual categories. Table D13 in Appendix D illustrates the differences for each division by category.

Per-Child Year-to-Year Differences in Expenditures by Division

The total year-to-year differences in VPI+ per-child expenditures varied by division.

Seven divisions saw increased per-child expenditures ranging from \$696 to \$7,246. Four divisions saw decreases in expenditures ranging from \$1,080 to \$11,923. Differences in per-child expenditures may be partly explained by changes in program size and enrollment in some divisions. ³⁶

Of the divisions with increased total per-child expenditures, Fairfax had the smallest increase (\$696; 4 percent change) and Brunswick had the largest increase (\$7,246; 34 percent change). Of divisions with decreased total per-child expenditures, Sussex had the smallest decrease (\$1,080; -7 percent change) and Petersburg had the largest decrease (\$11,923; -94 percent change). In terms of percent change, the divisions with increased total per-child expenditures saw changes that were smaller in magnitude than divisions with decreased expenditures.

In the salaries and benefits category, Brunswick, Winchester, Giles, Chesterfield, Prince William, Henrico, and Norfolk saw increases in per-child expenditures ranging from \$3,013 (Brunswick) to \$713 (Henrico). Brunswick staff cited salary raises for many staff members, including teachers, paraprofessionals, clerical staff, and the coach, which could account for the increase. Other divisions cited raises and increases in benefits as factors as well. Staff from Prince William specifically noted that they opened additional classrooms, which required funding for additional staff. Sussex, Petersburg, Richmond, and Fairfax saw decreases in per-child expenditures ranging from \$293 (Richmond) to \$3,850 (Petersburg). Fairfax staff noted that two staff members were on maternity leave during the 2017–2018 year, which could have impacted

³⁶ In response to lower-than-expected student enrollment rates, VDOE reduced and redistributed grant funds for Year 3 of the initiative. As a result of the redistribution of funds, two divisions (Frederick and Virginia Beach) were able to begin offering VPI+ classrooms. However, these two additional divisions were not included in the evaluation.

salaries and benefits spending. Other divisions cited a decrease in classroom and classroom staff as the main factor for the reduction in spending.

For materials and supplies, Winchester, Chesterfield, Norfolk, Brunswick, and Fairfax saw increases in per-child expenditures ranging from \$122 (Winchester) to \$909 (Brunswick). Brunswick staff shared that additional materials were purchased following feedback from the division's QRIS evaluation, which could explain the increase. Other divisions also purchased additional materials. For example, staff from Winchester shared that they made the decision to buy a few additional materials that they had been waiting to purchase in previous years. Henrico, Sussex, Prince William, Richmond, Giles, and Petersburg saw decreases in per-child expenditures ranging from \$12 (Henrico) to \$4,621 (Petersburg). Petersburg staff cited a shift from purchasing more expensive start-up materials for classrooms in 2016–2017 to less expensive, more consumable materials in 2017–2018 as the main factor in the change. Other divisions cited similar factors, and staff from Giles specifically shared that they decided to decrease spending on classroom materials and supplies to increase their spending on other things, like family engagement.

In the professional development category, Petersburg, Brunswick, and Fairfax saw increases in per-child expenditures ranging from \$129 (Petersburg) to \$441 (Brunswick). Staff from these divisions described additional professional development efforts, such as literacy and language programs for teachers, and, more simply, decisions to increase spending in this area for 2017–2018. Chesterfield, Henrico, Winchester, Giles, Richmond, Sussex, Prince William, and Norfolk saw decreases in per-child expenditures ranging from \$452 (Fairfax) to \$2,712 (Norfolk). Divisions cited various reasons for decreased professional development spending. For example, Chesterfield staff explained that professional development was more intensive in the early years of the study as a result of starting a new curriculum. Interestingly, Prince William saw an overall increase in professional development spending (Appendix D, Table D13) but

decreased per-child spending. This might be the result of patterns in enrollment across the two years, which are described in more detail below.

For indirect costs, Sussex, Norfolk, Winchester, and Prince William saw increases in per-child expenditures ranging from \$172 (Sussex) to \$507 (Prince William). Petersburg, Chesterfield, Giles, Henrico, Brunswick, Fairfax, and Richmond saw decreases in per-child expenditures ranging from \$41 (Petersburg) to \$1,906 (Richmond). Generally, these changes are likely the result of changes in division budgets or to the rate assigned to each division. A detailed explanation of how indirect costs were determined is provided in the methodology chapter of this report. To summarize, grant funds were used to reimburse seven divisions for indirect costs at a rate based on actual ASR data and carry-forward adjustments according to U.S. DOE rate agreements. The remaining four divisions did not claim an indirect rate, and so the study team calculated an indirect cost by applying the division's indirect rate to the division's total VPI+ expenditures.

For transportation, all divisions except Winchester saw increases in per-child expenditures ranging from \$56 (Petersburg) to \$3,699 (Brunswick). Staff from these divisions cited various reasons for increased transportation spending. For example, Prince William staff shared that additional grant funds were available that staff decided to put toward transportation, and Fairfax staff shared that increased enrollment created a need for increased transportation. Winchester's transportation per-child spending decreased by \$144. Staff shared that all of their transportation costs were covered through matching funds, and it is likely that the division simply spent more on transportation in 2017–2018.

Per-child expenditures in the other category increased in Norfolk, Henrico, and Fairfax, with increases ranging from \$276 (Norfolk) to \$654 (Fairfax). Staff from these divisions shared that they were able to obtain more detailed information from partner organizations that provided in-kind services like health screenings, which allowed the divisions to better report data and could account for the increase. The other eight divisions saw decreases in per-child

expenditures for this category ranging from \$53 (Prince William) to \$3,596 (Petersburg). Staff from Petersburg noted that they decreased advertising spending, which is included in this category. The division also removed a classroom, which decreased enrollment. Additionally, Winchester staff shared that their technology department did not spend its full budget, and there might have been fluctuations in family engagement activities between the two years.

Table 9. Differences in Per-Child Expenditures by Cost Category Between 2016–2017 and 2017–2018, All Divisions

Differences Across Divisions Between 2016–2017 and 2017–2018											
Category	Brunswick	Winchester	Henrico	Norfolk	Prince William	Chesterfield	Fairfax	Sussex	Giles	Richmond	Petersburg
Salaries and Benefits	3,013	2,931	713	1,506	837	995	(623)	(600)	1,522	(293)	(3,850)
Materials and Supplies ^a	909	122	(12)	729	(962)	430	350	(96)	(1,277)	(1,244)	(4,621)
Professional Development ^a	441	(515)	(469)	(2,712)	(1,628)	(452)	196	(1,118)	(531)	(571)	129
Indirect Costs ^c	(441)	212	(138)	214	507	(64)	(372)	172	(95)	(1,906)	(41)
Transportation	3,699	(114)	763	1,118	2,427	498	492	1,135	342	695	56
Other ^{a,d}	(358)	(657)	583	276	(53)	(343)	654	(572)	(1,389)	(168)	(3,596)
Total	7,264	1,978	1,441	1,131	1,127	1,065	696	(1,080)	(1,427)	(3,487)	(11,923)
% Change	34%	15%	9%	7%	6%	8%	4%	-7%	-12%	-18%	-94%

Sources: Expenditure data include state grant reimbursement data and data provided by divisions on matching and other local expenditures.

^a Some of these resources may have been shared with partner programs in the divisions that operated VPI+ classrooms in community programs.

^b The total per-child expenditures exclude expenditures in the food and partner program cost categories.

^c Indirect costs were estimated by the study team for Prince William, Giles, Brunswick, and Winchester.

^d Occupancy-related expenditures for all divisions were estimated by the study team using the Provider Cost of Quality (PCQC) tool.

While division staff shared context regarding spending decisions that may explain some variation between spending in 2016–2017 and 2017–2018, another major factor may be the pattern of changes in enrollment and number of classrooms across divisions. Based on results of the interim cost study, many divisions made changes to their program structure with the intention of increasing efficiency—mainly through removing or adding classrooms or through increasing or decreasing enrollment. Table 10 illustrates the change in the number of classrooms, enrollment, and average classroom size between the two years.

In terms of enrollment, four divisions had substantial shifts in enrollment between the two study years (10 or more students). Both Winchester and Norfolk had substantial decreases in enrollment. While Winchester did not change the number of classrooms in public settings for VPI+, enrollment decreased by 10 students. This decrease in enrollment aligns with an increase in the division’s total per-child expenditure because these data suggest that expenditures for the division would be spent across fewer children in 2017–2018 than in 2016–2017.

The pattern for Norfolk’s data reveals that perhaps changes in the number of classrooms may also impact per-child spending between years. Norfolk’s enrollment decreased by 74 students in 2017–2018, a much larger decrease than in Winchester. However, unlike Winchester, Norfolk also decreased the number of classrooms by two in 2017–2018. Since the division did not have to cover salaries, materials, or other expenses for those classrooms, it may have mitigated the increase in the total per-child expenditure, resulting in a smaller increase than seen in Winchester.

Of the divisions with increased enrollment between 2016–2017 and 2017–2018, Petersburg fit a pattern of increased efficiency: this division had a marked decrease in per-child spending that could be the result of more effectively structuring the program—essentially, increasing enrollment while ensuring all possible slots in classrooms are filled. In Petersburg, enrollment increased by 14 students, while the number of classrooms decreased by one. This suggests that perhaps the division had fully enrolled classrooms with students, rather than

spreading students across more classrooms without meeting the target classroom enrollment of 18 students per classroom. The average classroom size of 18 for Petersburg in 2017–2018 supports this explanation.

The goal of efficiency also aligns with actions taken by VDOE after reviewing data from the first two years of VPI+ implementation. Staff from VDOE reviewed data across the 11 divisions (enrollment patterns, number of classrooms meeting targets, spending patterns, etc.) and decided to reduce funding for some divisions and redistribute these funds to two new divisions.³⁷ The following divisions had the largest amounts of funds redistributed (amounts over \$100,000): Henrico (\$194,342), Richmond (\$171,335), Fairfax (\$169,117), and Prince William (\$110, 242). Of these divisions, only Richmond saw a decrease in per-child spending, and Fairfax had the smallest increase in per-child spending. It is likely that, in order to continue providing programming to their students, divisions supplemented their funding through local match and in-kind sources. While interpreting these patterns, it is also important to note that division budgets were not crafted in terms of per-child spending, which mean divisions may not have aligned their spending decisions to align with any specific per-child expectations. We discuss this further in the “Summary and Conclusions” section below.

³⁷ As previously noted, these two divisions were not included in the cost study.

Table 10. Changes in Classroom and Enrollment Data Between 2016–2017 and 2017–18, by Division

Division	Classroom Data			Enrollment Data			Class Size		
	VPI+ Classrooms in Public Settings 2016–2017	VPI+ Classrooms in Public Settings 2017–2018	Year-to-Year Difference	VPI+ Enrollment in Public Settings 2016–2017	VPI+ Enrollment in Public Settings 2017–2018	Year-to-Year Difference	Average VPI+ Classroom Size in Public Settings 2016–2017	Average VPI+ Classroom Size in Public Settings 2017–2018	Year-to-Year Difference
Brunswick	2	2	-	29	29	-	15	15	-
Chesterfield	10	10	-	160	160	-	16	16	-
Fairfax	3	5	2	52	51	(1)	17	10	(7)
Giles	2	2	-	36	36	-	18	18	-
Henrico	10	10	-	178	177	(1)	18	18	-
Norfolk	10	8	(2)	171	97	(74)	17	12	(5)
Petersburg	5	4	(1)	58	72	14	12	18	6
Prince William	11	12	1	199	214	15	18	18	-
Richmond	7	11	4	108	116	8	15	11	(5)
Sussex	2	2	-	25	27	2	13	14	1
Winchester	6	6	-	105	95	(10)	18	16	(2)
Total	68	72	4	1,121	1,074	(47)	16	15	(1.6)

Another way to explore year-to-year changes is to estimate expenditures assuming no changes in enrollment between the two years. This may further highlight divisions where changes in enrollment were impactful. Table 11 shows projected per-child expenditures for each division using 2016–2017 enrollment data. Patterns in this table mirror the previous discussion regarding the impact of enrollment. In Petersburg, Prince William, and Richmond—divisions that saw increases in enrollment—the actual per-child expenditures were lower in 2017–2018 than what was projected using the 2016–2017 enrollment data. In Norfolk, where enrollment decreased drastically, the actual 2017–2018 expenditure was much higher than it would have been if the division had maintained a similar level of enrollment between the two years.

Table 11. Estimated Per-Child Expenditures If Divisions Using 2016–2017 Enrollment Data, by Division

Projected 2017–2018 Expenditures Using 2016–2017 Enrollment^{a,b,c}					
Division	Total Expenditures (\$)	VPI+ Enrollment in Public Settings 2016–2017	Projected Per-Child Expenditures with 2016–2017 Enrollment (\$)	VPI+ Enrollment in Public Settings 2017–2018	Actual Per-Child Expenditures (\$)
Brunswick	628,232	29	21,663	29	21,663
Chesterfield	2,195,264	160	13,720	160	13,720
Fairfax	969,659	52	18,647	51	19,013
Giles	433,298	36	12,036	36	12,036
Henrico	2,753,218	178	15,468	177	15,555
Norfolk	1,624,043	171	9,497	97	16,743
Petersburg	909,532	58	15,682	72	12,632
Prince William	3,858,095	199	19,387	214	18,028
Richmond	2,304,586	108	21,339	116	19,867
Sussex	439,033	25	17,561	27	16,260
Winchester	1,294,075	105	12,325	95	13,622
All Divisions	17,409,033	1,121	15,530	1,074	16,210

Sources: Expenditure data include state grant reimbursement data and data provided by divisions on matching and other local expenditures.

^a The total per-child expenditures exclude expenditures in the food and partner program cost categories.

^b Indirect costs were estimated by the study team for Prince William, Giles, Brunswick, and Winchester.

^c Occupancy-related expenditures for all divisions were estimated by the study team using the Provider Cost of Quality (PCQC) tool.

Generally, the study team also noted differences in data quality (or type of data) provided between the two years that could possibly contribute to the changes described above. A main difference cited by many divisions is availability of data. After participating in the cost study for a year, division staff had a better idea of what kinds of data would be needed and how to better track them. Division staff were also better prepared to provide estimates of time for in-kind services, allowing the study team to better calculate expenditures for these items. This consideration may also apply to division staff knowledge of shared resources, which allowed them to provide better information regarding which items were shared between VPI+ and VPI and how to accurately break down the expenditures. On the other hand, staff turnover did occur for some divisions between the two years, and sometimes a loss of institutional knowledge made it harder to gather certain kinds of information. Although there were a few differences in data quality noted between the two years, the study team is confident that division staff provided accurate information to the best of their ability.

Benefit-Cost Analysis Results

The results of the preliminary and partial BCA are reported in Table 12. The results are shown for three impact estimates: estimates based on the separate impacts analyzed in the impact study for Cohorts 2 and 3, respectively, and an estimate based on the average of the effects across the two cohorts.³⁸ The estimated per-child expenditure of VPI+ is aligned with each cohort and thus is \$16,082 and \$16,210 for the 2016–2017 and 2017–2018 school years, respectively. The average per-child expenditure across the two years is \$16,146 and was used with the average impact estimate.

The estimated benefits in the form of future earnings are based on estimates of test score effect size impact for the two cohorts of 0.38 and 0.32, respectively, derived using a regression discontinuity methodology (SRI, forthcoming 2019). Earlier, we indicated that an increase in an achievement score of one standard deviation is estimated to result in a \$64,765 gain in lifetime earnings (measured in present-value dollars, after discounting for the stream of future earnings). Thus, a 0.38 effect size gain for Cohort 2 from participation in VPI+ is estimated to produce an increase in present-value lifetime earnings of \$24,611 (0.38 times \$64,765), while a 0.32 effect size gain produces a lifetime earning advantage of \$20,725. In other words, the present-value projected earnings range from just under \$21,000 per student for Cohort 3 to nearly \$25,000 for Cohort 2, with an average projected earnings of about \$22,700. Across all three estimates, the benefits outweigh the cost by about \$4,500 to about \$8,500 per student. The resulting benefit-cost ratio ranges from 1.28 to 1.53 or an average estimate of \$1.40 in benefits for every dollar of cost.

³⁸ These impact estimates are also based only on enrollment in public settings, in line with the cost study.

Table 12. Estimated Per-Student Present-Value Costs and Benefits for VPI+

Indicator	Based on Estimated Impact for Cohort 2 (2016–2017)	Based on Estimated Impact for Cohort 3 (2017–2018)	Based on Average Estimated Cost and Impact for Cohorts 2 and 3
Present-value costs (\$)	16,082	16,210	16,146
Present-value benefits from projected future earnings (\$)	24,611	20,725	22,668
Estimated net present-value benefits (\$)	8,529	4,515	6,522
Benefit-cost ratio	1.53	1.28	1.40

Source: Authors' analysis.

Notes: All dollar figures are present-value, discounted dollars using a 3 percent real discount rate.

As noted earlier, the estimates in Table 12 are not intended to present a comprehensive BCA for VPI+. Rather, the projection of potential future earnings gains based on the estimated impact of a year of VPI+ participation on student test scores at the start of kindergarten demonstrates the potential for positive economic returns, based on the costs to implement the program in the 2017–2018 year and the estimated impacts on test scores for Cohorts 2 and 3. The estimates are preliminary in that they are based on highly uncertain future earnings projections. The estimates are partial because other areas of impact could neither be measured nor forecasted, such as potential future effects on educational outcomes including special education use and grade retention, as well as outcomes at older ages that have been demonstrated for other high-quality preschool programs. Any favorable outcomes in these other domains would be expected to add to the benefits to society from VPI+ participation.

On the other hand, as noted earlier, the estimates of per-child expenditures exclude some expenditure categories, notably expenditures on food. To the extent that the per-child expenditure of VPI+ used in Table 12 is an underestimate of the full cost to implement the preschool program, we will have overstated the potential net present-value benefits and the benefit-cost ratio. However, as discussed in Appendix C, the omitted food expenditures are

likely to amount to \$97 to \$1,404 per student. Thus, if the per-student costs of VPI+ were higher by this amount, net present-value benefits would still exceed zero and the benefit-cost ratio would still exceed one.

The estimated economic benefits from VPI+ participation reported in Table 12 can be compared with the estimated returns for other state-funded large-scale preschool programs. For example, Bartik, Gormley, and Adelstein (2012) estimate that the full-day Oklahoma universal preschool program, delivered in the Tulsa school district, cost \$8,806 in 2005–2006 dollars and had projected earning gains per student of about \$25,000 to \$30,000 depending on the student's income level. The resulting benefit-cost ratio ranged from 2.82 to 3.45. These ratios are higher than those reported in Table 12 for VPI+ because the estimated effect sizes for the Tulsa preschool program were somewhat higher than those for VPI+ and because the estimated per-student costs were lower.

Summary and Conclusions

The objective of this cost study report is to present preliminary findings on VPI+ program expenditures for the 2017–2018 school year. The report includes estimates of the average per-child expenditures for the VPI+ project, examines variability in per-child expenditures across the 11 participating divisions, and examines how expenditures are distributed across different cost categories and across funding sources. The report also explores year-to-year changes in expenditures between the 2016–2017 and 2017–2018 school years. Lastly, the results of a benefit-cost analysis (BCA) using 2016–2017 and 2017–2018 expenditure data are also outlined.

Potential for Positive Economic Returns

The BCA was intended to provide a preliminary and partial estimate of the potential economic returns from the investment in VPI+. Based on estimates from the research literature of the relationship between measures of early student achievement and later adult earnings, we estimated that, given the impacts on measures of school readiness estimated for VPI+ participants in Cohorts 2 and 3, VPI+ would be expected to produce about \$1.40 in benefits from future earnings for every dollar of expenditure on the program. In other words, based on the estimated benefits for VPI+ participants in terms of lifetime earnings, the program is estimated to generate benefits to society that exceed costs. This is a limited view of the potential returns from the VPI+ program to the extent that benefits in other domains may accrue in the short or longer term that we have not yet observed and not yet valued (e.g., savings from reduced special education use or grade retention and later benefits for participants in other life outcomes).

To the extent that VPI+ produces other favorable short- and longer-term benefits for participants and the rest of society, the estimated return would be expected to be even higher, thereby producing an even greater “bang for the buck.” A more complete estimate of the full

economic returns would require ongoing evaluation of the impacts of participation in VPI+ on subsequent school performance, such as special education use and grade retention, or other outcomes during the school-age years (e.g., risky behavior or delinquent or criminal activity). Even longer-term follow-up could determine whether students who participated in VPI+ are more likely to graduate from high school and obtain post-secondary degrees. If such favorable effects are realized, the economic returns from the VPI+ program would be even greater than those reported here. The BCA was intended to provide a preliminary and partial estimate of the potential economic returns from the investment in VPI+.

Variability in Per-Child Spending

Analyses suggested that, on average, VPI+ program expenditures totaled \$16,210 per child for the 2017–2018 year. However, this estimate, and all others presented in the main body of this report, did not include expenditures related to food because of concerns that the expenditures reported for this category might not reflect the full cost of providing meals to children in VPI+. Similarly, the estimates presented in this report did not include most expenses incurred in the operation of VPI+ classrooms in community partner programs, for the three divisions that operated classrooms using this mixed delivery model. Community partner program expenditures were not included in the per-child estimates because of concerns about potential discrepancies in reporting that may have led to inaccurate or skewed estimates. The enrollment figures presented in this report were also adjusted to reflect the enrollment only in public settings. As a result, the per-child expenditure estimates pertain only to public settings.

Considerable variability occurred in per-child expenditures across divisions. The variability in per-child expenditures could be driven by low enrollment in some divisions because it is likely that divisions based their budget planning on target enrollment numbers. Because not all divisions achieved full enrollment, the difference between target and actual enrollment counts in those divisions may have been a key factor in the resulting higher per-child expenditures. In

those divisions without full enrollment, the division's expenditures were spread across a smaller number of children, resulting in higher per-child expenditures. In addition, the fact that not all divisions had a target enrollment of 18 children per classroom may also have contributed to differences in per-child spending. Variability may also be the result of more specific issues in each category, which are outlined in the body of the report.

The largest category of spending was for salaries and benefits, but divisions differed significantly in per-child spending in this category. This was perhaps a result of the number of staff members hired in each division to support operation of the VPI+ program. Divisions also exhibited great variability in spending in the materials and supplies category. Differences in spending on materials and supplies may have been a result of the resources already available in the divisions and the amount of funds left over after divisions paid for basic instructional activities. It is likely that divisions that had large amounts of funds left over decided to invest in special materials or equipment (such as computers, tablets, and other forms of technology), especially if these were not already available in these divisions. These special investments would have resulted in higher per-child expenditures for these divisions. Transportation expenditures also varied greatly across divisions and may be attributed to differences in transportation needs (e.g., if a division needed to buy new buses,³⁹ differences in bus routes in rural versus more urban areas) or how divisions chose to provide maintenance for buses. For example, staff from Norfolk shared that new buses were not needed in the 2017–2018 school year.

The study team also identified several other cost drivers that may have contributed to the variability in division spending for VPI+. Among these cost drivers were starting and average K–12 teacher salaries, which are potentially proxies for cost of living; total division-wide pre-K enrollment, which is potentially indicative of the size and scale of the infrastructure available to

³⁹Bus purchases were not funded via grant reimbursement.

support VPI+ in a division; and provision of summer school, which may indicate that more resources are needed in categories such as salaries and benefits and materials and supplies as a result of the longer operating year. The study team also used data from the composite index of local ability to pay to further assist in the comparison across divisions.

Divisions supplied about 25 percent of expenditures for the program through matching and other local funding sources, which left about 75 percent to be funded directly through the grant. Locally, divisions reported other expenditures as the largest part of their matching contribution, which included comprehensive services and family engagement. The second highest matching contribution category was transportation.

Across all 11 divisions included in this report, VPI+ program expenditures decreased by \$618,498, and the overall per-child expenditure increased by \$128 between 2016–2017 and 2017–2018. The materials and supplies category saw the largest change between the study years. Context and possible explanations for the changes were shared by division staff during their interviews and summarized in this report. The explanations included factors such as increased or decreased spending on one-time investments and more intentional spending for specific categories. Year-to-year changes in per-child expenditures also varied across divisions. Seven divisions saw increased per-child expenditures ranging from \$696 to \$7,264, while four divisions saw decreased expenditures ranging from \$1,080 to \$11,923. The study team hypothesizes that differences in per-child expenditures may be partly explained by changes in program size and enrollment in some divisions.

Contextualizing the Findings

The analyses of expenditures for VPI+ across the 11 divisions implementing the program demonstrate that costs can vary considerably depending on underlying differences in the cost of personnel and other resources as well as choices made about how programs are implemented. Other research estimating the cost of high-quality preschool programs likewise demonstrates

that there is variation in the combinations of resources used and the resulting cost per child served. We briefly summarize below key findings from the larger literature on the cost of publicly funded preschool programs as a way to place the findings for VPI+ in context.⁴⁰

Cost analyses for publicly funded preschool programs are typically associated with an evaluation study that seeks to understand the resources required to implement the program, along with the associated impacts. For example, Bartik, Gormley, and Adelstein (2012) reported that the school-day, one-year, state-funded preschool program in Tulsa, Oklahoma, required spending of about \$10,700 per child served, in 2015 dollars, as reported by Karoly and Auger (2016). Other school-day, one-year, publicly funded programs with cost estimates, reported by Karoly and Auger (2016) in 2015 dollars, include Boston's program (\$12,390 per child) and the New Jersey Abbott program (\$13,350 per child). All these programs require a lead teacher with a bachelor's degree as well as other high-quality features.

Other estimates are based on cost modeling for programs with particular features, such as the education level of classroom staff, the number of children and staff in the classroom, and the annual hours. For example, budget-based estimates of preschool program costs at the national level from the National Academy of Sciences, Engineering, and Medicine (NAS) study on financing high-quality early care and education, based on national prices and 2016 dollars, indicates that a high-quality program—in which each classroom is staffed with a lead teacher with a bachelor's degree compensated at parity with public school teachers and also has a child-teacher ratio of 10-to-1—would cost \$13,655 per child per year based on a full-day, full-year schedule (National Academies of Sciences, Engineering, and Medicine, 2018).

Comparative analyses of preschool program costs reveal that personnel costs, particularly classroom staff, are the largest cost component, ranging from 79 to 88 percent of preschool program expenditures (Pierson, Karoly, Zellman & Beckett, 2014). Thus, key drivers of cost are

⁴⁰ This section draws on an earlier summary provided by Karoly (2017).

the education level of the classroom staff, the salary scale and associated fringe benefits, the ratio of teaching staff to children in the classroom, and the group size. As would be expected, part-day programs are less costly per child than full-day programs, and academic-year programs are less resource-intensive than full-year programs. Syntheses across preschool program cost studies indicate that per-child costs are also higher when programs provide ancillary services (e.g., the health services component of Head Start), but per-child costs may be lower in programs with higher enrollment because of economies of scale.

The estimated expenditure per child for the 11 VPI+ divisions will not be strictly comparable with these other estimates because of differences in price levels (e.g., staff salaries) and other differences in program structure. Nevertheless, while the overall per-child estimate for VPI+ may be slightly higher than these other estimates, at the division level, the estimates are within the range of national-level estimates and those for other states or school divisions, with a few outliers. The composition of expenditures, particularly the large share associated with staff salaries and benefits, is also consistent with detailed estimates in other studies. Furthermore, it appears that if target enrollment had been achieved in all divisions, the per-child expenditure estimates would have appeared even closer to the national estimates, at just a little more than \$14,000 per child. It is also important to note that division budgets for VPI+ were not crafted on a per-child basis, which could have impacted how divisions made spending decisions. It is likely that decisions were made with a focus on meeting the immediate needs of each division's program and less on meeting a set per-child spending goal.

As noted earlier, the estimated preliminary and partial benefit-cost ratio for VPI+ participation—ranging from 1.28 to 1.53, or an average of about \$1.40 in benefits for every dollar of cost—can be compared with the estimated returns for other state-funded large-scale preschool programs. The benefit-cost ratio for the Oklahoma Tulsa preschool program, based on similar projections of lifetime earning gains from initial test score impacts, ranged from 2.82 to 3.45. These ratios are higher than those for VPI+ because the estimated effect sizes for the

Tulsa preschool program were higher than those for VPI+ and the estimated per-student costs were lower. BCAs for other preschool programs that have longer-term follow-up to measure other domains of impact demonstrate the potential for even higher returns from high-quality pre-K programs, but fewer programs have the type of long-term follow-up required for more comprehensive estimates of the economic returns (Karoly, 2016).

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Appendix A: Henrico Expenditures

Henrico, the largest division participating in the study, was unique due to its blended funding model. The entire division's preschool program was "braided" with four different funding sources: Head Start, Title I, VPI and VPI Improved, and VPI+. Out of the total 53 preschool classrooms operated in Henrico, most (43 classrooms) were operated through this braided funding model, which made it difficult to isolate expenditures funded through VPI+ in all classrooms. However, in the 10 new classrooms, slots were filled only by children meeting the VPI+ eligibility requirements. As a result, the evaluation included only children in the 10 new classrooms with dedicated VPI+ funding.

Henrico provided local matching expenditure information for the 10 new VPI+ classrooms rather than for all 53 preschool classrooms in the division. However, VPI+ grant reimbursement data used in the analysis for this report contained expenditures that may have been applicable to all 53 preschool classrooms. The cost study team carefully reviewed Henrico's cost data and determined that in the largest cost category, salaries and benefits, Henrico's VPI+ grant expenditure data represented costs only for the 10 new VPI+ classrooms and did not include costs for the 43 other blended classrooms. However, it is likely that some of the VPI+ grant expenditures in the other cost categories were used to support both the 10 new VPI+ classrooms and the 43 other blended classrooms. However, because of the blended nature of Henrico's funding, the cost study team also believed that other funding sources, such as VPI and Head Start, were likewise sometimes shared in supporting the 10 new VPI+ classrooms in these other cost categories.

It was not possible to determine the extent to which the VPI+ expenditures that support other classrooms were "canceled out" by other funding streams supporting the new VPI+ classrooms. As a result, there is uncertainty about the accuracy of the per-child expenditure estimate for Henrico. It is possible that the per-child figure for Henrico overestimates VPI+

expenditures if a significant amount of VPI+ spending supported other classrooms but other funding streams contributed little to VPI+. On the other hand, it is also possible that the per-child figure for Henrico underestimates VPI+ expenditures if little VPI+ spending supported other classrooms but significant resources were used for VPI+ from other funding streams. A lower-bound estimate of what the per-child expenditures would have been without the potentially shared costs with the 43 blended classrooms is \$13,034, or \$2,521 less than the per-child estimate presented in the findings section of this report (\$15,555). The study team calculated this estimate by identifying a total for all Henrico grant reimbursement requests with uncertainty about to which classrooms the requests pertained and by generating a per-child estimate by dividing that total by the total enrollment for Henrico in public settings.

Appendix B: Cost Capture Tool

Costs								
Cost Category	Cost Total and Detail for Cost Category	Total Estimated Costs	Costs Submitted to VDOE for VPI+ Grant Reimbursement	Costs Reported to VDOE as Matching Costs for VPI+	Other Estimated Costs	Description of Other Estimated Costs, Source, and How Calculated	Additional Local Funding Sources (e.g., Title 1, Head Start, Foundation)	Notes/Comments
Program Evaluation	Total costs for program evaluation	0						
Salaries and Benefits	Total costs for salaries and benefits	0						
Materials and Supplies	Total costs for materials and supplies	0						
Food	Total costs for food	0						
Professional Development	Total costs for professional development	0						
Partner Programs	Total costs for partner programs	0						
Indirect Rate	Total costs for indirect rate	0						
Other	Total costs for other	0	0	0	0			
	Detail: transportation	0						
	Detail: other unknown	0						
	Total Costs Across Cost Categories	0	0	0	0			

Appendix C: Food Expenditures

During the data collection process, concerns over the accuracy of reports of food expenditures emerged. These concerns stemmed from a lack of clarity regarding how divisions documented food expenditures and how USDA reimbursements factored into those expenditures. After conducting the division interviews, the study team gained more insight regarding food expenditures; however, it was not sufficient to confidently highlight any divisions as having complete data.

Based on available data, the per-child expenditure for food ranged from \$97 (Winchester) to \$1,404 (Henrico). The average per-child expenditure was \$547, compared with the Price of Quality Calculator (PCQC) assumption of \$1,000 per child for food. It is important to note that the PCQC estimate includes both the cost of food and food preparation.⁴¹ Given that the estimate for this study includes only the cost of food, it may align with the PCQC assumption if food preparation was not included. However, concerns over whether food data were complete led the study team to exclude food category expenditures from the total and per-child expenditure estimates.

⁴¹ Estimates for the Price of Quality Calculator can be found here: <https://www.ecequalitycalculator.com/Login.aspx>.

Appendix D: Additional Tables

Table D1. Total Expenditures by Cost Category and by Division

Category	Total Cost (1,000s of \$)											
	Total	Brunswick	Prince William	Sussex	Henrico	Norfolk	Richmond	Chesterfield	Winchester	Petersburg	Giles	Fairfax
Salaries and Benefits	11,825	318	2,439	334	1,712	1,096	1,562	1,657	1,049	691	282	686
Materials and Supplies ^a	1,129	103	152	11	304	105	177	142	36	12	32	55
Professional Development ^a	358	22	64	2	113	18	22	19	8	37	4	49
Indirect Costs ^c	372	4	157	8	35	45	17	34	39	19	3	12
Transportation	1,422	110	669	41	160	142	110	93	10	33	16	36
Other ^{a,d}	2,304	71	377	42	429	219	418	251	152	117	95	133
Total	17,409	628	3,858	439	2,753	1,624	2,305	2,195	1,294	910	433	970

Sources: Expenditure data include state grant reimbursement data and data provided by divisions on matching and other local expenditures.

^a Some of these resources may have been shared with partner programs in the divisions that operated VPI+ classrooms in community programs.

^b The total per-child expenditures exclude expenditures in the food and partner program cost categories.

^c Indirect costs were estimated by the study team for Prince William, Giles, Brunswick, and Winchester.

^d Occupancy-related expenditures for all divisions were estimated by the study team using the Provider Cost of Quality (PCQC) tool.

Table D2. Salary and Benefits Expenditures for Support Staff

Expenditures for 2017–2018 in \$								
Division	Health	Cafeteria	Guidance Counselor	School Office Staff/ Admin	Social Worker/Family Service	Other Staff ^a	Combined Salaries ^b	Other ^c
Brunswick	686	4,853	1,329			17,652		
Chesterfield							54,955	
Fairfax	3,679			4,258	3,020	106,696		
Giles							13,553	
Henrico								
Norfolk	21,099		8,507	37,206				11,990
Petersburg								44,274
Prince William						187,976		
Richmond	14,780				83,406	40,858		53,284
Sussex		5,136	9,699	12,943		45,782		
Winchester	6,481	26,787				64,840		

^a This category includes expenditures that are found only in the corresponding divisions. For Brunswick, the category includes a librarian, school board clerk, payroll clerk, and a paraprofessional. For Fairfax, it includes staff in various roles, including curriculum and grant managers, various specialists, and a financial analyst. For Prince William, it includes a speech teacher and “other personnel.” For Richmond, it includes an EC manager and an instructional assistant facilitator. For Sussex, it includes a principal, assistant principal, a secretary, and a VPI+ coordinator. For Winchester, it includes a human resources staff member and transportation staff.

^b This category includes expenditures that divisions combined across several positions. For Chesterfield, the category includes combined administrative, attendance, and health roles. For Giles, it includes combined librarian, physical education, attendance, and health services roles.

^c This category includes expenditures that did not fit into the coding scheme. For Norfolk, the category includes an expenditure listed as “media.” For Petersburg, it includes an expenditure listed as “salaries and benefits” without a description. For Richmond, it includes expenditures listed for two names without descriptions.

Table D3. Estimated Indirect Rates

Division	Estimated Indirect Rate
Brunswick	1.1
Giles	0.8
Prince William	5.5
Winchester	2.0

Source: Rates are based on fiscal year (FY) 2018 Local Education Agency indirect cost rates for indirect cost recovery on federal grants (based on actual FY 2015 ASR data and carry-forward adjustment for FY 2018 according to U.S. DOE rate agreement). The unrestricted rates were used as estimates.

Contextual Information About Division Data and Calculations

Table D4. Salaries and Benefits

Division	Contextual Information for Salaries and Benefits
Brunswick	This division's salaries and benefits expenditure data were provided by VDOE as part of the state reimbursement data. The division provided additional salaries and benefits expenditure data as part of its local match data. The study team did not have to perform any additional calculations.
Chesterfield	This division's salaries and benefits expenditure data were provided by VDOE as part of the state reimbursement data. The division provided additional salaries and benefits expenditure data as part of its local match data. The study team prorated these expenditures to reflect the VPI+ program only.
Fairfax	This division's salaries and benefits expenditure data were provided by VDOE as part of the state reimbursement data. The division provided additional salaries and benefits expenditure data as part of its local match data. The study team prorated these expenditures to reflect the VPI+ program only.
Giles	This division's salaries and benefits expenditure data were provided by VDOE as part of the state reimbursement data. The division provided additional salaries and benefits expenditure data as part of its local match data. The study team recalculated the original amount to remove salaries and benefits for two VPI Improved assistants.
Henrico	This division's salaries and benefits expenditure data were provided by VDOE as part of the state reimbursement data. The division provided additional salaries and benefits expenditure data as part of its local match data. The study team did not have to perform any additional calculations.
Norfolk	This division's salaries and benefits expenditure data were provided by VDOE as part of the state reimbursement data. The division provided additional salaries and benefits expenditure data as part of its local match data. The study team recalculated the original local match amounts to reflect salaries and benefits expenditures only.
Petersburg	This division's salaries and benefits expenditure data were provided by VDOE as part of the state reimbursement data. The division provided additional salaries and benefits expenditure data as part of its local match data. The study team did not have to perform any additional calculations.
Prince William	This division's salaries and benefits expenditure data were provided by VDOE as part of the state reimbursement data. The division provided additional salaries and benefits expenditure data as part of its local match data. The study team did not have to perform any additional calculations.
Richmond	This division's salaries and benefits expenditure data were provided by VDOE as part of the state reimbursement data. The division provided additional salaries and benefits expenditure data as part of its local match data. The study team did not have to perform any additional calculations.
Sussex	This division's salaries and benefits expenditure data were provided by VDOE as part of the state reimbursement data. The division provided additional salaries and benefits expenditure data as part of its local match data. The study team did not have to perform any additional calculations.
Winchester	This division's salaries and benefits expenditure data were provided by VDOE as part of the state reimbursement data. The division provided additional salaries and benefits expenditure data as part of its local match data. The study team recalculated the original

local match amounts to reflect salaries and benefits expenditures only, and to reflect December 2017 VPI+ enrollment.

Table D5. Materials and Supplies

Division	Contextual Information for Materials and Supplies
Brunswick	This division's materials and supplies expenditure data were provided by VDOE as part of the state reimbursement data. The study team prorated these expenditures for the second half of the year to reflect the VPI+ program only.
Chesterfield	This division's materials and supplies expenditure data were provided by VDOE as part of the state reimbursement data. The division provided additional materials and supplies expenditure data as part of its local match data. The study team did not have to perform any additional calculations.
Fairfax	This division's materials and supplies expenditure data were provided by VDOE as part of the state reimbursement data. The division provided additional materials and supplies expenditure data as part of its local match data. The study team prorated the original amount from the matching data to reflect expenditures for VPI+ classrooms only.
Giles	This division's materials and supplies expenditure data were provided by VDOE as part of the state reimbursement data. The study team prorated these expenditures to reflect the VPI+ program only.
Henrico	This division's materials and supplies expenditure data were provided by VDOE as part of the state reimbursement data. The division provided additional materials and supplies expenditure data as part of its local match data. The study team prorated the original amount from the matching data to reflect expenditures for VPI+ classrooms only.
Norfolk	This division's materials and supplies expenditure data were provided by VDOE as part of the state reimbursement data. The division provided additional materials and supplies expenditure data as part of its local match data. The study team subtracted VPI Improved expenditures from original materials and supplies expenditure total.
Petersburg	This division's materials and supplies expenditure data were provided by VDOE as part of the state reimbursement data. The division provided additional materials and supplies expenditure data as part of its local match data. The study team prorated the original amount from the state reimbursement data to reflect expenditures for VPI+ classrooms only.
Prince William	This division's materials and supplies expenditure data were provided by VDOE as part of the state reimbursement data. The division provided additional materials and supplies expenditure data as part of its local match data. The study team did not have to perform any additional calculations.
Richmond	This division's materials and supplies expenditure data were provided by VDOE as part of the state reimbursement data. The study team did not have to perform any additional calculations.
Sussex	This division's materials and supplies expenditure data were provided by VDOE as part of the state reimbursement data. The division provided additional materials and supplies expenditure data as part of its local match data. The study team did not have to perform any additional calculations.
Winchester	This division's materials and supplies expenditure data were provided by VDOE as part of the state reimbursement data. The study team did not have to perform any additional calculations.

Table D6. Transportation

Division	Contextual Information for Transportation
Brunswick	Some of this division's transportation expenditure data were provided by VDOE as part of the state reimbursement data. The division provided additional transportation expenditure data as part of its local match data. The study team did not have to perform any additional calculations.
Chesterfield	Some of this division's transportation expenditure data were provided by VDOE as part of the state reimbursement data. The division provided additional transportation expenditure data as part of its local match data. The study team did not have to perform any additional calculations.
Fairfax	Some of this division's transportation expenditure data were provided by VDOE as part of the state reimbursement data. The division provided additional transportation expenditure data as part of its local match data. The study team prorated these expenditures to reflect expenditures for the VPI+ program only.
Giles	The division provided all transportation expenditure data as part of its local match data. The study team did not have to perform any additional calculations.
Henrico	The division provided transportation expenditure data as part of its local match data. The VDOE state reimbursement data also contained additional transportation data. The study team did not have to perform any additional calculations.
Norfolk	This division's transportation expenditure data were provided by VDOE as part of the state reimbursement data. The division provided additional transportation expenditure data as part of its local match data. The study team did not have to perform any additional calculations.
Petersburg	This division's transportation expenditure data were provided by VDOE as part of the state reimbursement data. The division provided additional transportation expenditure data as part of its local match data. The study team prorated the original amount to reflect expenditures for VPI+ students only.
Prince William	This division's transportation expenditure data were provided by VDOE as part of the state reimbursement data. The division provided additional transportation expenditure data as part of its local match data. The study team did not have to perform any additional calculations.
Richmond	This division's transportation expenditure data were provided by VDOE as part of the state reimbursement data. The division provided additional transportation expenditure data as part of its local match data. The study team did not have to perform any additional calculations.
Sussex	This division's transportation expenditure data were provided by VDOE as part of the state reimbursement data. The division provided additional transportation expenditure data as part of its local match data. The study team did not have to perform any additional calculations.
Winchester	The division provided all transportation expenditure data as part of its local match data. The study team recalculated the original local match amounts to reflect transportation expenditures only.

Table D7. Professional Development

Division	Contextual Information for Professional Development
Brunswick	This division's professional development expenditure data were provided by VDOE as part of the state reimbursement data. The study team prorated the original amount for the second half of the year to reflect expenditures for VPI+ teachers only.
Chesterfield	This division's professional development expenditure data were provided by VDOE as part of the state reimbursement data. The study team did not have to perform any additional calculations.
Fairfax	This division's professional development expenditure data were provided by VDOE as part of the state reimbursement data. The division provided some additional professional development expenditure data as part of its local match data. The study team prorated the original amount to reflect expenditures for VPI+ teachers only.
Giles	This division's professional development expenditure data were provided by VDOE as part of the state reimbursement data. The study team prorated the original amount to reflect expenditures for VPI+ teachers only.
Henrico	This division's professional development expenditure data were provided by VDOE as part of the state reimbursement data. The division provided some additional professional development expenditure data as part of its local match data. The study team prorated the original amount to reflect expenditures for VPI+ teachers only.
Norfolk	This division's professional development expenditure data were provided by VDOE as part of the state reimbursement data. The study team did not have to perform any additional calculations.
Petersburg	This division's professional development expenditure data were provided by VDOE as part of the state reimbursement data. The study team prorated the original amount to reflect expenditures for VPI+ teachers only.
Prince William	This division's professional development expenditure data were provided by VDOE as part of the state reimbursement data. The study team did not have to perform any additional calculations.
Richmond	This division's professional development expenditure data were provided by VDOE as part of the state reimbursement data. The study team prorated the original amount to reflect expenditures for VPI+ teachers only.
Sussex	This division's professional development expenditure data were provided by VDOE as part of the state reimbursement data. The study team did not have to perform any additional calculations.
Winchester	This division's professional development expenditure data were provided by VDOE as part of the state reimbursement data. The study team prorated the original amount to reflect expenditures for VPI+ teachers only.

Table D8. Indirect Expenditures

Division	Contextual Information for Indirect Expenditures
Brunswick	The division did not explicitly report any indirect expenditures in its local match data, and VDOE did not provide any additional indirect expenditure data. It is likely that indirect expenditures were incorporated across other items. The study team did not have to perform any additional calculations.
Chesterfield	This division's indirect expenditure data were provided by VDOE as part of the state reimbursement data. The study team did not have to perform any additional calculations.
Fairfax	This division's indirect expenditure data were provided by VDOE as part of the state reimbursement data. The study team did not have to perform any additional calculations.
Giles	The division did not explicitly report any indirect expenditures in its local match data, and VDOE did not provide any additional indirect expenditure data. It is likely that indirect expenditures were incorporated across other items. The study team did not have to perform any additional calculations.
Henrico	This division's indirect expenditure data were provided by VDOE as part of the state reimbursement data. The study team did not have to perform any additional calculations.
Norfolk	This division's indirect expenditure data were provided by VDOE as part of the state reimbursement data. The study team did not have to perform any additional calculations.
Petersburg	This division's indirect expenditure data were provided by VDOE as part of the state reimbursement data. The study team did not have to perform any additional calculations.
Prince William	The division did not explicitly report any indirect expenditures in its local match data, and VDOE did not provide any additional indirect expenditure data. It is likely that indirect expenditures were incorporated across other items. The study team did not have to perform any additional calculations.
Richmond	This division's indirect expenditure data were provided by VDOE as part of the state reimbursement data. The study team did not have to perform any additional calculations.
Sussex	This division's indirect expenditure data were provided by VDOE as part of the state reimbursement data. The study team did not have to perform any additional calculations.
Winchester	The division did not explicitly report any indirect expenditures in its local match data, and VDOE did not provide any additional indirect expenditure data. Further clarification was not provided. The study team did not have to perform any additional calculations.

Table D9. Other

Division	Contextual Information for Other
Brunswick	This division's expenditures coded as other were provided by VDOE as part of the state reimbursement data. Some items were also coded as other in the division's local match data. The study team estimated health screening expenditures.
Chesterfield	This division's expenditures coded as other were provided by VDOE as part of the state reimbursement data. Some items were also coded as other in the division's local match data. The study team did not have to estimate any of the expenditures.
Fairfax	This division's expenditures coded as other were provided by VDOE as part of the state reimbursement data. Some items were also coded as other in the division's local match data. The study team prorated all of these expenditures to reflect expenditures for VPI+ students and families only.
Giles	This division's expenditures coded as other were provided by VDOE as part of the state reimbursement data. Some items were also coded as other in the division's local match data. The study team estimated health screening expenditures.
Henrico	This division's expenditures coded as other were provided by VDOE as part of the state reimbursement data. Some items were also coded as other in the division's local match data. The study team did not have to perform any additional calculations.
Norfolk	This division's expenditures coded as other were provided by VDOE as part of the state reimbursement data. Some items were also coded as other in the division's local match data. The study team recalculated original local match expenditures to reflect administrative and facilities expenditures.
Petersburg	This division's expenditures coded as other were provided by VDOE as part of the state reimbursement data. Some items were also coded as other in the division's local match data. The study team did not have to perform any additional calculations.
Prince William	This division's expenditures coded as other were provided by VDOE as part of the state reimbursement data. Some items were also coded as other in the division's local match data. The study team did not have to perform any additional calculations.
Richmond	This division's expenditures coded as other were provided by VDOE as part of the state reimbursement data. Some items were also coded as other in the division's local match data. The study team prorated comprehensive expenditures to reflect expenditures for VPI+ students and families only.
Sussex	This division's expenditures coded as other were provided by VDOE as part of the state reimbursement data. Some items were also coded as other in the division's local match data. The study team did not have to perform any additional calculations.
Winchester	This division's expenditures coded as other were provided by VDOE as part of the state reimbursement data. Some items were also coded as other in the division's local match data. The study team prorated comprehensive services expenditures to reflect expenditures for VPI+ students and families only. Additionally, the study team recalculated original local match expenditures to reflect administrative and facilities expenditures.

Table D10. Food

Division	Contextual Information for Food
Brunswick	The division provided some data related to food expenditures in the local match data. Additional data for food expenditures was provided by VDOE. The division receives USDA reimbursement but was unable to provide complete data. This division may have underreported food expenditures.
Chesterfield	The division provided some data related to food expenditures in the local match data. Additional data for food expenditures was provided by VDOE. The division receives USDA reimbursement but was unable to provide complete data. The study team prorated the expenditures to reflect the VPI+ program only. This division may have underreported food expenditures.
Fairfax	The division provided some data related to food expenditures in the local match data. Additional data for food expenditures was provided by VDOE. The division receives USDA reimbursement and was able to provide those data. The study team recalculated food expenditures based on discussion during the interview and data sent post-interview. This division likely has a good estimate of food expenditures.
Giles	The division provided some data related to food expenditures in the local match data. Additional data for food expenditures was provided by VDOE. The division receives USDA reimbursement. The study team believes that the food data are not complete and so this division may have underreported food expenditures.
Henrico	The division provided all data related to food expenditures in the local match data. Additional data for food expenditures was provided by VDOE. The study team calculated food expenditures using the USDA reimbursement rates provided by the division. As a result, the food expenditure may not reflect the full cost of providing food.
Norfolk	This division's food expenditure data were provided by VDOE as part of the state reimbursement data. The division provided data related to food expenditures in the local match data. The study team prorated food expenditures reported in state reimbursement data to reflect expenditures for VPI+ students only. The division likely has a good estimate of food expenditures.
Petersburg	The division provided some food expenditures for the entire division in the local non-match data. No clarification was provided regarding possible USDA reimbursement. This division may have underreported food expenditures.
Prince William	The division provided monthly meal counts and costs that the study team used to calculate food expenditures for the timeframe of the study. The division receives USDA reimbursement. This division may have underreported food expenditures, since the calculations were based solely on counts.
Richmond	The division provided monthly food expenditures for schools with VPI+ classrooms. The study team prorated these expenditures to reflect VPI+ students only. This division likely has a good estimate of food expenditures.
Sussex	The division provided food expenditures for the entire division, which were prorated for VPI+. The study team did not have to perform any additional calculations. This division likely has a good estimate of food expenditures.
Winchester	The division provided some data related to food expenditures in the state reimbursement data provided by VDOE. No clarification was provided regarding possible USDA reimbursement. The study team did not have to perform any additional calculations. This division may have underreported food expenditures.

Table D11. Local Match Overall

Division	Contextual Information for Local Match
Brunswick	The division provided expenditures covered locally for staff salaries and benefits, volunteer hours, and some administrative/facilities costs. The study team had to estimate the cost of health screenings.
Chesterfield	The division provided expenditures covered locally for staff salaries and benefits and transportation. The division provided expenditures, such as field trips and in-kind services, covered by other sources. Additionally, the division provided documentation of volunteer hours. The study team had to prorate expenditures for the volunteer time included in the local match since they are split with the VPI program.
Fairfax	The division provided expenditures covered locally for staff salaries and benefits, administrative/facilities, in-kind services, and volunteer time. The study team had to prorate all expenditures in the local match data to reflect the VPI+ program only.
Giles	The division provided expenditures covered locally for staff salaries and benefits, transportation, food services, and volunteer time. The study team had to research an estimated hourly rate for health screenings.
Henrico	The division provided expenditures covered locally for staff salaries and benefits, transportation, in-kind services, donations, and volunteer time (mostly for service on local boards and committees). The study team had to recalculate all local expenditures based on the actual program enrollment.
Norfolk	The division provided expenditures covered locally for salaries and benefits, food, transportation, materials and supplies and administrative/facilities expenditures. The study team had to recalculate all local expenditures to match our cost categories.
Petersburg	The division provided expenditures covered locally (match and non-match) for food and food services, salaries and benefits, transportation, administrative and facilities, and vision and dental screenings. The study team estimated vision and dental screening costs based on per-child rates provided by the division.
Prince William	The division provided expenditures covered locally for salaries and benefits, volunteer hours, administrative and facilities expenditures, and transportation. Data regarding administrative/facilities costs from 2016–2017 were used to estimate expenditures for 2017–2018. The study team did not have to perform any additional calculations.
Richmond	The division provided expenditures covered locally for salaries and benefits, food, facilities, and transportation. The study team did not have to perform any additional calculations.
Sussex	The division provided expenditures covered locally for administrative and facilities expenditures, salaries and benefits, food, transportation, and comprehensive services. The study team did not have to perform any additional calculations.
Winchester	The division provided expenditures covered locally for salaries and benefits, transportation, hearing, vision and dental screenings, and administrative and facilities. The study team had to recalculate all local expenditures based on the actual program enrollment.

Table D12. Per-Child Expenditures by Cost Category in the 2017–2018 Academic Year and Potential Cost Drivers, by Division (Grant Only)

Expenditures Per Child, 2017–2018, From Highest to Lowest Per-Child Expenditures (Grant Only)											
Category	Brunswick	Prince William	Sussex	Henrico	Norfolk	Richmond	Chesterfield	Winchester	Petersburg	Giles	Fairfax
Salaries and Benefits	7,410	10,251	9,525	9,559	10,869	11,074	9,678	9,652	8,918	7,756	11,486
Materials and Supplies ^a	3,537	690	407	745	1,080	1,523	255	379	171	882	962
Professional Development ^a	769	297	92	606	182	185	117	89	515	121	945
Indirect Costs ^{b,c}	141	733	310	195	459	148	210	204	259	85	234
Transportation	101	1,715	65	13	24	62	10	-	3	-	10
Other	1,014	338	113	93	693	1,578	138	102	163	309	169
Total^d	12,973	14,023	10,511	11,211	13,307	14,571	10,409	10,426	10,029	9,153	13,805

Sources: Expenditure data include state grant reimbursement data

^a Some of these resources may have been shared with partner programs in the divisions that operated VPI+ classrooms in community programs.

^b Indirect costs were estimated by the study team for Prince William, Giles, Brunswick, and Winchester.

^c Occupancy-related expenditures for all divisions were estimated by the study team using the Provider Cost of Quality (PCQC) tool

^d The total per-child expenditures exclude expenditures in the food and partner programs cost categories.

Table D13. Year-to-Year Differences in Total Expenditures by Division by Category

Differences Across Divisions Between 2016–2017 and 2017–2018											
Category	Prince William	Henrico	Brunswick	Chesterfield	Winchester	Fairfax	Sussex	Giles	Richmond	Petersburg	Norfolk
Salaries and Benefits	337,449	117,307	87,382	159,189	197,400	(45,843)	9,704	54,809	76,039	(88,877)	(578,494)
Materials and Supplies	(180,737)	(3,803)	26,378	68,939	9,011	17,140	(1,559)	(45,974)	(122,176)	(265,616)	44,792
Professional Development	18,629	53,919	5,428	(25,075)	(12,263)	17,260	(966)	(2,109)	(200,331)	19,714	(24,306)
Indirect Costs	17,140	9,971	1,051	19,824	15,370	1,145	(1,516)	(950)	(9,835)	(4,744)	(15,466)
Transportation	286,335	(37,829)	100,819	2,406	(53,055)	(3,929)	11,066	(7,142)	27,959	10,642	(352,468)
Other	15,787	101,394	(10,390)	(54,844)	(84,956)	31,410	(11,211)	(50,014)	10,644	(185,790)	(119,686)
Total	494,604	240,959	210,669	170,440	71,508	17,183	5,518	(51,379)	(217,700)	(514,670)	(1,045,629)

Appendix E: Occupancy-Related Costs Reported by Divisions

Division	Per-Child	Enrollment 2017-2018	Total	Use of Space	Utilities	Janitorial/Custodial Staff	Cleaning Supplies	Maintenance	School Site Management	Renovation	Operations	Administration	Other
Brunswick	725	29	21,017	140	6,150	9,533		5,193					
Chesterfield	817	160	130,789					35,532	95,257				
Fairfax	92	87	8,034		1,548	4,082	104	2,300					
Giles	3,332	36	119,948	54,156	40,181					17,129		8,482	
Henrico	493	177	87,218		69,862			17,280					76
Norfolk	1,409	106	149,312								112,106	37,206	
Petersburg	344	72	24,777		10,189	14,587							
Prince William	496	214	106,173	101,323				4,850					
Richmond	717	165	118,226										118,226
Sussex	795	27	21,465	4,351	2,570	4,779	1,000	4,723					4,042
Winchester	1,691	95	160,669								130,727		29,941