

Prekindergarten Education Study: Interim Report

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REPORT

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**Report to the House Committees on Education
and on Human Services and the Senate
Committees on Education and on Health and
Welfare**

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Summary of the Study

In October, 2018, the Vermont Agency of Education (AOE), in consultation with the Agency of Human Services (AHS), contracted with Education Development Center, Inc. (EDC) to conduct a study of state-funded prekindergarten (preK) education in Vermont. The purpose of the preK study, as directed by [Act 11, section E.500.7](#), is to provide Vermont with information regarding how to more effectively and efficiently provide state-funded, universal preK education. Once complete, the preK study will address

- whether the current delivery and funding models are working effectively to provide preK education services and, if not, the issues with the current models and recommendations to enhance the quality and effectiveness of these models;
- how Vermont families make early care and education arrangements for their children under six years of age, including what factors may constrain parental choices;
- how well the preK system is operating to provide preK education to all eligible Vermont children and how to provide equitable access to preK education for children from economically deprived backgrounds;
- how to identify ways that the preK education system may create undesirable outcomes for preK students, their parents or guardians, or providers of preK education services or child care services and steps to mitigate them; and
- how to simplify regulatory oversight and administration of preK education.

Act 11 mandated that the preK study include an interim report, to be provided to the House Committees on Education and on Human Services and the Senate Committees on Education and on Health and Welfare regarding the status of the study, no later than March 15, 2019. Likewise, AOE is to provide a final report to the same committees no later than July 1, 2019.

Background

In 2014, the Vermont legislature passed Act 166, which created a publicly-funded universal preK program across the state. Under this program, all children ages three, four, and five (if not yet enrolled in kindergarten) are entitled to receive 10 hours a week of state-funded preK programming for 35 weeks per year. While Act 166 was passed in 2014, full implementation did not begin until the 2016-17 school year (Vermont Agency of Education and Vermont Agency of Human Services, 2018). As such, the program has operated at full implementation for approximately two-and-a-half years. As of the 2016/17 school year, enrollment levels were relatively high, with 75% of four-year-olds and 60% of three-year-olds enrolled in the program (Friedman-Krauss, Barnett, Weisenfeld, Kasmin, DiCrecchio, and Horowitz, 2018).

PreK is provided in multiple settings, including public schools, private centers, family child care homes and Head Start. Caregivers may choose from any prequalified preK program in the state. Regardless of setting type, preK programs must meet and maintain specific quality standards in order to achieve prequalification status.

Status Update

In accordance with EDC's contract with AOE as well as the timeline set out in the first deliverable submitted to AOE in October 2018, EDC has completed 13 interviews with state-

level stakeholders, analyzed transcripts and summarized findings from those interviews, and conducted a detailed review of the research literature related to preK education. Through biweekly meetings with AOE staff, EDC has incorporated feedback from the AOE team on the development of interview protocols, surveys and other aspects of the project work, and AOE, AHS, and EDC met prior to the submission of this report to review its contents.

The next steps for the study are to conduct and analyze interviews with a randomly selected sample of 30 preK program directors and principals across the 14 counties in the state, conduct and analyze a survey of family preK choices and conduct a secondary data analysis of AOE student and program data related to preK. The final pieces of the study will be incorporated into the final report, along with recommendations for the improvement of preK education in Vermont, to be submitted to the House Committees on Education and on Human Services and the Senate Committees on Education and on Health and Welfare no later than July 1, 2019.

Interim Findings

The following sections of the report summarize the findings from the stakeholder interviews and the systematic review of research regarding aspects of preK systems that were of primary interest to the Vermont legislature, as put forth in Act 11. The 13 semi-structured interviews were conducted with a convenience sample of state-level stakeholders that represented a variety of stakeholder perspectives, including individuals from: the state legislature, AOE, AHS, Vermont School Boards Association, Vermont Superintendents Association, Building Bright Futures and the University of Vermont. While these stakeholders represent a breadth of perspectives on Vermont's preK system, the sample does not consist of a representative sample of state-level stakeholders and is relatively small, so we caution against generalizing the interview findings to the population of preK stakeholders. The summary of interview findings is presented alongside the findings from the systematic research literature review in order to show how the data from research addresses insights and concerns raised by interviewees and the conclusions that can be drawn based on the systematic review.

To aid in interpretation, key findings are provided at the beginning of each section of the report. The sections are titled: Prekindergarten Delivery Models, Prekindergarten Funding Models, Prekindergarten Access and Dosage, Prekindergarten Quality, and Prekindergarten Administration. A list of references is provided at the end of the report.

Prekindergarten Delivery Models

Key Findings

- Most state-level stakeholders support the state's mixed-delivery system for preK for its promotion of caregiver choice, convenience, enrollment capacity and cross-sector collaboration. Despite these positive factors, concerns emerged about misperceptions and mistrust between public and private providers and about the cross-sector applicability of regulations.
- Studies of large-scale, nationally representative datasets of children who attended early childhood programs have found that children who attended private, center-based

programs tended to have better academic outcomes than children who attended public or home-based programs.

- Experts have commended mixed-delivery systems for their potential to expand caregiver options, reduce child transitions and raise quality through broader participation in rating systems. Yet others have raised concerns about inequities between public and private settings, based in part on the notion that public settings will attract and retain the best teachers via superior salaries and benefits.

Vermont's Current Model

PreK in Vermont is available to families through a mixed-delivery system, in which both public and private providers may offer preK. All programs—whether public or private—must apply for and receive prequalification status in order to participate as a universal preK provider. In general, prequalification requires programs to meet specific quality standards defined by the National Association for the Education of Young Children or Vermont's STep Ahead Recognition System, maintain licensure through the Department for Children and Families, align its curriculum with Vermont's Early Learning Standards and hire or contract with licensed teachers (Vermont Agency of Education and Vermont Agency of Human Services, 2017).

With the exception of children who reside in a district with an approved prekindergarten region, families may choose to enroll their children in any prequalified program in the state, including the following:

- A public program operated by the local school district
- A public program operated by a non-local school district that accepts out-of-district students
- A private program operated in a community- or center-based setting located anywhere in Vermont
- A private program operated in a family child care home setting located anywhere in Vermont
- A Head Start program located anywhere in Vermont

As of June 2018, there were 389 prequalified programs in Vermont. Among prequalified programs, 35% were located in public schools, 54% in private centers and 11% in family child care homes (Vermont Legislative Joint Fiscal Office, 2018). Combined, the programs offered at least 7,946 preK slots; with some programs using each slot for more than one child. Of these seats, 61% were available in private centers, 37% in public schools and only about 1.5% in family child care homes.

State-level Stakeholder Perspectives

Strengths of the current delivery model

In interviews, stakeholders spoke highly of the mixed-delivery model. They praised the model for working equitably for families, providing qualified individuals with opportunities to start their own private family child care businesses and encouraging a diverse group of voices and perspectives in the early education sphere to come together.

Interviewees described how the infrastructure of public-private partnerships ensured that high-quality early education was accessible across Vermont. Mixed delivery was seen as especially valuable in rural areas, where private programs might be more conveniently located for families than public schools. Qualified educators across Vermont could open their own private programs. These individuals with, “master’s degrees in early childhood education,” as described by one stakeholder, “are valuable resources for children and families.” Additionally, the delivery model encourages people from different arenas to meet and share ideas — “that’s just an opportunity for ideas to grow and spread,” said another.

According to stakeholders, the mixed-delivery model allows for caregiver choice, enabling children who could benefit from programs with small group sizes to attend programs best suited to their needs. Caregiver choice also allows adults to keep children in the same facility, thereby reducing the number of transitions children and families must manage in a single day or week. Similarly, another individual said the model enables families to transport children to a single location as opposed to having to transport children to multiple programs during the same day or week: “So, if it went all to public schools and it was 10 hours a week, then parents have to figure out a way to get their kids more than one place during the week if they need full-time care.”

Finally, from a practical standpoint, some interviewees noted that a truly universal program wouldn’t be possible without a mixed-delivery system. At present, there simply aren’t enough seats available in either public programs alone or private programs alone to serve all of the state’s three- and four-year-olds.

Challenges associated with the current delivery model

Stakeholders discussed two core challenges in the current delivery model. The first challenge is a philosophical divide over what it means for educators to provide preK in public versus private settings. The second challenge concerns overlapping compliance requirements required of public and private providers.

Interviewees spoke about differences in philosophy over whether preK is the first step in the education system or whether it is considered child care. Stakeholders highlighted cultural divides between educators operating in private and public programs and spoke about private providers critiquing public providers for their lack of understanding in how to take care of young children. One individual spoke of the misperception that public programs are not nurturing enough or equipped to educate young children. In contrast, another individual said public providers criticize private providers, “because they don’t have the degrees under their belt.” This person explained that because of this divide between providers’ perceptions of each other, “we’ve got trust, respect issues, and philosophical differences just because of where the energy lies in private child care or in schools . . .”

Regarding public- and private-setting compliance requirements, stakeholders discussed how legislation does not take into account well enough the existing compliance requirements of public providers in K–12 settings. One interviewee said, “And schools are saying, why do we need this? Why do we have to comply with this one? This is a school for Pete’s sake, and so some of it makes sense, but a lot of these logistical pieces in the rules don’t.” Since schools are

well regulated by the state, some interviewees highlighted a need for standardization of compliance requirements across public and private providers.

Another recommendation was to simplify the process for supervisory unions to set up their own regions. Stakeholders who made this suggestion predicted that the establishment of regions would encourage stronger private-public provider relationships at the local level. Districts could focus their efforts on building partnerships with a smaller number of regional providers, instead of overseeing contracts and communication with providers throughout the state. As one interviewee explained:

I think there are some school districts who would say that the portability of the law and the fact that families could enroll their child anywhere, they would argue, has limited their ability to have those partnerships. I've heard from some school districts who maybe did successfully partner under a previous law feel like they can't do that under Act 166 because kids could be going anywhere.

Similarly, some stakeholders called for greater efforts to learn from and systematically scale-up some of the local innovations that have led to strong public-private partnerships. For example, one district implemented a peer-mentoring program in which public and private preK providers can earn professional development credits by observing classrooms in other settings. Interviewees recommended that these types of opportunities be available throughout the state, not just in regions that have taken the initiative to offer them.

Literature Review

The vast majority of state-funded preK programs utilize a mixed-delivery system, allowing both public and private providers to participate in publicly-funded preK (Friedman-Krauss et al., 2018). Among programs serving over half of their state four-year-old population in preK, a substantial variation exists in the distribution of students by setting. In Florida and Oklahoma—states with universal programs that boast some of the highest four-year-old enrollment rates in the U.S.—the distributions look quite different. Most children in Florida attend preK in private settings, whereas in Oklahoma, the majority of preK children are served in public schools. Other states with universal programs and high levels of coverage, such as Georgia and New York, have a fairly even distribution of students in public and private settings.

Some mixed-delivery states only provide direct funding to public schools, allowing each district to determine whether it will partner with community-based organizations to offer preK. In others, such as West Virginia and New York, the state requires some (WV) or all (NY) public programs to collaborate with private providers to deliver preK.

Our literature review did not identify any peer-reviewed research comparing child outcomes within state-funded preK programs based on delivery system. However, a longitudinal evaluation commissioned by the state of Georgia to study its universal preK program did explore the relationship between setting type and outcomes among participating children (Peisner-Feinberg, Schaaf, Hildebrandt, and Pan, 2015; Peisner-Feinberg, Garwood, and Mokrova, 2016; Peisner-Feinberg, Mokrova, and Anderson, 2017). To reduce the threat of selection bias, the evaluation used a regression discontinuity design. Students were assessed at kindergarten entry (Peisner-Feinberg et al., 2015), the end of kindergarten (Peisner-Feinberg et

al., 2016), and the end of first grade (Peisner-Feinberg et al., 2017). In all three years, a similar pattern appeared in which children who attended preK in public settings made greater academic gains than children who attended preK in private settings. By the end of first grade, though, there were no statistically significant differences in academic or behavioral outcomes between the two groups. Because public program participants tended to enter preK with lower scores than their peers in private settings, the gains experienced by the public preK group essentially helped them catch up to the private preK group.

Within the peer-reviewed literature, researchers have drawn on nationally representative datasets to examine associations between setting type and child outcomes for early childhood education programs in general, as opposed to publicly-funded preK specifically. The results, while informative for mixed-delivery preK programs, are not as fine-grained as policymakers might prefer. Analyses typically compare public vs. private centers, or formal vs. informal care. Thus, the generalizability of findings to state-funded preK in mixed-delivery systems is somewhat limited. In general, these correlational studies based on analyses of large-scale datasets from the National Center for Education Statistics' Early Childhood Longitudinal Studies have found that private, center-based care has the strongest association with academic outcomes. These analyses have also raised concerns about weaker outcomes for children who attend informal or home-based care (Bassok, Fitzpatrick, Greenberg, and Loeb, 2016; Bassok, Gibbs, and Latham, 2018; Coley, Votruba-Drzal, Collins, and Cook, 2016).

One recent study examined two cohorts of the Early Childhood Longitudinal Study – Kindergarten Cohort (ECLS-K), including one cohort comprised of children who started kindergarten in 1998 and another with children who started in 2010 (Bassok et al., 2018). Researchers disaggregated their results by setting in order to compare outcomes associated with public preschool against those associated with private preschool. Analyses controlled for several demographic variables, including socioeconomic status and parental education. For both the 1998 and 2010 cohorts, the positive relationship between preschool participation and academic outcomes measured at kindergarten entry and again in the spring of third grade was stronger for children who attended private, as opposed to public, preschool. Moreover, findings from the 2010 cohort suggested that the relationship between preschool enrollment and academic skills persisted through third grade for private preschool students but was only apparent through the end of kindergarten for public preschool students. In other words, the positive relationship seemed to last longer for students who attended private centers. Researchers noted that the public-private gap seems to have narrowed over time, as differences between the two groups were larger in the 1998 cohort. While most behavioral outcomes were similar between the two groups across different time points, analyses of the 2010 dataset found a significant negative association between public preschool and self-control (as reported by teachers) in third grade.

A 2016 study based on the Early Childhood Longitudinal Study – Birth Cohort (ECLS-B) came to a similar conclusion in its comparison of child outcomes by setting (Coley et al., 2016). The ECLS-B dataset is representative of all children born in the U.S. in 2001, but researchers limited their sample to low-income children. Among those who attended Head Start, public centers, private centers, and home-based care, the children who attended private centers had the highest math, reading, and language skills at age 5. While enrollment in Head Start, public centers, and

private centers all had positive associations with academic outcomes, the relationship was strongest for children who attended private centers. Behavioral outcomes did not vary by setting.

In the studies by Bassok et al. (2018) and Coley et al. (2016), findings countered the researchers' hypotheses that children in public settings and/or Head Start would demonstrate the strongest outcomes. Why might this be? Researchers in both studies noted that although they attempted to control for student-level covariates related to socioeconomic status, higher-income students may have been overrepresented in private-center preschools. The authors also pointed out that for low-income children enrolled in private centers, the presence of high-income peers could result in peer effects, through which disadvantaged children benefit from being in mixed-income classrooms. Putting these hypotheses aside, it's also possible that private centers, regardless of student income distribution, may indeed be more effective than public centers at promoting academic skills (Bassok et al., 2018).

Analyses of the ECLS-B dataset have also found that children who attend home-based care tend to have lower scores on academic assessments than children in other types of early childhood education settings. In the study by Coley et al. (2016), researchers reported that early childhood care was positively associated with children's academic skills at age 5 for all settings (public, private center-based, and Head Start) except home-based care. Another study based on the ECLS-B that compared formal care (defined as child care centers, Head Start, or preK) to informal care (defined as family child care homes or other home-based care) documented similar findings (Bassok, Fitzpatrick, Greenberg, and Loeb, 2016). Even after controlling for demographic variables, children who participated in informal care scored lower on assessments of reading and math at age 5 than children who participated in formal care. However, when the analysis was limited to home providers who demonstrated high levels of quality, child outcomes were similar to those observed in formal care settings. Based on this finding, the authors suggested that it may be especially worthwhile to invest in efforts to raise quality among home-based providers. No single dimension of quality among informal care centers accounted for higher academic outcomes. In other words, the positive effect was only present when quality was higher across multiple measures, such as child-to-teacher ratios, caregiver education credentials, observational measures of quality, and activities and curriculum.

Beyond child outcomes, other factors that might influence a state's decisions about preK delivery include practical considerations such as capacity and concerns about equity and quality. In fact, some observers have noted that policy choices related to preK delivery are often characterized by a direct tradeoff between the competing goals of high capacity and high quality (Ackerman, Barnett, Hawkinson, Brown, and McGonigle, 2009; Weiland, 2018). If public schools don't have sufficient classroom space or staff, then allowing private providers to participate in publicly-funded preK may be the quickest solution to meeting enrollment demands (Ackerman et al., 2009). Mixed-delivery systems can also expand the range of options available to caregivers and families. As a result, caregivers can select a setting that best meets their needs in terms of convenience or preferred educational approach. In particular, caregivers who work full-time or throughout the year may have an easier time ensuring continuity of care through a mixed-delivery system, which can help eliminate the need to move children between multiple settings. Further, the quality standards that typically accompany participation in

publicly-funded preK may act as a catalyst for private centers to improve instruction and invest in additional resources—actions that might ultimately result in improved outcomes for the children enrolled in private programs (Phillips, Anderson, Datta, and Kisker, 2018; Schumacher, Ewen, Hart, and Lombardi, 2005).

On the other hand, concerns exist that mixed delivery of preK might result in a “two-tiered system” in which the experiences of children and staff vary inequitably by setting (Weiland, 2018). In particular, early childhood education experts have warned about the implications of disparities in salary and benefits between public school educators and private school educators (Ackerman et al., 2009; Barnett and Kasmin, 2017; Chaudry, 2017; Phillips, Austin, and Whitebook, 2016). PreK teachers who work for public schools typically receive substantially higher salaries and better benefits than preK teachers who work for private centers. In theory, this puts public schools in a better position to attract and retain the best and most experienced teachers, potentially resulting in higher quality instruction in public schools (Ackerman et al., 2009; Chaudry, 2017).

While some states have enacted parity policies that require public preK teachers to be paid on the same salary schedule as their K–12 colleagues, there has been less movement to match salaries between private and public preK teachers. Only Alabama, Georgia, and New Jersey have parity policies that aim to address gaps between the sectors (McLean, Dichter, and Whitebook, 2017). In Alabama, preK teachers in all settings receive the same starting salary, although equal benefits are not required. Georgia requires the same minimum salary in both public and private settings, based on education level. For example, a private preK teacher with a bachelor’s degree would have the same minimum salary as a public preK teacher. Of New Jersey’s three preK programs, two mandate equal pay between settings for teachers who have the same credentials. Private programs must also offer benefits, although they don’t have to be comparable to public school benefits. New Jersey is unique, however, in that its parity policy (like the state’s Abbott preK program itself) came about through judicial mandate, not legislative action. Such pay parity policies are not free from critics, though. Alabama has received some pushback from private programs, who note that they now face internal disparities within their centers between preK and non-preK teachers. And in Georgia, although the state’s parity law was implemented in 2016/17, some preK administrators have reported a stubborn public perception that the work of early childhood educators does not merit salaries similar to K–12 educators (McLean et al., 2017).

Prekindergarten Funding Models

Key Takeaways

- In interviews, some stakeholders discussed concerns about the distribution of public funds to private providers. Others pointed to possible inequities in the amount of funding provided to public vs. private programs.
- In general, experts have pointed to K–12 funding formulas as the best option to provide consistent and adequate financial support for preK programs. States with mixed-delivery systems that rely on K–12 formulas to support preK have set guidelines to promote the equitable distribution of funds between public and private providers.

- Pay for Success is a relatively new method for funding preventative programs, such as early childhood education. The model has been used in Utah and Chicago to fund government-sponsored preschool programs.

Vermont's Current Model

Universal preK is funded through Vermont's Education Fund. The Education Fund receives its revenue from a variety of taxes, including on property, sales, vehicle purpose and use, meals/rooms and alcohol. The greatest contribution (almost two-thirds) comes from property taxes. All state lottery proceeds are also directed into the Education Fund (Vermont Department of Taxes, 2018).

Funds for preK flow directly from the Education Fund to public school districts through the school funding formula. The amount each district receives from the Education Fund depends on the budget approved by the voters of any given district. Within that budget are the preK costs for the district, as well as all costs for the other district students. Those preK program costs may vary from district to district, both as total costs and per-pupil costs, but they are all funded by the Education Fund.

PreK students attending a preK program operated by the school district are part of the school operating costs, just like any other student. But, if a preK student residing within a district decides to enroll in a prequalified program other than the one offered by the district, the district is then obligated to pay that provider, public or private, at a per-child tuition rate set by the state. The current preK annual tuition rate for the 2018/19 school year is \$3,267 per child, which provides for 10 hours of preK per week for 35 weeks of the year. The amount is adjusted each year to account for inflation. The state arrived at this rate after considering four different funding methods, each of which resulted in a similar amount (Vermont Agency of Education and Agency of Human Services, 2016). Ultimately, the state adopted a method based on the National Institute for Early Education Research's (NIEER) model, which was developed by the Institute for Women's Policy Research and Early Childhood Policy Research.

State-level Stakeholder Interviews

Revenue

In interviews, stakeholders did not suggest any changes to the mechanisms through which the state obtains revenue to fund preK. For instance, no one recommended substituting the diversified tax base that contributes to the Education Fund with an alternative model such as social impact bonds or relying solely on lottery proceeds. However, some interviewees noted that concerns exist in the state about a possible mismatch between the funding source and the activities and objectives the funds are supporting. Specifically, stakeholders remarked that a perception exists—not universally, but in some pockets—that a portion of the Education Fund dollars spent on preK are being used to support child care instead of education. In many ways, this concern about funding overlaps closely with those related to mixed delivery, quality and monitoring and oversight. The stakeholders who raised this issue acknowledged that the early care system may indeed be underfunded and that there may be value to bolstering public funding for early childhood care. However, they did not see Education Fund dollars as an

appropriate source to meet this need, suggesting instead that funds to support early care derive from a source dedicated specifically to early care instead of education.

Others pointed out that some segments maintain a broader opposition to the use of public funds to support private programs, even if those funds are being used solely for education. These constituencies would prefer that public preK funds be available to public providers only. Yet some noted that Vermont's distribution of funds to private educational programs is not unique to preK. One participant pointed to the state's town tuitioning program, in which K–12 students who live in towns without a public school receive a set amount of money—similar to a voucher—to defray the cost of attending the public or private school of the student's choice.

Expenditures

Many stakeholder comments about preK expenditures centered around ADM—the average daily membership formula that plays a role in determining how much money is distributed from the Education Fund to public districts. Some were troubled by the possibility that ADM calculations contribute to inequitable levels of funding between public and private programs, with public preK spending lacking transparency. Others wanted to offer greater flexibility for public schools to be able to increase the ADM preK weight in proportion to the number of preK hours offered.

When asked about weaknesses of the current funding model, some interviewees called for greater transparency in how public schools use funds received via the ADM formula. One stakeholder described the concern as follows:

So, in some districts, they may be getting \$7,000 into their local budget because they're serving a preK kid. And they're paying \$3,100 out for a contract, and the rest of the money they're keeping. So, it's very hard to analyze how these programs are running.

Interviewees explained that the amount left over after paying tuition to out-of-district providers is intended to pay for the internal, within-district administrative costs of overseeing preK subcontracts among multiple providers, providing transportation, and facilities management within the public schools. However, stakeholders noted that there are few monitoring or reporting requirements in place to guarantee that public programs are in fact spending preK funds as intended. Further, one interviewee pointed out that private programs often have similar types of preK administrative costs to those faced by public programs, especially among private programs that are partnering with multiple districts. Consequently, some perceive the funding model as inequitable due to the higher amount of per-child funding typically received by public programs.

While some stakeholders wanted to revisit the preK ADM formula as a whole, others suggested implementing a variable ADM option for public programs that want to offer more than the 10 hours of preK per week that is currently funded by the state. One interview participant explained that, in contrast to private programs that have the ability to charge tuition, public programs have little incentive to offer more than 10 hours of preK per week without additional state support. Yet there is interest among public programs in expanding the number of preK hours provided. Due to this interest, some interviewees recommended offering a

voluntary option for public schools to weigh preK ADM at a higher rate based on the number of hours offered, which could be capped depending on available funds.

Finally, some interviewees expressed uncertainty as to whether the current per-pupil spending was the right amount needed to fund 10 hours of preK provided under the current quality standards. To clarify, stakeholders didn't weigh in on whether the amount was too high or too low—they simply weren't sure. As such, they suggested it might be worthwhile to take a closer look at the actual amount needed to fund 10 hours of preK that meet the state's quality standards. One interviewee acknowledged that it may take some trial and error over the initial years of implementation to identify the proper amount.

Literature Review

Funding is a critical element of preK programs, as the amount of funding available often has a direct impact on program access and quality. As funding levels increase, programs can enroll more children or increase the number of preK hours offered. Similarly, greater levels of financial support can lead to higher quality programs through investments in professional development, curricular materials, appropriate class sizes, and educator salaries (Ackerman et al., 2009; Barnett and Kasmin, 2018). When funding levels are insufficient to support both broad access and high quality, policymakers may confront tradeoffs about whether to direct funding towards program expansion or program quality (Hustedt and Barnett, 2011).

States have adopted a wide variety of approaches to fund preK, differing in revenue sources, methods of disbursing funds, and mix of federal, state and local dollars. Among states that serve over half of their four-year-old population in state-funded preK, almost all have a dedicated revenue source and utilize a funding formula to determine the amount of money distributed to each public district or private program (Friedman-Krauss et al., 2018). Iowa and Georgia are exceptions, however. Iowa's Statewide Voluntary Preschool Program does not have a dedicated revenue source, and Georgia's preK program relies solely on lottery proceeds instead of a school-funding or state-aid formula. In addition to state resources, some states also draw on money from federal programs, such as the Individuals with Disabilities Education Act (IDEA), Temporary Assistance for Needy Families (TANF), and Child Care and Development Fund (CCDF). Further, 18 states received federal money for preK through the 2016/17 Preschool Development Grant (PDG) program. Beyond state and federal funding, some states require local providers to match a set portion of the amount contributed by the state. For example, Arkansas's program requires a 40% local match, and Mississippi requires a 1:1 match of local funds. Looking again to the states that enroll over half of their four-year-olds in preK, only Wisconsin mandates local contributions.

State K–12 funding formulas

Although the amount of funding allocated for preK will tend to impact access and program quality, the choice of a specific funding model is unlikely to have a direct effect on child outcomes (Hustedt and Barnett, 2011). Of greater importance is that the funding source is stable and capable of providing sufficient funding to meet the program's goals. In general, experts have pointed to K–12 funding formulas—the approach used by Vermont—as the best option to provide consistent and adequate financial support for preK programs (Barnett and Kasmin,

2018; Boylan and White, 2010; Hustedt and Barnett, 2011). Other methods of funding preK—such as relying on legislative appropriations from the state general revenue or depending solely on lottery funds—tend to be less predictable and consistent. Total funding amounts are more likely to vary based on changing political and economic climates, raising the possibility of underfunding preK (Stone, 2008).

While not without disadvantages, K–12 funding formulas offer several important benefits for funding preK. In a comparison of states that apply K–12 funding formulas with those that do not, Barnett and Kasmin (2018) found that states that fund preK through the K–12 formula typically had higher amounts of funding and greater levels of enrollment. In addition, overall funding tended to be more stable from year to year. After the 2008 recession, for instance, the overall amount spent on preK among states with formulas experienced a slight decrease for one year before resuming its steady climb. In contrast, total preK funding in states without formulas contracted post-recession, and has only started to rebound in the past five years. Much of the advantage of K–12 funding formulas is due to the fact that they result in a relatively linear relationship between funding and enrollment—as participation increases, so does the amount of money to support preK (Ackerman, 2009; Boylan and White, 2010; Hustedt and Barnett, 2011). The inclusion of preK funding in K–12 budgets also can communicate to the public that preK is on par with K–12 education in terms of its value and status as an essential public good (Boylan and White, 2010). Finally, some observers have also noted that preK teacher salaries are generally higher in states that use a K–12 formula to fund preK (Barnett and Kasmin, 2018). However, this association could also reflect a state’s strong commitment to education overall, as opposed to a causal relationship between funding formulas and preK teacher salaries.

Funding preK through the state K–12 funding formula is not a foolproof approach, however. While states with a funding formula are more likely to provide adequate and equitable amounts of funds to support preK, these outcomes are not guaranteed (Barnett and Kasmin, 2018). As would be true with other types of funding mechanisms, it’s important to ensure that the amount allocated to preK through the funding formula is sufficient to meet the preK quality standards and program goals intended by policymakers. When folding preK into their funding formulas, many states assume that the cost of providing preK education for a set number of hours is the same as the cost of educating a K–12 student for the same number of hours (Boylan and White, 2010). While some states, such as Maine, have conducted studies to determine the actual cost of providing K–12 education, these types of analyses are relatively rare (Barnett and Kasmin, 2016). Absent a state-specific cost analysis, states run the risk of over- or underfunding preK. As a result, some observers have recommended that states conduct cost studies that account for the discrete components of providing high-quality preK that meets individual students’ needs, as delivered in different settings (Barnett and Kasmin, 2016; Boylan and White, 2010).

New Jersey offers one example of a state preK program that uses a (non-K–12) formula based on this approach. As described by Barnett and Kasmin (2016), in 2009, the state’s Department of Education conducted a line-item analysis of its Abbott preschool program to determine the actual cost of providing quality preK education. The results informed the creation of a formula that is now used to determine funding levels for all three of New Jersey’s preK programs. Not only did analysts examine the costs of individual preK components, they also adjusted overall

per-child costs by setting type. The results led to higher per-child funding rates for private providers compared to public school providers to account for differences in access to facilities funds, which are available to public schools through the K–12 formula (Barnett and Kasmin, 2016; Boylan and White, 2010).

As with adequacy, the use of a K–12 formula to fund preK does not automatically guarantee an equitable distribution of funds either. If the state formula used to fund K–12 results in an inequitable distribution of funds at the K–12 level, the same is likely to happen for preK (Barnett and Kasmin, 2016). Specifically, K–12 formulas that don't make adjustments based on students' individual needs or districts' ability to raise revenue are more likely to result in levels of funding that don't provide students or districts with the level of support needed for an equitable education (Barnett and Kasmin, 2018). In Vermont, the K–12 formula does provide additional financial support for high-needs students by adding additional weights for low-income and English learner students (16 V.S.A. § 4010). These adjustments for high-needs students extend to preK participants as well. Targeted preK programs that use the state's K–12 funding formula, such as in Colorado and Texas, usually do not add weights for at-risk students, as these groups comprise the entire population of state-funded preK participants (Barnett and Kasmin, 2018).

In interviews, some state-level stakeholders expressed concerns about the equitable distribution of funds between public and private preK programs. These interviewees pointed out that school districts typically receive a higher amount per preK student than what they are required to distribute to private preK providers. The assumption is that districts use the difference between per-pupil ADM costs and tuition payments to cover associated administrative costs. With this concern in mind, we looked to other mixed-delivery preK states in which funding is based on the K–12 funding formula to explore how they approach the distribution of funds by setting. As with other aspects of preK funding, states vary in their regulations regarding compensation of private preK providers. Here are some examples:

- Colorado: Public schools have the option to subcontract with private centers. Colorado's Department of Education recommends that, for each child enrolled in a private program, at least 85% of per-pupil funds should be distributed to the private provider. Public schools that send less than 85% must document and justify the lower payment based on other services provided to the private providers, such as materials or professional learning. Public programs may spend no more than 5% of their preK revenue on overhead costs. (Colorado Department of Education, 2018).
- Iowa: Public schools have the option to subcontract with private centers. For each child enrolled in a private program, at least 95% of per-pupil funds are required by law to be distributed to the private provider. Of the amount distributed from a public district to a private provider, no more than 10% may be spend on administrative costs. Public schools are limited to spending 5% of per-pupil preK funds on administrative costs (IA Code § 256C.2).
- West Virginia: Half of all public programs are required to collaborate with private community partners to provide preK (Friedman-Krauss et al., 2018). Local education agencies (LEAs) are responsible for developing "collaborative contracts" with each community partner that specify how activities, resources and costs will be divided

between the LEA and the community partner. In other words, the public schools work closely with private providers to determine line-item costs (e.g., curriculum materials, teacher salaries) and who will pay for them. This approach results in a great deal of local discretion, but the state provides resources to guide LEAs in working with community partners and creating contracts (West Virginia Board of Education, 2018). Further, county boards of education are required by law to provide annual “documentation that the county board is equitably distributing funding for all children regardless of setting” (West Virginia Code § 18-5-44).

- Wisconsin: Public schools have the option to subcontract with private centers. Wisconsin is similar to West Virginia in that public school districts are responsible for developing the terms of any contracts with community partners. Schools work with community partners to determine how to best combine resources towards the provision of preK. For example, a public district might contract out a preK teacher to provide instruction in a private setting. In all cases, the school district is responsible for funding the cost of preK instruction and providing transportation for preK hours. Guidelines issued by Wisconsin’s Department of Public Instruction note that the district will retain some of its per-pupil funding to cover administrative costs, but do not specify the exact amount or percentage (Wisconsin Department of Public Instruction, 2017).

Pay for Success

Pay for Success programs are a relatively new method of funding government services, including early childhood education programs. In a Pay for Success model, a non-governmental organization delivers the designated service, with funding provided by an external investor. If the organization delivering the service meets specific outcomes or targets, the investor is repaid for both the invested principal and a predetermined rate of return. If the service provider does not meet the specified goals, the government does not provide payment, and the investor loses the capital it invested (Costa, 2014). According to Harvard’s Kennedy School of Government (2017), the benefits of Pay for Success models lie beyond simply securing funding and mitigating the risk of program failure. As described by the School’s Government Performance Lab:

They are a way to overcome barriers to shifting spending towards preventative services. They are a way to expand promising interventions, while rigorously assessing their effectiveness and protecting taxpayers against the risk that an ineffective program will continue to receive funding. And most importantly, they are a way of binding government agencies and providers together in a multi-year data-driven effort to improve service delivery and thereby make progress on a difficult social problem. These [Pay for Success] benefits are significant because none of them are easy to accomplish using standard public sector management practices. (Harvard Kennedy School Government Performance Lab, 2017, p.3).

Pay for Success programs are typically used to fund the delivery of preventative programs, based on the assumption that it costs government less to avert social or educational problems than to correct such problems once they’ve occurred (Temple and Reynolds, 2015). Thus, a careful cost-benefit analysis is a critical component of Pay for Success programs. For the

model to work as intended by generating an overall cost savings for the government, the estimated value of program participation should exceed the amount paid to investors for a successful outcome. It is also important to predict the timing of such government savings. Accurate timeline estimates ensure that outcomes are measured at the appropriate time.

Early childhood education programs in Chicago and Salt Lake City, Utah, have used Pay for Success models to expand existing programs (Temple and Reynolds, 2015). In Chicago, Goldman Sachs and philanthropic foundations funded the growth of the Child-Parent Center (CPC) preschool program. The participating parties defined success as the number of children who attended CPC and did not receive special-education status in kindergarten through grade 12, relative to a comparison group who did not attend CPC. For every child who avoided special education, funders were paid \$9,100 per year. Chicago also paid \$2,900 for every CPC child who met school readiness standards at the beginning of kindergarten, and who met third grade proficiency standards in reading. In Utah's Salt Lake and Granite counties, a similar model was implemented to expand Utah's High Quality Preschool Program. Funded by Goldman Sachs and philanthropic foundations, Utah's Pay for Success initiative also used special-education placement as its key outcome measure. Based on the prediction that students with low scores on the Peabody Picture Vocabulary Test were at higher risk of special-education placement, the county paid approximately \$2,500 per year for each low-scoring student who avoided special-education designation. However, the program's evaluation methodology has been criticized for the absence of a comparison group (Harvard Kennedy School, 2017). As such, Utah's implementation of Pay for Success underscores the importance of applying a rigorous evaluation design to decrease the likelihood of misrepresenting the program's impact.

Pay for Success is a fairly recent innovation that has only been applied in a limited number of early childhood contexts. As such, it is challenging to predict whether a Pay for Success model would be effective in Vermont. The model has received increased attention in recent years, and it may be worth further exploration due to the possible benefits mentioned above. However, there are also potential drawbacks to consider. Start-up efforts may require multiple years of planning and technical assistance (Harvard Kennedy School, 2017). Even in later years, administrative costs can remain high (Temple and Reynolds, 2015). In education, where decisions about special education designation or within-grade retention have elements of subjectivity, there may be potential for children to be denied necessary supports when such decisions are directly linked to success payments. As with other social-research initiatives, there are often practical barriers to conducting and implementing a methodologically rigorous evaluation design, especially if long-term outcomes are of interest. Concerns also exist that the expansion of Pay for Success models could result in less attention to important social problems for which outcomes are not easily defined or measured (Rangan and Chase, 2015).

Prekindergarten Access and Dosage

Key Takeaways

- Interviewees expressed mixed viewpoints regarding criteria for preK eligibility. Some wanted to maintain a universal program, while others suggested that Vermont prioritize participation and/or dosage for under-resourced children.
- Many stakeholders said that the program should consider offering more than 10 hours per week. Participants hypothesized that increased hours would lead to improved outcomes for students, higher levels of participation among low- and middle-income families, and simpler transportation arrangements for caregivers.
- Studies have documented improved school readiness skills among children attending both universal and targeted preK programs. Research suggests that children from a range of family income levels can benefit from preK participation, but low-income children tend to benefit more.
- The relationship between weekly hours of preK and child outcomes is not entirely clear. Some studies have found a positive relationship between full-day programs and child outcomes, while others have suggested there may be little difference in effects associated with full-day vs. part-day programs.
- In general, the literature suggests that children who attend preschool or center-based care for two years make greater academic gains—at least in the short term—compared to children who only attend for one year.

Vermont's Current Model

Vermont's preK program is universally available to all Vermont three-, four-, and five-year-olds not yet eligible for kindergarten. There is no income requirement; parents or guardians may enroll their children in preK regardless of family income level. Act 166 specifies that a minimum of 10 hours of preK are offered per week for 35 weeks of the year.

State-level Stakeholder Perspectives

Universal vs. targeted

No consensus existed among stakeholder interviewees as to whether Vermont's preK program should be open to all (universal) or targeted to under-resourced children. Supporters of universal access cited both philosophical and practical reasons to maintain universality. One interviewee noted that Vermont has a history of delivering education in inclusive settings and classrooms that seek to integrate children across a range of demographic variables, including income. Consequently, a targeted preK program would diverge from this tradition, potentially sending a message that early childhood education is important only for some, but not all, children. Another participant praised universal access for its inclusion of middle-class families, who may be unable to afford the high costs of preschool but are likely to be excluded by a targeted system. Others cited research on early childhood outcomes that supports universality. For example, one stakeholder noted that even though research suggests low-income children tend to benefit the most from preK, children from all income levels can still see positive

impacts. Likewise, another interviewee mentioned that mixed-income classrooms are more likely than primarily low-income classrooms to lead to equitable outcomes for participants.

Among those in favor of moving to a targeted system, many were concerned that Act 166 is distributing resources inequitably. For families who are already well-off, stakeholders explained, Act 166 essentially provides a small financial benefit to those who are likely to enroll their children in a high-quality preschool setting absent the law. In contrast, the provision of 10 hours per week in a public setting or a tuition reduction of \$3,267 in a private setting fails to significantly lower the proportion of household income that low-income families would need to pay for early childhood education. Some felt that such a result contrasts with the original intent of Act 166. As one interviewee explained:

So if our goal, if we just back up and say, 'Why did we pass this law?', it was because we had concerns about the achievement gap in the state.... And I'm not convinced that the way we have set this program up, we're getting those resources to those kids who otherwise would not already be in decent settings.

Stakeholders who shared this sentiment wanted the state to consider how it could better target preK resources to low-income or otherwise at-risk children. Multiple interviewees brought up the idea of a “sliding scale” program, which would create an inverse relationship between household income and hours of preK provided. At the same time, several interviewees said they wanted to see additional data about the relationship between income and preK enrollment, and hoped that any such data would inform decisions about whether to move towards a targeted system. Overall, interviewees shared a sense that higher-income families are accessing preK at greater rates than low-income families, but said such impressions needed to be backed up by relevant data before considering any changes.

Hours of operation

While stakeholders were divided as to the value of universal vs. targeted programs, most agreed that 10 hours of preK per week seemed too low. Some participants pointed out that 10 hours can be especially limiting if programs opt to divide the time equally over five weekdays, resulting in two to two-and-a-half hours of preK per day. Specifically, one interviewee explained that, “It’s very hard to get a high-quality schedule in two-and-a-half hours. But it’s really easy to do it in three to four hours.”

Comments about hours of operation often overlapped with concerns about equity. While some interviewees were interested in moving to a 20- or 30-hour-per-week universal program, others thought disadvantaged or low-income children should receive priority for increased hours. Again, the rationale for targeted hours was based on the likelihood that higher-income families already have the means to provide their children with an extra 10 or 20 hours of high-quality preschool. Some pointed out, however, that children in the lowest income brackets may already be receiving funding for additional hours of child care or preschool through state subsidy or Head Start. One interviewee went on to say that the potential impact of offering additional preK hours could be greatest for low- to middle-income families who earn too much to qualify for additional subsidies but may find it challenging to afford additional early childhood care or education hours.

Others were concerned about the transportation challenges associated with a 10-hour-per-week program, especially for low-income families. Some theorized that the difficulty of arranging transportation to and from preK, especially if the hours are equally divided over the week, might prevent some families from enrolling at all. For example, a lower-income family whose child is already enrolled in an affordable but lower-quality program or informal care might not be able to provide transportation both to those settings for a majority of the time and to preK for a smaller fraction of time.

One vs. two years

Stakeholders shared fewer opinions as to whether preK should serve both three- and four-year-olds, resulting in two potential years of preK, or only four-year-olds, leading to a single year of preK. A couple interviewees did bring up the idea of offering a universal, half-day program for four-year-olds only, delivered completely in public settings. One participant mentioned that such a system would eliminate any concerns about public dollars from the Education Fund going to private programs. But another noted that this type of model could have a negative impact on the financial sustainability of private programs, who might be at greater risk of losing their four-year-old population if preK is delivered entirely in the public schools.

Literature Review

Universal vs. targeted

Among the 43 states (including the District of Columbia) that provide state-funded preK, a fairly even split exists between those that offer at least one universal program (23 states, plus D.C.) and those that restrict enrollment based on family income (20 states) (Friedman-Krauss, et al., 2018). In universal programs, eligibility rules are usually straightforward—all age-eligible children have the option to enroll. Targeted programs typically restrict participation to children from low-income families, with income requirements ranging from 100% of the federal poverty line (FPL) in Delaware to 250% of FPL in Michigan. Alternatively, some states, such as California and North Carolina, use their state median income (SMI) as a threshold, limiting eligibility to families earning 70-75% of SMI. Some targeted programs are available to children who may be at-risk for reasons other than family income. For example, preK programs in North Carolina and Texas are open to children whose home language is not English or who have a parent on active military duty.

While theoretical and values-based arguments can easily be made in favor of both universal and targeted programs, few studies have attempted to directly compare the outcomes for children who attend universal preK programs with outcomes for children who attend targeted programs. Within this limited slice of the literature, findings are mixed. In a recent study, Cascio (2017) used a difference-in-differences approach to compare preK outcomes across states. For this research design, a group of comparison states served as the counterfactual to estimate what would have happened for children in the treatment states if preK programs did not exist. Results suggested that low-income children in universal programs had significantly higher reading scores at the end of preK than low-income children who attended targeted programs. This finding held even after controlling for the variation in preK program standards across states and variation in population demographics. In contrast, a correlational study that

compared universal and targeted programs in 11 states based on academic outcomes for low-income children found almost no difference based on program type (Dotterer, Burchinal, Bryant, Early, and Pianta, 2013). Expressive language was the only domain for which children who attended universal preK had higher gains than children who attended targeted preK.

Another set of studies has focused solely on the outcomes associated with specific universal preK programs at the state or local level (Cascio and Schanzenbach, 2013; Fitzpatrick, 2008; Gormley, Gayer, Phillips, and Dawson, 2005; Gormley, Phillips, and Anderson, 2018; Peisner-Feinberg, Schaaf, LaForett, Hildebrandt, and Sideris, 2014; Weiland and Yoshikawa, 2013). Because these programs enroll children from families with a range of incomes, researchers have been able to compare outcomes for children from low-income families to those from higher-income families. In general, findings from these studies suggest that children from a range of income levels can benefit from preK, but that low-income and disadvantaged children tend to benefit somewhat more on certain measures. More specifically, the differences in outcomes between children who did or did not attend universal preK were statistically significant for children in a range of income categories, but effect sizes were typically larger for low-income participants.

In studies of the universal programs in Tulsa, Boston and Georgia, researchers found that universal preK enrollment resulted in positive short-term outcomes for children both eligible and ineligible for free or reduced-price lunch (Gormley et al., 2005; Peisner-Feinberg et al., 2014; Weiland and Yoshikawa, 2013). However, in assessments of some academic and executive function skills, it appeared that universal preK in Tulsa and Boston had a greater impact for children who were eligible for free or reduced-price lunch. In Tulsa, this pattern existed for all three outcome measures—letter-word identification, spelling and applied problems (numeracy) (Gormley et al., 2005). The study of Boston’s universal preK program examined a wider range of outcomes—12 in total—including the same letter-word and applied-problems assessments used in the Tulsa study, along with measures of 10 other academic and executive function skills. For nine of these measures, results were not significantly different for children eligible for free or reduced-price lunch compared to non-eligible children. But for three outcomes—applied problems, inhibitory control, and attention shifting—effects were stronger for children eligible for free or reduced-price lunch. The gap was largest for attention shifting, an executive function skill. There was a small positive effect for children eligible for free or reduced-price lunch, but almost no effects for non-eligible children. Adding to the evidence that universal preK can benefit children from multiple income levels, an evaluation of Georgia’s universal preK program found positive effects on 10 outcomes measured at kindergarten entry, with no differences based on family income (Peisner-Feinberg et al., 2014). Researchers found positive effects in the moderate-to-large range for language and literacy, math skills and basic self-knowledge.

The studies in Boston, Tulsa and Georgia all utilized a regression discontinuity design. With this approach, researchers compare two adjacent cohorts—or groups—of preK children. Assignment to either the treatment group or the control group is determined by the birth date cutoff for eligibility to enroll in preK. For example, consider a state in which children must turn four years old by September 1 in order to enroll in preK. A child who turns four on August 31 could enroll in preK during the immediate academic year, and would be assigned to the

treatment group. In contrast, a child who turns four on September 2 would not be able to enroll in preK until the following academic year, and would be assigned to the control group. By comparing outcomes for children who turn four shortly before the cutoff date and immediately enroll in preK with children who turn four shortly after the cutoff date and enroll in preK one year later, researchers reduced the threat of selection bias that can occur when comparing children whose caregivers chose to enroll them in preK to children whose caregivers chose not to enroll them in preK. As a result, the regression discontinuity design is generally considered to be a rigorous methodological alternative to randomized control trials.

In addition to studies of the effects of universal programs at kindergarten entry, researchers have also examined the extent to which impacts of universal programs in Oklahoma and Georgia persist into elementary and middle school grades (Cascio and Schanzenbach, 2013; Fitzpatrick, 2008; Gormley et al., 2018). All of these studies have documented benefits for low-income universal preK participants that last beyond kindergarten. For non-low-income children, the pattern is less clear, with some findings suggesting no long-term benefits on some measures and other findings suggesting that higher-income children benefit significantly more on certain outcomes.

In a recent study of Oklahoma’s universal preK program in Tulsa, researchers used propensity score matching to compare observed outcomes for seventh-grade preK participants with estimated outcomes for seventh-grade non-participants. For some outcomes, researchers identified significant benefits only for children eligible for free or reduced-price lunch. These included an increased likelihood of enrollment in an honors course and a decreased likelihood of repeating a grade. For other outcomes—including decreased rates of special education placement, chronic absenteeism and in-school suspension—impacts were only observed for paid-lunch children. Both free- and paid-lunch children who participated in preK had significantly higher math scores than non-participants (Gormley et al., 2018). Returning to Georgia’s universal preK program, Fitzpatrick (2008) applied a difference-in-differences approach to estimate the impact of preK enrollment on fourth-grade outcomes. While there were some positive effects for non-low-income children, positive impacts were most consistent for low-income children in rural areas or small towns. Children with these demographics who attended preK had higher fourth-grade National Assessment of Educational Progress (NAEP) math and reading scores than children who did not attend. Another study using a difference-in-differences model estimated the effects of Oklahoma and Georgia’s universal preK programs on NAEP math and reading scores through eighth grade (Cascio and Schanzenbach, 2013). Results suggested that universal preK had a positive impact on math test scores for lower-income children, but no effect on test scores for higher-income children.

Although studies of targeted preK programs are generally limited in their ability to disaggregate child outcomes by family income, one especially interesting exception comes from research on North Carolina’s More at Four program (Dodge, Bai, Ladd, and Muschkin, 2017; Ladd, Muschkin, and Dodge, 2014; Muschkin, Ladd, and Dodge, 2015). In these studies, researchers studied the average *community-wide* effects of the More at Four program for approximately one million children over 13 years. They noted that this approach makes the outcomes especially relevant to policymakers, who are often most interested in the overall impact of policy choices at the population level. More at Four primarily enrolls children whose

families earn 75% or less of the state's median income, but most classrooms included a mix of both More at Four and non-More at Four children. Researchers found that More at Four had beneficial impacts on reading and math scores, special education assignment and grade retention in third, fourth and fifth grades. Moreover, associated effect sizes either increased or remained constant over time. In short, findings suggested that the impact of More at Four did not fade out. While benefits were typically greatest for children eligible for free or reduced-price lunch—the children most likely to have participated in More at Four—findings also suggested that the positive impact of the program extended to children ineligible for free or reduced-price lunch. In other words, the program likely had a spillover effect, in which children benefitted from More at Four even if they didn't participate. How might such an impact be possible? The researchers theorized that, by preparing at-risk children for kindergarten, More at Four may have allowed kindergarten and later elementary teachers to focus on a higher level of skills and curriculum than would be possible if many children required remedial content. Another possibility is that, if More at Four participants entered kindergarten with strong academic and social skills, non-participants may have benefitted from their interactions with these children.

Although targeted preK programs generally don't allow researchers to compare child outcomes by income, multiple studies have documented both short-term benefits for low-income or otherwise at-risk children who attended targeted preK programs. Regression discontinuity studies of state preK programs in Arkansas' Better Chance program, New Jersey's Abbott preschool program, and North Carolina's More at Four initiative all found positive impacts on participants' school readiness skills in language, literacy and math (Hustedt, Barnett, Jung, and Thomas, 2007; Lamy, Barnett, and Jung, 2005; Peisner-Feinberg and Schaaf, 2011). Taken as a whole, these results suggest that targeted preK programs—like universal programs—have the potential to bolster children's academic outcomes as measured at kindergarten entry.

Beyond kindergarten, several studies have also reported positive associations between targeted preK participation and children' academic outcomes in mid-to-late elementary school (Andrews, Jargowsky and Kuhne, 2012; Barnett, Jung, Youn and Frede, 2013; Peisner-Feinberg and Schaaf, 2010). However, the majority of these studies used relatively weak research designs that don't control for selection bias as effectively as other approaches. As such, it's difficult to discern to what extent the positive outcomes for preK participants might be due to other factors associated with parents' decisions to enroll their children in preK.

Recently, though, two studies have successfully conducted randomized control trials that examined the impact of attending targeted preschool programs on academic outcomes through third grade. These include a study of Tennessee's Voluntary PreK program (Lipsey, Farran and Durkin, 2018) and the Head Start Impact Study (Puma et al., 2012). In both studies, program participants outperformed non-participants at the conclusion of the preschool program. But by the end of third grade, neither study suggested that program participants experienced substantial academic benefits as compared to non-participants. In fact, in the Tennessee study, preK participants actually scored lower than non-participants on third-grade state achievement tests. In both cases, researchers explained that non-participants essentially caught up to their peers who had attended the programs. It's important to keep in mind that we can't attribute the absence of impact at third grade to the targeted nature of these programs. There

are too many other variables, such as program quality factors, that could help account for the outcomes observed among targeted preK participants.

Full-day vs. half-day programs

PreK programs are often categorized as either full-day or half-day based on the program's minimum daily or weekly operating hours. Full-day programs are typically defined as those offering at least six hours of preK per day, or 30 hours total within a week (Chaudry, 2017). Currently, most state-funded preK programs operate on a half-day schedule (Friedman-Krauss et al., 2018). Nine states, plus the District of Columbia, have opted to offer full-day programs.

Although state programs are usually classified as either full- or half-day, Gormley (2017) points out that policymakers could also consider offering "hybrid" programs. Under a hybrid system, the state would fund some centers for a full day and others for a half day, with centers located in higher-needs locations receiving full-day funding. In Vermont, however, such a system would likely result in enrollment imbalances due to the option for families to enroll their children in any prequalified program statewide. Alternatively, some city-funded universal preK programs, such as in Denver and Seattle, utilize a sliding scale fee, in which families pay for preK in proportion to their income. Vermont has considered this option in the past through a legislative proposal to allocate preK subsidies on a sliding scale determined by household income and family size (H. 517, 2017).

In studies comparing the impact of full-day preK programs to half-day programs, findings have been mixed. A recent experimental study in a district outside of Denver found that children randomly assigned to full-day preK performed better than their part-day peers on tests of receptive vocabulary and literacy administered at the end of preK and beginning of kindergarten (Atteberry, Bassok and Wong, 2018). Full-day children also received higher ratings at the end of preK on several teacher-reported outcomes, including cognition, literacy, math and physical development. In another study that examined preK outcomes for almost 3,000 children in 11 states, the authors did not find an association between length of the preK day and academic gains during the preK year (Howes, et al., 2008). In other words, there did not seem to be an academic benefit to attending full-day preK, which was defined in this study as 20 or more hours of preK per week.

Findings from a similar strand of research involving studies of other types of early childhood education programs, such as Head Start or preschool, are also inconclusive as to the added value of full-day programs. A recent study that followed Head Start participants through the end of kindergarten found no difference in academic or social outcomes between children who completed full- vs. half-day Head Start (Leow and Wen, 2017). However, the dataset used by the researchers for their analysis only indicated whether a program was full- or half-day without identifying a specific number of hours. As such, the authors acknowledged the possibility that some programs in the dataset likely used different definitions of full- and half-day, which limits the interpretability of findings. In contrast to the outcomes based on Head Start data, children who attended full-day preschool in Chicago's Child-Parent Centers (CPC) outperformed half-day participants at the end of preschool in socioemotional development, language, math and physical health (Reynolds et al., 2014). Full-day CPC children attended the

program for seven hours per day, whereas part-day children attend for three hours per day. While neither the Head Start nor the Chicago CPC study randomly assigned children to programs, both used propensity score matching in an attempt to control for selection bias—the possibility that families who choose to enroll their children in full-day programs might differ from families who opt for part-day programs in ways that affect measured outcomes.

Some research suggests that the effects of full-day care may differ based on children’s demographics. A broader study of center-based care using data from the Early Childhood Longitudinal Study found that outcomes associated with full-day vs. part-day care varied by income level (Loeb, Bridges, Bassok, Fuller and Rumberger, 2007). Attending center-based care for 30 or more hours per week was related to higher pre-reading and math skills at kindergarten for low- and middle-income, but not high-income, children. Researchers also found that 30 or more hours of center-based care was associated with negative behavioral outcomes for Black and White, but not Hispanic, children. For these groups of children, the higher dosage of center-based care was related to lower scores on kindergarten teachers’ evaluations of children’s social skills, self-control and externalizing behaviors. While these latter two studies by Reynolds et al. (2014) and Loeb et al. (2007) suggest that full-day early childhood programs offer greater academic (although not necessarily behavioral) benefits than part-day programs when measured at kindergarten entry, neither study informs our understanding of the long-term impact of full-day programs.

Because research on the effects of full-day preK compared to half-day preK is mixed and limited to shorter-term outcomes, it’s uncertain whether positive impacts of full-day preK are likely to persist through kindergarten or beyond. For this reason, we broadened our review of the literature to include studies comparing the effects of full-day vs. part-day kindergarten. Here, the research suggests that full-day kindergarten boosts academic outcomes in the short term, but that these positive impacts tend to dissipate over time. Indeed, multiple studies have documented the advantage of full-day kindergarten programs for children’s literacy (Gibbs, 2014; Lee, Burkam, Ready, Honigman, and Meisels, 2006; Zvoch, Reynolds, and Parker, 2008) and math skills (Zvoch et al., 2008), as measured at the end of kindergarten. Yet a meta-analysis of prior research on full-day kindergarten found that the greater academic gains experienced by children who attended full-day programs, instead of part-day programs, faded by third grade (Cooper, Allen, Patall, and Dent, 2010). Other relatively recent studies absent from the meta-analysis observed similar findings, in which math and reading gains for full-day children disappeared by the end of first grade (DeCicca, 2007; Wolgemuth, Cobb, Winokur, Leech and Ellerby, 2006).

One year vs. two years

Most state preK programs serve a combination of three- and four-year-olds, with several states restricting eligibility to four-year-olds exclusively. Three-year-olds are eligible for preK in 29 states. Of these, only the District of Columbia and Vermont serve over half of their three-year-old populations in preK (Friedman-Krauss et al., 2018). With over 80% of children in the U.S. starting kindergarten at age 5 (McFarland et al., 2018), differences in the minimum entrance age for preK can equate to the difference between one and two years of preK leading up to kindergarten entry. As with questions about the added benefits of increasing the weekly

dosage of preK hours, policymakers are also likely to be interested in knowing whether children benefit from starting preK at age 3 instead of age 4.

Most of the research on this issue suggests that children who attend preschool or center-based care for two years make greater academic gains—at least in the short term—compared to children who only attend for one year (Fuller, Bein, Bridges, Kim and Rabe-Hesketh, 2017; Domitrovich et al., 2013; Lee, 2011; Loeb, Bridges, Bassok, Fuller and Rumberger, 2007; Skibbe, Connor, Morrison and Jewkes, 2011; Wen, Leow, Hahs-Vaughn, Korfmacher and Marcus, 2012). In half of these studies, participating children were either low-income or Head Start participants, suggesting that disadvantaged children may reap academic benefits from attending two years of an early education program instead of one (Domitrovich et al., 2013; Lee, 2011; Wen et al., 2012). Looking across income levels, Loeb (2007) found that children from low-, middle-, and high-income families who entered center-based care at age 2 or 3 demonstrated stronger pre-reading and math skills at the start of kindergarten than children who began center-based care at earlier or later ages.

In contrast to these findings suggesting benefits for attending two years of preschool instead of one, a study of New Jersey’s state-funded Abbott preschool program—a program primarily attended by low-income children—did not find statistically significant benefits to an additional year of enrollment (Barnett and Lamy, 2006). At kindergarten entry, children who participated in Abbott for two years had slightly higher, yet not statistically significantly different, scores on measures of vocabulary, literacy and math, compared to single-year participants. The authors note that the Abbott program maintains high quality standards and robust funding levels. With this context in mind, one possible interpretation of these findings is that the program is of such high quality that students reach a threshold of benefits after just one year of participation, beyond which a second year does not increase achievement further.

While much of the existing evidence points to possible short-term advantages for starting preK at age 3, less is known about associated long-term benefits. So far, analyses of lasting effects have been limited to a small number of programs. One set of analyses utilizes data from children who attended Chicago’s CPC preschool program in the 1980s. Similar to the short-term gains described above, Reynolds (1995) found that children who completed two years of CPC had stronger academic skills at the beginning and end of kindergarten than children who completed one year of CPC. But by the end of sixth grade, there were no significant differences between the groups in reading, math, grade retention, special education placement or teacher observations of social adjustment. More recently, an analysis of outcomes into adulthood found some positive long-term benefits among children who enrolled in two years of CPC instead of one. Specifically, two-year participants were less likely to be placed in special education and were also less likely to commit crimes (Arteaga, Humpage, Reynolds and Temple, 2014). In addition to studies of CPC participants, the HighScope/Perry Preschool study also collected data on long-term outcomes for children who attended the program for one vs. two years. While the study is highly regarded for its use of a randomized control trial to assign participants to treatment conditions, caution should be used when interpreting results for children who attended for a single year, as the group only included 13 children (Barnett, 1985). With this caveat in mind, outcomes measured at age 40

found similar benefits for children who participated in the Perry program for one year compared to two years (Schweinhart, Montie, Xiang, Barnett, Belfield and Nores, 2004).

Prekindergarten Quality

Key Takeaways

- Many stakeholders were concerned that variation in teacher standards across settings could lead to inequitable experiences for preK students. Further, several interviewees requested additional clarification and guidance regarding the requirement that a licensed teacher be “present” in private centers during the 10 designated-preK hours.
- Other stakeholder recommendations included simplifying the STep Ahead and Recognition System (STARS) and offering accessible professional development opportunities for non-public programs.
- The research literature suggests that structural quality features of preK programs—such as small class sizes and low child-teacher ratios—are necessary, but not sufficient conditions for ensuring preK quality. Instead, studies find that efforts to improve process quality—especially through instructional supports such as providing feedback and scaffolding learning activities—are more likely to benefit children’s school readiness skills.
- In general, research conducted over the past 15 years has found no or limited relationships between early childhood educators’ level of education and child outcomes.

Vermont’s Current Quality Standards

Act 166 specifies minimum quality standards that providers must meet to participate in universal preK. Providers need to fulfill the following teacher and program standards.

Teacher standards

Teacher standards vary depending on whether the program is located in a public school, private center-based program, or family child care home, as described below:

- **Public, district-operated classrooms:** PreK teachers must hold a Vermont educator license with an endorsement in either early childhood education (ECE) or early childhood special education (ECSE). Licensure requires a bachelor’s degree.
- **Private, center-based classrooms:** Programs must employ, or contract with, at least one teacher who holds a Vermont educator license with an endorsement in ECE or ECSE. The licensed teacher must be present during the 10 hours that preK education is provided.
- **Family child care homes:** At minimum, the program must receive “regular, hands-on active training and supervision” from a teacher who holds a Vermont educator license with an endorsement in ECE or ECSE for at least three hours each week during the 35 weeks of the year that preK is offered. Providers must maintain written documentation of the weekly training and supervision (Vermont Agency of Education and Vermont Agency of Human Services, 2018).

Program standards

- Providers must meet one of the following quality recognition standards:
 - National Association for the Education of Young Children (NAEYC) accreditation
 - A four- or five-star rating in the Department of Children and Families STARS system, with at least two points in each of the five arenas
 - A three-star STARS rating with a plan approved by AHS and AOE to achieve four or five stars within two years, with at least two points in each of the five arenas
- Programs must be licensed through the Department of Children and Families.
- PreK curricula need to be aligned with the Vermont Early Learning Standards.

In addition to meeting these teacher and program standards, programs also are required to conduct biannual Teaching Strategies Gold (TS Gold) assessments for each child enrolled. TS Gold scores must be reported to AOE (Vermont Agency of Education, n.d.).

State-level Stakeholder Perspectives

When asked about quality criteria standards, stakeholders talked about disparities in standards for educators teaching in private and public settings. Individuals honed in on challenges associated with educator standards and provided recommendations for standardizing educator requirements.

A central concern was the lack of clarity around what it means to have a licensed teacher present in the private provider space. As one person said, "...the discrepancy in the field in private child care centers is that....they need someone with a teaching license on site, and the rules say present, and that has not been clearly defined." One stakeholder questioned whether licensed teachers were consistently present at private centers during all hours designated as preK: "...we're not even under our law assuring that that child has access to that teacher, because as I said, [the child] might be there on Monday or Tuesday, and the teacher is on site on Thursday or Friday." On the other hand, one interviewee contended that the requirement for private centers to have a licensed teacher on site for 10 hours per week seemed disconnected from the way in which private centers function on a day-to-day basis. For providers who operate for potentially over 50 hours per week, the transition to the 10 designated hours of preK time might seem arbitrary. As one stakeholder said,

...when you're in an early childhood program that runs 50 or 60 hours a week, your curriculum runs 50 or 60 hours a week. So it's not like you have 10 hours of it that you're like, 'Oh, this is my preK hours.'

Issues of equity surfaced within the context of access to high-quality teaching. Stakeholders voiced questions over potential variability of access to high-quality teaching, particularly where private providers were concerned, and thus whether universal preK was reaching all children with equal levels of quality. One stakeholder described how activities and lessons taught by educators may look different across public and private settings:

You know, to really be education, teaching needs to be intentional. And intentional teaching takes time, it takes planning, it takes knowledge. It takes looking at the standards and figuring out creative ways to implement. And I think that really varies across settings. So I do worry about that, what's being called preK, when it's just someone stopping by for three hours a week. It doesn't feel like it's the same as having a teacher in the classroom delivering. So I think that is worrisome to me in terms of equity.

Others maintained the view that a licensed, bachelor-degree-holding teacher was not necessary for children to have a high-quality preK experience. These interviewees agreed that preK teachers should be knowledgeable about child development and curriculum, but felt that such training could be obtained through an associate's degree along with continued professional development and mentoring. In the interest of maintaining the same teacher standards across settings, one participant suggested revising the standards to set the minimum education credential as an associate's degree in all settings.

One reason discussed behind the varying levels of quality between private and public providers was public providers' ease of access to funds and time for professional development. An interviewee spoke to the challenges that private providers went through in acquiring funds for professional development and also finding time to leave the classroom to complete training. One interviewee suggested Vermont develop a statewide professional development system to support providers in achieving higher ratings within STARS system ". . . so we would define a statewide system for professional development that is based on our [universal preK] roles and on the special ed. rules . . . and then providing that to programs in order so they can get to the different STARS level." A second interviewee also recommended intertwining professional development accomplishments with STARS requirements, so that when a state licenser did a STARS "check" at a private provider, they could contextualize their observations with the level and type of professional development completed. An additional recommendation from an interviewee was for professional development experiences to be shared between public and private providers, which would build trust between providers in both sectors and build a common language.

Stakeholders also recommended revisiting the overall STARS system, which some characterized as overly complex. As one stakeholder explained, the STARS system is burdensome for private providers to navigate. However, according to the same individual, the STARS system will be streamlined in the coming year. Specifically, it will merge with child care licensing, allowing a rating of one STAR to every licensed provider in good standing as well as a restructured process for assigning ratings. Others mentioned the subjective criteria of STARS ratings, for example:

I was talking with someone the other day who's involved in revising the STARS criteria and how subjective it is, and they were contemplating criteria like, does the climate within the care facility honor diversity? . . . but I think we need to revisit that to make it a little more focused and less subjective.

In one case, a stakeholder discussed the challenges resulting from providers needing to adhere to a more rigorous set of quality standards. One consequence of this was that private providers have been going out of business. This person went on to say, "These entities aren't making a lot

of money doing this work for them to try to meet that standard, it's too big of a lift I think." In particular, this interviewee explained that perhaps some of the hardest-hit private providers that were going out of business were in rural areas that were serving low-income family populations. Another stakeholder expanded on this idea, saying private providers may be going out of business because of lack of funds that would enable them to adhere to stricter standards. However, this interviewee said that private providers may have been going out of business regardless, and that their reasoning as "not enough money is an easy scapegoat."

Literature Review

PreK program characteristics that are theorized to promote quality are typically divided into two categories: structural quality and process quality (Burchinal, 2018; Weiland, 2016). Structural quality refers to "those features of quality that can be changed by structuring the setting differently or putting different requirements in place" (Yoshikawa, et al., 2013). In practice, structural quality is typically gauged through measures of class sizes, child-teacher ratios, and educator qualifications. Process quality, on the other hand, primarily refers to the nature of children's interactions with their teachers and other children in the classroom (Weiland, 2016; Yoshikawa et al., 2013). Although structural quality features of preK programs are easier to regulate and measure (Farran, 2017), experts have increasingly come to view them as necessary, but not sufficient conditions for ensuring preK quality (Burchinal, 2018; Pianta, Downer and Hamre, 2016; Weiland, 2016). Instead, research suggests that efforts to improve process quality—especially through instructional supports such as providing feedback and scaffolding learning activities—are more likely to benefit children's school readiness skills.

Structural quality

Teacher education and credentials.

As discussed above, state-level stakeholders in Vermont expressed concern about the adequacy of current preK teacher standards, especially for educators in nonpublic settings. In particular, some interviewees did not support variation between public and private providers in the extent to which a licensed teacher with a bachelor's degree is required to be involved in preK instruction. These stakeholders felt that such discrepancies could lead to inequitable experiences for children in public vs. private programs. While some researchers and organizations have indeed called for all preK teachers to hold a bachelor's degree (National Institute for Early Education, n.d.; Whitebook, 2003), research conducted over the past 15 years has found no or limited relationships between early childhood educators' level of education and child outcomes (Early et al., 2006; Early et al., 2007; Howes et al., 2008; Lin and Magnuson, 2018; Mashburn et al., 2008)

In studies of state-funded preK programs, most analyses have failed to find a pattern between preK teacher credentials and students' school readiness skills. Most of the research in this area is based on large datasets collected by the National Center for Early Development and Learning's (NCEDL) Multi-State Study of Pre-Kindergarten, along with the NCEDL's supplemental State-Wide Early Education Programs Study (Early et al., 2005; Early et al., 2006; Howes et al., 2008; Mashburn et al., 2008). Based on these datasets, researchers generally have not detected a relationship between teacher qualifications and children's

academic skills, as measured at the end of preK (Howes et al., 2008; Mashburn et al., 2008). One slight exception comes from an analysis which found that children whose teachers had bachelor's degrees made significant gains in math during the preK year in comparison to children whose teachers did not hold a bachelor's degree (Early et al., 2006). The same study also found that children whose teachers had earned only a high school diploma or an associate's degree experienced significant gains in basic skills, such as rhyming or naming numbers, if those teachers had *also* earned a Child Development Associate (CDA) certificate. However, the CDA was not associated with gains in deeper learning skills like language or math. But beyond these relationships, no other consistent patterns emerged from the NCEdL relating teacher credentials to child outcomes.

Looking beyond studies limited to public preK, similar findings have emerged from research on early childhood education classrooms in general. Recently, Lin and Magnuson (2018) examined the association between the qualifications of center-based preschool teachers and children's school readiness skills for over 650 children who attended 189 different centers. This study is particularly notable because the researchers were able to measure teacher education at a greater level of detail than is typical. Specifically, teacher-level variables included the number of early childhood education credits earned, in addition to teachers' position on the state's 17-step "career ladder." Yet even with these fine-grained measures included in the analysis, the study did not find a relationship between teacher qualifications and children's reading, math or literacy skills at the end of preschool. As discussed below, however, these studies did show a positive relationship between process quality measures and child outcomes. In another study, researchers took advantage of several large datasets of early childhood education programs to explore the same question (Early et al., 2007). Overall, the findings failed to suggest that a relationship exists between teachers' level of education or major and children's gains in academic skills during preschool.

In several of these studies, the authors explicitly noted that the outcomes contradicted their hypotheses. Many predicted that there would be a positive relationship between child outcomes and teachers' level of education. What factors might account for the null findings? Some researchers theorized that teacher preparation programs may not sufficiently equip early childhood education teachers with the strategies needed to boost children's cognitive outcomes (Early, 2007; Lin and Magnuson, 2018). The same studies also pointed to a lack of support once new teachers enter the classroom as a possible explanation. For example, a well-prepared teacher might still struggle to improve students' academic skills if the classroom doesn't provide appropriate curriculum or materials. Regardless of the explanation, one study specifically cautioned readers from misinterpreting the findings as a sign that teacher quality is unimportant (Early et al., 2007). While teacher quality remains a critical factor in early childhood education, the authors noted, the key takeaway is that higher levels of education do not translate into an automatic guarantee of high-quality classrooms.

Class size and child-teacher ratios.

Research on class size and child-teacher ratios suggests there are few advantages to reducing preK class sizes or ratios, especially considering the cost of hiring additional teachers. Scholars have explored the association between such structural factors and child outcomes at the end of

preK using two large-scale datasets that provide information on approximately 2,500 children who attended state-funded preK in 11 different states during the 2001/02 and 2003/04 school years. One study that examined child-adult ratios found no relationship between the size of the ratio and growth in children’s academic skills during the preK year (Howes et al., 2008). Another set of researchers took a slightly different approach to the same dataset by noting whether each child’s classroom met NIEER’s benchmarks for class size (20 or fewer) and child-teacher ratio (10:1 or better) (Mashburn et al., 2008). Findings suggested no association between the benchmark standards and children’s academic or social skills at the end of preK.

As noted by Mashburn et al. (2008), structural quality variables within state-funded preK programs tend to vary within a narrow range. NIEER’s benchmark standards for class size and child-teacher ratio are quite common in public preK programs. As such, it is difficult for researchers to make claims about the relationship between child outcomes and class sizes or ratios that depart notably from the standards, simply because so few of them exist. For example, it is easy to hypothesize that a child-teacher ratio of 50:1 would be worse for children than a ratio of 10:1. But because virtually no programs with such a high ratio exist for researchers to study, we cannot make empirical claims about their relationship with child outcomes. Instead, studies of “real world” programs such as publicly-funded preK are limited to exploring variation within the restricted range that already exists. As such, it is not necessarily surprising that analyses would fail to detect a strong relationship between widely adopted structural regulations and child outcomes.

A recent meta-analysis of the impact of class sizes and ratios in early childhood education classrooms offers somewhat more nuanced results (Bowne, Magnuson, Schindler, Duncan and Yoshikawa, 2017). After reviewing 40 evaluations of early childhood education programs (including, but not limited to state-funded preK), researchers found that class sizes and ratios had to be quite small before a positive association was detected between such factors and children’s academic and cognitive outcomes. Specifically, class sizes needed to meet a threshold of 15 or fewer, and child-teacher ratios needed to be 7.5:1 or better, before they seemed to matter. Even then, associated effect sizes were only small to modest. With this in mind, the authors concluded that policies aimed at reducing class sizes or ratios to these thresholds are probably not a cost-effective strategy for increasing the quality of early childhood classrooms. Hiring extra teachers would represent a significant program cost for what appears to be only a marginal benefit. The study went on to say that the current standards that cap class sizes at 20 and child-teacher ratios at 10:1 are likely sufficient for the majority of children.

Process quality

While regulating preK structures seems unlikely to guarantee program quality, evidence exists that process quality—the nature of the interactions between preK children and their teachers—is associated with positive outcomes for preK participants. Most studies have measured process quality using the Classroom Assessment Scoring System (CLASS). CLASS evaluates three dimensions of process quality—instructional support, emotional climate and classroom management (La Paro, Pianta and Stuhlman, 2004). Observers rate each dimension on a seven-point scale. Of the three dimensions, instructional support tends to be most consistently associated with cognitive gains for preK participants. Some studies have also found a positive

relationship between emotional support and child outcomes, but the pattern is less consistent than that for instructional support (Anderson and Phillips, 2017; Howes et al., 2008; Mashburn et al., 2008)

Some of the research supporting the importance of process quality comes from the same studies mentioned above in which researchers analyzed the NCEdL's datasets on preK participants (Howes et al., 2008; Mashburn et al., 2008). In one analysis, the authors documented a positive relationship between instructional interactions and children's language and math skills at the end of preK, and between emotional interactions and student social outcomes (Mashburn et al., 2008). The analysis by Howes et al. (2008) arrived at similar conclusions: preK children in the study performed better on assessments of language and literacy in classrooms with higher-quality instructional climates and stronger teacher-student relationships. However, the study did not detect relationships for math or social outcomes. Further, the effect sizes for language and literacy, while statistically significant, tended to be small. The authors attributed these more modest findings to their analysis approach, which was somewhat more conservative than the method used in the Mashburn et al. (2008) study.

The positive relationship between process quality and preK participant outcomes observed in the NCEdL data has been replicated in other studies drawing on different data sources, adding further support to the importance of teacher-child interactions in fostering children's academic and social skills. In a study of over 700 children enrolled in 240 preK classrooms across six states, researchers found an association between instructional quality and children's language, reading and social (but not math) outcomes at both the end of preK and the end of kindergarten (Burchinal et al., 2008). Specifically, the authors explained that gains were greater when teachers "encouraged children to communicate and use language to develop reasoning skills, interacted frequently with children, provided clear and positive discipline and supervision, developed concepts coherently and provided feedback clearly and positively" (Burchinal et al., 2008). Although the relationships between process quality and child outcomes were statistically significant, effect sizes were modest.

Recent research on Oklahoma's preK program, as implemented in Tulsa, also found that instructional support predicted both short- and long-term academic outcomes for preK participants. One study detected moderately large effects for math and literacy at kindergarten entry (Johnson, Markowitz, Hill and Phillips, 2016). In contrast to some of the findings from earlier studies mentioned above (Burchinal et al. 2008; Howes et al., 2008), instructional quality had a stronger relationship with math skills than with literacy skills. Longitudinal research on Tulsa's preK program found an association between instructional support and students' reading skills at both kindergarten entry and in seventh grade (Anderson and Phillips, 2017).

Prekindergarten Administration

Key Takeaways

- Many—but not all—stakeholders supported the idea of administering Act 166 through a single agency. Among these interviewees, some suggested delegating governance to AOE, some did not express a preference for AOE vs. AHS, and others recommended that Vermont consider consolidating administration into a new stand-alone agency. In contrast, some viewed joint administration as an asset to Vermont’s mixed-delivery system, based on its inclusion of multiple perspectives regarding preK policies and facilitation of cross-agency data sharing.
- Several interviewees recommend that Vermont centralize preK contracting and payments at the state level, while taking steps to maintain opportunities for communication and collaboration between local-level public and private settings.
- Some stakeholders suggested shifting responsibility for preK delivery and oversight to the regional level.
- The research literature suggests there is not a single best practice or model for administering preK and early childhood programs. What is effective for any given state will likely depend on its unique political context, governance structure and resources.
- Although no “one size fits all” approach exists, researchers and experts have identified benefits to consolidating early childhood initiatives at the state level, either within an existing agency or through the creation of a new agency.

Vermont’s Current Administrative and Oversight Practices

Act 166 specifies that universal preK should be jointly administered by both AOE and AHS. The agencies are responsible for collaboratively developing rules to determine whether a provider meets and maintains prequalification status, establishing a system to monitor preK programs, and setting annual tuition rates. AOE and AHS maintain an Act 166 Interagency Implementation Team, which includes leadership and staff from both agencies. The team develops rules for the implementation of universal preK, in addition to providing guidance to the field. Such guidance is typically distributed to provide programs with answers to common questions or to clarify aspects of the law.

State-level Stakeholder Perspectives

Joint administration

Most stakeholders supported the idea of administering Act 166 through a single agency. Interviewees who favored single administration described the current system as challenging and inefficient. Several participants pointed to philosophical and cultural divides between the agencies as the root cause of existing difficulties. As one interviewee explained, the agencies view universal preK through their “respective lenses.” Multiple stakeholders noted that AOE’s perspective is grounded in education and the K–12 school system, whereas AHS tends to focus more on child care and the needs of families. Based on these paradigms, each agency has developed its own approaches, systems and processes. Interviewees said that the differences between the two agencies have resulted in preK administrative delays due to disagreements.

One stakeholder explained how joint administration can hinder the agencies' ability to provide prompt guidance to providers:

Sometimes when there is non-agreement for a certain subject, topic, or whatever that we're trying to put guidance out for, that's when difficulties come, challenges come, and we might come to a standstill on different issues.... That's very challenging. That's very frustrating...because we need answers to get out to the field, and we can't do it. So that's the hardest, that's one of the downsides of the joint agency because you have to have both in agreement for everything.

Among interviewees who suggested moving to single agency administration, some did not express a preference for a certain agency, while others felt AOE would be the most appropriate location in which to house preK. One participant reasoned that because preK is supported by the Education Fund, AOE should be responsible for administration and oversight. Another expressed concern that preK would not receive sufficient attention under AHS alone, due to the agency's broad scope and multitude of other initiatives to oversee. On the other hand, some doubted AOE could oversee preK on its own without hiring additional staff, especially if it also assumed responsibility for centralized contracting. Many of the stakeholders who favored single agency administration recognized that both agencies bring valuable perspectives and strengths to the successful implementation of preK. Accordingly, these interviewees recommended that any shift to single agency administration be coupled with formal structures to promote ongoing collaboration and cross-agency input, such as an interagency council. A couple participants also proposed the idea of creating a new state-level agency that would be responsible for the administration and oversight of preK.

A few participants recommended maintaining the current system of jointly administering preK, with responsibility shared between AOE and AHS. Those who held this viewpoint acknowledged the difficulties of joint administration, but ultimately felt that the benefits of joint administration outweighed any challenges or inefficiencies. For these stakeholders, it is "worth the effort" to work through the challenges inherent in joint administration to ensure that preK effectively serves students. One interviewee described how joint oversight is especially valuable in a mixed-delivery system such as Vermont's:

With the joint oversight, we're able to really think about those two different settings and the way that they're different and really try to be intentional about being responsive to that and not necessarily putting things out that maybe works well in one setting but not in the other. So I think really being able to bring the perspectives together given the mixed-delivery system. I think that is a real strength. And I would say to you I think that makes this whole system stronger...We have strengths at each agency in terms of what we can offer and provide to ensure that kids are able to get to kindergarten in a way that they can then be successful.

Another stakeholder explained that joint administration facilitates the sharing of important data between the two agencies. In particular, agencies could gain a more complete understanding of the extent to which children are being served by a range of government services.

None of the stakeholders we interviewed supported dividing administration by setting, with AOE responsible for public programs and AHS responsible for private programs. A bifurcated system seemed more likely to lead to inequitable experiences for children, participants said.

Regardless of future administrative plans, several interviewees supported the idea of shifting contracting and payments to the state level. Under the current system, supervisory unions and private providers often oversee multiple preK contracts with other providers, which stakeholders described as inefficient. Some interviewees were concerned, however, that a change to centralized contracting could weaken ties between public and private providers. As such, they suggested that any transition to centralized payments be accompanied by additional efforts to foster communication between settings. Other stakeholders shared a perception that local contracting has, in some instances, damaged relationships between public and private programs. These interviewees went on to explain that localized contracting has prompted some public districts to assume an informal monitoring role. Public schools feel responsible for ensuring that the Education Funds that pass through their districts are only distributed to private programs that currently meet prequalification standards. As a result, some stakeholders felt that the current system of local contracting might create tensions between public and private providers, lending further support to the potential benefits of centralized contracting.

A few interviewees suggested that the state consider devolving responsibility for preK students to local supervisory unions, similar to their responsibilities for K–12 students. Under this model, supervisory unions would be charged with providing a quality preK education for eligible and interested children, either within its own public schools or within private programs. As with K–12, the burden of ensuring a quality education would shift from the state level to the regional level. Supervisory unions could choose to offer their own preK program with enough seats to meet local enrollment demand, tuition out all of its local preK students to private programs, or offer a combination of public program slots and tuitioned seats in private centers. Stakeholders who introduced this idea envisioned supervisory unions hiring preK teachers who would provide support for private partners. For example, public preK teachers might travel to private centers to coordinate curriculum or even lead preK instruction. The local district or supervisory union might be further responsible for offering professional development that would bring together both its public teachers and private providers. In this model, private providers—both centers and family child care homes—would essentially be relieved from the current requirements to hire a licensed educator, identify professional development opportunities, and oversee preK curriculum. In short, regional supervisory unions would ensure that high-quality preK education components were executed in private settings.

Literature Review

As with other preK policy options, states vary in their approach to administering preK programs. Typical possibilities include single administration by a state’s agency of education or equivalent, single administration by a state’s agency of human services or equivalent, joint administration by both agencies, or single administration by a stand-alone agency responsible for preK and/or other early childhood initiatives (Friedman-Kraus et al., 2018). Single

administration by the state department of education is the most common option (Chaudry, 2017).

In recent years, it has become increasingly common for states to establish a new agency with sole oversight for early care and learning, including publicly-funded preK (Jenkins and Henry, 2016). Washington was the first to do so in 2006, with the creation of its Department of Early Learning (Chaudry, 2017). Other states that have followed suit include Alabama (Department of Early Childhood Education), Connecticut (Office of Early Childhood), and Massachusetts (Department of Early Education and Care) (Friedman-Kraus et al., 2018). Similarly, some states—such as Michigan, Maryland, and California—have consolidated all of their early childhood programs under a single agency—typically the department of education (Regenstein and Lipper, 2013).

Some states have adopted unique approaches to joint administration. For instance, Arkansas’s Better Chance program is funded through the state’s Department of Education, but administered by the Department of Human Services. The Department of Education essentially contracts with the Department of Human Services to operate the program, but the State Board of Education retains “final authority for approval of rules and grants” (Arkansas Department of Human Services, 2019). New Mexico divides preK administration by setting. Its Public Education Department (PED) is responsible for oversight of public school programs, while the Children, Youth, and Families Department (CYFD) is responsible for community-based providers (Friedman Kraus et al., 2018). The state’s Early Learning website suggests that there are structures in place to facilitate ongoing collaboration between the agencies. Specifically, representatives from PED, CYFD and the Department of Health “meet on a regular basis” to plan early learning services, coordinate the state’s early childhood data system and oversee communications, among other activities (Early Learning New Mexico, 2015).

States also vary in the extent to which they delegate authority for preK administration and oversight to the local level (Chaudry, 2017). In West Virginia, county-level teams are responsible for implementing preK (Wechsler et al., 2016). Each county maintains a “core collaborative team,” which includes representatives from preK, the county school system preschool special needs program, a community child care program and Head Start. The teams are also required to develop and implement continuous quality improvement processes (West Virginia Board of Education, 2018). By assigning quality improvement efforts to the county level, collaborative teams can tailor plans and resources to local needs. In addition, counties must provide professional development that takes into account data collected through the continuous improvement process (Wechsler et al., 2016). Michigan also delegates some of the responsibility for its Great Start Readiness Program to the local level. At least in part, the state opted for regional administration to expand the program’s monitoring capacity and ability to provide supports and resources based on local needs (Wechsler et al., 2016).

The preK administrative model adopted by each state is likely to depend on its unique political context, governance structure, resources and administrative history. As a result, there is no one-size-fits-all “best practice model,” so each state needs to carefully consider the most appropriate structure for its own context (Regenstein, 2015). Regenstein (2015) suggests that states begin their consideration of a governance system by identifying their early childhood goals and

intended outcomes. Goals and outcomes can then be used to guide the selection of a model. Common governance goals include coordination, alignment, sustainability, efficiency and accountability.

Regenstein (2015) outlines core questions states should ask as they contemplate potential changes to early childhood administrative models. These include the following:

- Should early childhood programs be consolidated into a single agency?
- If consolidation is deemed the best option, is it better to consolidate into an existing agency, or create a new agency?
- If consolidation into an existing agency is preferable, which agency should be responsible?

Regarding the first question—whether to consolidate at all—Regenstein (2015) details several advantages to consolidating early childhood programs. Specifically, consolidation has the potential to facilitate coordination between services, strengthen communication and streamline monitoring and accountability efforts. In theory, the creation of a new agency could also increase public awareness and perceived legitimacy of early childhood programs. In short, consolidation can help to decrease redundancies and increase efficiency (Regenstein and Lipper, 2013). States considering consolidation must also identify which programs to combine. Potential options include the range of programs serving the birth-to-five population, including child care, preK/preschool, Head Start, early childhood special education and professional development programs for early childhood educators (Regenstein, 2015).

States that opt to consolidate early childhood programs will typically move on to weigh the pros and cons of creating a new agency or consolidating within an existing agency (Regenstein, 2015). Decision makers should consider the potential political influence and authority, both in the short and long term, of each option. For instance, a new stand-alone agency might garner more public legitimacy for early childhood programs, but may be at risk for underfunding or understaffing as a new agency. Leadership is another important factor to assess. If programs are combined into an existing agency, the state may want to ensure that the leader of early childhood initiatives is high-ranking enough to effectively advocate for resources. It may also be worthwhile to predict the political feasibility of enacting either alternative. Regenstein (2015) points out that, depending on the political climate, states might start by consolidating programs into an existing agency, which leaves open the option to create a new “spin-off” agency in the future.

Should a state choose to consolidate early childhood programs within an existing agency instead of creating a new one, the next question is where to consolidate (Regenstein, 2015). Typically, states who take this route will decide between the department of education or the department of human services. Key considerations include the extent to which the mission and goals of each agency align with early childhood goals, the enthusiasm of each agency lead to oversee early childhood programs, and the capacity of agency staff. On one hand, Regenstein (2015) notes that a state’s department of education may be a better fit for early learning programs, due to a well-established focus on academic outcomes and the potential for K–12 alignment. On the other hand, early childhood programs often aim to promote developmental outcomes beyond academics. Such goals may be more closely aligned with state human services

departments (Regenstein and Lipper, 2013). Further, human services agencies often bring a wealth of experience working with the range of community providers that are usually involved in early childhood services (Regenstein, 2015). Finally, if established local or regional early childhood systems exist within a state, policymakers might weigh the likelihood of each agency's aptitude to effectively collaborate with local or regional structures.

In addition to identifying key questions and important factors to guide decision-making about early childhood programs, Regenstein and Lipper (2013) also conducted interviews with state agency staff from three states—California, Maryland and Michigan—that successfully consolidated their early childhood initiatives. Although the sample size was small, interviewees claimed that the consolidation was worthwhile. However, they also characterized the process as a challenging one. Consolidation demanded attention to complex issues, such as employee transitions, administrative systems and funding streams. In the end, though, agency leaders felt that the long-term positive benefits of consolidation outweighed the short-term difficulties.

Similar themes emerged from a recent case study analysis of four state preK governance models (Wechsler et al., 2016). In their review, the authors detailed the contextual factors that led Michigan, West Virginia, Washington and North Carolina to their current preK administrative structures. The four states vary in their approaches. Michigan and West Virginia administer preK from their respective departments of education, North Carolina from its department of human services, and Washington created a new agency to administer preK. While the states adopted different structural approaches, all sought to systematically increase coordination among early childhood programs and services (Wechsler et al., 2016). In fact, the recommendation to coordinate the administration of birth-through-grade-three programs emerged as one of the key lessons from the review. Specifically, the authors suggested bringing all children's services (e.g., preK, child care, home visiting) into a single agency and implementing formal systems to promote cross-agency collaboration. The report also recommended that states develop data systems to facilitate the centralization of information related to preK. For example, West Virginia's data system includes data on child assessment, health, attendance and program assessment.

While state-level experiences can provide insights regarding the streamlining of preK administration, much less is known about the association between the centralization of early childhood governance and child outcomes (Jenkins, 2014). Findings from one study exploring this relationship pointed to a positive association between decentralized early childhood governance and children's kindergarten reading skills (Jenkins and Henry, 2016). In other words, children who attended early childhood education programs in states with dispersed administration scored higher on reading assessments at kindergarten entry than children who attended programs in states with greater levels of consolidation. There was a similar, although not statistically significant relationship, for math skills. Specifically, analyses suggested that administrative involvement across four agencies is the optimal number for promoting children's reading outcomes. In the study, researchers assigned each state a dispersion score based on the number of state-level agencies involved in the following policy areas in 2005: child care subsidy, child care licensing, child care quality initiatives, preK, Head Start, IDEA and IDEA – Early Intervention. The authors note that their findings contradict the prevailing

viewpoint in the literature, which typically characterizes decentralized early childhood governance as a problem.

References

- Ackerman, D. J., Barnett, W. S., Hawkinson, L. E., Brown, K. and McGonigle, E. A. (2009). *Providing Preschool Education for All 4-Year-Olds: Lessons from Six State Journeys*. Preschool Policy Brief. Issue 18. National Institute for Early Education Research.
- Anderson, S., and Phillips, D. (2017). Is pre-K classroom quality associated with kindergarten and middle-school academic skills?. *Developmental psychology*, 53(6), 1063.
- Andrews, R. J., Jargowsky, P., and Kuhne, K. (2012). *The effects of Texas's targeted pre-kindergarten program on academic performance* (No. w18598). National Bureau of Economic Research.
- Arkansas Department of Human Services. (2019). *Arkansas Better Chance program*. Retrieved from: <https://humanservices.arkansas.gov/about-dhs/dcece/programs-services/arkansas-better-chance-program>
- Arteaga, I., Humpage, S., Reynolds, A. J., and Temple, J. A. (2014). One year of preschool or two: Is it important for adult outcomes?. *Economics of education review*, 40, 221-237.
- Atteberry, A., Bassok, D., and Wong, V. C. *The Effects of Full-day Pre-kindergarten: Experimental Evidence of Impacts on Children's School Readiness*. Retrieved from: https://curry.virginia.edu/sites/default/files/uploads/epw/64_Effects_Full_Day_Prekindergarten.pdf
- Barnett, W. S. (1985). Benefit-cost analysis of the Perry Preschool Program and its policy implications. *Educational evaluation and policy analysis*, 7(4), 333-342.
- Barnett, W. S., Jung, K., Youn, M., and Frede, E. C. (2013). *Abbott preschool program longitudinal effects study: Fifth grade follow-up*. National Institute for Early Education Research, 20.
- Barnett, W. S., and Kasmin, R. (2016). *Funding landscape for preschool with a highly qualified workforce*. National Institute for Early Education Research.
- Barnett, W. S., and Kasmin, R. (2017). *Teacher compensation parity policies and state-funded pre-k programs*. Center for the Study of Child Care Employment, University of California, Berkeley.
- Barnett, W. S., and Kasmin, R. (2018). Fully Funding Pre-K through K-12 Funding Formulas. *State Education Standard*, 18(1), 22.
- Barnett, W. S., and Lamy, C. (2006). *Estimated impacts of number of years of preschool attendance on vocabulary, literacy and math skills at kindergarten entry*. New Brunswick, NJ: National Institute for Early Education Research.
- Bassok, D., Fitzpatrick, M., Greenberg, E., and Loeb, S. (2016). Within-and between-sector quality differences in early childhood education and care. *Child Development*, 87(5), 1627-1645.
- Bassok, D., Gibbs, C. R., and Latham, S. (2018). Preschool and children's outcomes in elementary school: Have patterns changed nationwide between 1998 and 2010? [Advance online publication]. *Child Development*. doi: 10.1111/cdev.13067

- Boylan, E., and White, S. (2010). *Formula for Success: Adding High-Quality Pre-K to State School Funding Formulas*. Education Reform Series. Pew Center on the States.
- Bowne, J. B., Magnuson, K. A., Schindler, H. S., Duncan, G. J., and Yoshikawa, H. (2017). A meta-analysis of class sizes and ratios in early childhood education programs: Are thresholds of quality associated with greater impacts on cognitive, achievement, and socioemotional outcomes?. *Educational Evaluation and Policy Analysis*, 39(3), 407-428.
- Burchinal, M. (2018). Measuring early care and education quality. *Child Development Perspectives*, 12(1), 3-9.
- Burchinal, M., Howes, C., Pianta, R., Bryant, D., Early, D., Clifford, R., and Barbarin, O. (2008). Predicting child outcomes at the end of kindergarten from the quality of pre-kindergarten teacher-child interactions and instruction. *Applied Development Science*, 12(3), 140-153.
- Cascio, E. U. (2017). *Does Universal Preschool Hit the Target? Program Access and Preschool Impacts* (No. w23215). National Bureau of Economic Research.
- Cascio, E. U., and Schanzenbach, D. W. (2013). *The impacts of expanding access to high-quality preschool education* (No. w19735). National Bureau of Economic Research.
- Chaudry, A. (2017). The promise of preschool education: Challenges for policy and governance. *Puzzling it out: The current state of scientific knowledge on pre-kindergarten effects*. Washington, DC: Brookings Institution.
- Coley, R. L., Votruba-Drzal, E., Collins, M., and Cook, K. D. (2016). Comparing public, private, and informal preschool programs in a national sample of low-income children. *Early Childhood Research Quarterly*, 36, 91-105.
- Colorado Department of Education. (2018). Preschool finance document. Retrieved from: <http://www.cde.state.co.us/cpp/statepkfinance>
- Cooper, H., Allen, A. B., Patall, E. A., and Dent, A. L. (2010). Effects of full-day kindergarten on academic achievement and social development. *Review of educational research*, 80(1), 34-70.
- Costa, K. (2014). *Fact sheet: Social impact bonds in the United States*. Center for American Progress.
- DeCicca, P. (2007). Does full-day kindergarten matter? Evidence from the first two years of schooling. *Economics of Education Review*, 26(1), 67-82.
- Dodge, K. A., Bai, Y., Ladd, H., and Muschkin, C. (2017). Impact of statewide early childhood programs and policies on educational outcomes in elementary school. *Child Development*, 88, 996-1014.
- Domitrovich, C. E., Morgan, N. R., Moore, J. E., Cooper, B. R., Shah, H. K., Jacobson, L., and Greenberg, M. T. (2013). One versus two years: Does length of exposure to an enhanced preschool program impact the academic functioning of disadvantaged children in kindergarten?. *Early Childhood Research Quarterly*, 28(4), 704-713.

- Dotterer, A. M., Burchinal, M., Bryant, D., Early, D., and Pianta, R. C. (2013). Universal and targeted pre-kindergarten programmes: a comparison of classroom characteristics and child outcomes. *Early Child Development and Care*, 183(7), 931-950.
- Early, D., Barbarin, O., Bryant, D., Burchinal, M., Chang, F., Clifford, R., ... and Kraft-Sayre, M. (2005). *Pre-kindergarten in eleven states: NCEDE's multi-state study of pre-kindergarten and study of state-wide early education programs (SWEEP)*. Chapel Hill, NC: University of North Carolina, Chapel Hill. Retrieved from: <https://fpg.unc.edu/node/4654>
- Early, D. M., Bryant, D. M., Pianta, R. C., Clifford, R. M., Burchinal, M. R., Ritchie, S., ... and Barbarin, O. (2006). Are teachers' education, major, and credentials related to classroom quality and children's academic gains in pre-kindergarten?. *Early Childhood Research Quarterly*, 21(2), 174-195.
- Early, D. M., Maxwell, K. L., Burchinal, M., Alva, S., Bender, R. H., Bryant, D., ... and Henry, G. T. (2007). Teachers' education, classroom quality, and young children's academic skills: Results from seven studies of preschool programs. *Child development*, 78(2), 558-580.
- Early Learning New Mexico. (2015). *Administration*. Retrieved from <http://www.earlylearningnm.org/administration>
- Farran, D.C. (2017). Characteristics of pre-kindergarten programs that drive positive outcomes. *Puzzling it out: The current state of scientific knowledge on pre-kindergarten effects*. Washington, DC: Brookings Institution.
- Fitzpatrick, M. D. (2008). Starting school at four: The effect of universal pre-kindergarten on children's academic achievement. *The BE Journal of Economic Analysis and Policy*, 8(1).
- Friedman-Krauss, A. H., Barnett, W. S., Weisenfeld, G. G., Kasmin, R., DiCrecchio, N., and Horowitz, M. (2018). *The State of Preschool 2017: State Preschool Yearbook*. National Institute for Early Education Research.
- Fuller, B., Bein, E., Bridges, M., Kim, Y., and Rabe-Hesketh, S. (2017). Do academic preschools yield stronger benefits? Cognitive emphasis, dosage, and early learning. *Journal of Applied Developmental Psychology*, 52, 1-11.
- Gibbs, C. (2014). Experimental evidence on early intervention: *The impact of full-day kindergarten*. Frank Batten School of Leadership and Public Policy Working Paper, 4. Retrieved from: <https://pdfs.semanticscholar.org/2afd/c0c676804815fa5aeb504d24a428edd31f0d.pdf>
- Gormley Jr, W. T. (2017). Universal vs. Targeted Pre-Kindergarten: Reflections for Policymakers. *Puzzling it out: The current state of scientific knowledge on pre-kindergarten effects*. Washington, DC: Brookings Institution.
- Gormley Jr, W. T., Gayer, T., Phillips, D., and Dawson, B. (2005). The effects of universal pre-K on cognitive development. *Developmental psychology*, 41(6), 872.

- Gormley Jr, W. T., Phillips, D., and Anderson, S. (2018). The Effects of Tulsa's Pre-K Program on Middle School Student Performance. *Journal of Policy Analysis and Management*, 37(1), 63-87.
- H. 517, 2017-2018 Session, (Vt. 2017).
- Harvard Kennedy School Government Performance Lab. (2017). *Social Impact Bonds 101*. Retrieved from: https://govlab.hks.harvard.edu/files/govlabs/files/sibs_101_gpl_2017.pdf
- Howes, C., Burchinal, M., Pianta, R., Bryant, D., Early, D., Clifford, R., and Barbarin, O. (2008). Ready to learn? Children's pre-academic achievement in pre-kindergarten programs. *Early childhood research quarterly*, 23(1), 27-50.
- Hustedt, J. T., and Barnett, W. S. (2011). Financing early childhood education programs: State, federal, and local issues. *Educational Policy*, 25(1), 167-192.
- Hustedt, J. T., Barnett, W. S., Jung, K., and Thomas, J. (2007). *The effects of the Arkansas Better Chance Program on young children's school readiness*. New Brunswick, NJ: National Institute for Early Education Research (NIEER).
- Jenkins, J. M. (2014). Early childhood development as economic development: Considerations for state-level policy innovation and experimentation. *Economic Development Quarterly*, 28(2), 147-165.
- Jenkins, J. M., and Henry, G. T. (2016). Dispersed vs. centralized policy governance: The Case of state early care and education policy. *Journal of Public Administration Research and Theory*, 26(4), 709-725.
- Johnson, A. D., Markowitz, A. J., Hill, C. J., and Phillips, D. A. (2016). Variation in impacts of Tulsa pre-K on cognitive development in kindergarten: The role of instructional support. *Developmental psychology*, 52(12), 2145.
- Ladd, H. F., Muschkin, C. G., and Dodge, K. A. (2014). From birth to school: Early childhood initiatives and third-grade outcomes in North Carolina. *Journal of Policy Analysis and Management*, 33(1), 162-187.
- Lamy, C., Barnett, W. S., and Jung, K. (2005). *The effects of New Jersey's Abbott Preschool Program on young children's school readiness*. New Brunswick, NJ: National Institute for Early Education Research, Rutgers University.
- La Paro, K. M., Pianta, R. C., and Stuhlman, M. (2004). The classroom assessment scoring system: Findings from the prekindergarten year. *The Elementary School Journal*, 104(5), 409-426.
- Lee, K. (2011). Impacts of the duration of Head Start enrollment on children's academic outcomes: moderation effects of family risk factors and earlier outcomes. *Journal of Community Psychology*, 39(6), 698-716.
- Lee, V. E., Burkam, D. T., Ready, D. D., Honigman, J., and Meisels, S. J. (2006). Full-day versus half-day kindergarten: In which program do children learn more?. *American Journal of Education*, 112(2), 163-208.

- Leow, C., and Wen, X. (2017). Is full day better than half day? A propensity score analysis of the association between Head Start Program intensity and children's school performance in kindergarten. *Early Education and Development, 28*(2), 224-239.
- Lin, Y. C., and Magnuson, K. A. (2018). Classroom quality and children's academic skills in child care centers: Understanding the role of teacher qualifications. *Early Childhood Research Quarterly, 42*, 215-227.
- Lipsev, M. W., Farran, D. C., and Durkin, K. (2018). Effects of the Tennessee Prekindergarten Program on children's achievement and behavior through third grade. *Early Childhood Research Quarterly, 45*, 155-176.
- Loeb, S., Bridges, M., Bassok, D., Fuller, B., and Rumberger, R. W. (2007). How much is too much? The influence of preschool centers on children's social and cognitive development. *Economics of Education Review, 26*(1), 52-66.
- Mashburn, A. J., Pianta, R. C., Hamre, B. K., Downer, J. T., Barbarin, O. A., Bryant, D., ... and Howes, C. (2008). Measures of classroom quality in prekindergarten and children's development of academic, language, and social skills. *Child development, 79*(3), 732-749.
- McFarland, J., Hussar, B., Wang, X., Zhang, J., Wang, K., Rathbun, A., Barmer, A., Forrest Cataldi, E., and Bullock Mann, F. (2018). *The Condition of Education 2018 (NCES 2018-144)*. U.S. Department of Education. Washington, DC: National Center for Education Statistics.
- McLean, C., Dichter, H., and Whitebook, M. (2017). *Strategies in Pursuit of Pre-K Teacher Compensation Parity: Lessons from Seven States and Cities*. National Institute for Early Education Research.
- Muschkin, C. G., Ladd, H. F., and Dodge, K. A. (2015). Impact of North Carolina's early childhood initiatives on special education placements in third grade. *Educational Evaluation and Policy Analysis, 37*(4), 478-500.
- National Institute for Early Education. (n.d.). *Overview of changes to NIEER Quality Standards Benchmarks*. Retrieved from: <http://nieer.org/wp-content/uploads/2017/10/Overview-of-Changes-to-NIEER-Quality-Standards-Benchmarks.pdf>
- Peisner-Feinberg, E. S., Garwood, J. D., and Mokrova, I. L. (2016). *Children's Outcomes and Classroom Quality from Pre-K through Kindergarten: Findings from Year 2 of Georgia's Pre-K Longitudinal Study*. Chapel Hill, NC: University of North Carolina, Frank Porter Graham Child Development Institute.
- Peisner-Feinberg, E. S., Mokrova, I. L., and Anderson, T. L. (2017). *Children's outcomes through first grade: Findings from year 3 of Georgia's Pre-K longitudinal study*. Chapel Hill, NC:
- Peisner-Feinberg, E. S., and Schaaf, J. M. (2010). *Long-term effects of the North Carolina More at Four Pre-Kindergarten Program: Children's reading and math skills at third grade*. Chapel Hill, NC: University of North Carolina, Frank Porter Graham Child Development Institute.

- Peisner-Feinberg, E. S., and Schaaf, J. M. (2011). *Effects of the North Carolina more at four pre-kindergarten program on children's school readiness skills: Key findings*. Chapel Hill, NC: University of North Carolina, Frank Porter Graham Child Development Institute.
- Peisner-Feinberg, E. S., Schaaf, J. M., Hildebrandt, L. M., and Pan, Y. (2015). *Children's pre-k outcomes and classroom quality in Georgia's Pre-K Program: Findings from the 2013-2014 evaluation study*. Chapel Hill, NC: University of North Carolina, Frank Porter Graham Child Development Institute.
- Peisner-Feinberg, E. S., Schaaf, J. M., LaForett, D. R., Hildebrandt, L. M., and Sideris, J. (2014). *Effects of Georgia's pre-K program on children's school readiness skills: Findings from the 2012–2013 evaluation study*. Chapel Hill, NC: University of North Carolina, Frank Porter Graham Child Development Institute.
- University of North Carolina, Frank Porter Graham Child Development Institute.
- Phillips, D. A., Anderson, S., Datta, A. R., and Kisker, E. E. (2018). The changing landscape of publicly-funded center-based child care: 1990 and 2012. *Children and Youth Services Review, 91*, 94-104.
- Phillips, D., Austin, L. J., and Whitebook, M. (2016). The early care and education workforce. *The Future of Children, 139-158*.
- Pianta, R., Downer, J., and Hamre, B. (2016). Quality in early education classrooms: Definitions, gaps, and systems. *The Future of Children, 26(2)*, 119-137.
- Puma, M., Bell, S., Cook, R., Heid, C., Broene, P., Jenkins, F., ... and Downer, J. (2012). *Third Grade Follow-Up to the Head Start Impact Study: Final Report*. OPRE Report 2012-45. Washington, DC: Office of Planning, Research and Evaluation, Administration for Children and Families, U.S. Department of Health and Human Services
- Rangan, V. K., and Chase, L. A. (2015). The payoff of pay-for-success. *Stanford Social Innovation Review, 4*, 28-38.
- Regenstein, E. (2015). Glancing at Governance. *Early Childhood Governance: Choices and Consequences, 33*.
- Regenstein, E., and Lipper, K. (2013). *A framework for choosing a state-level early childhood governance system*. Build Initiative.
- Reynolds, A. J., Richardson, B. A., Hayakawa, M., Lease, E. M., Warner-Richter, M., Englund, M. M., ... and Sullivan, M. (2014). Association of a full-day vs part-day preschool intervention with school readiness, attendance, and parent involvement. *Jama, 312(20)*, 2126-2134.
- Schumacher, R., Ewen, D., Hart, K., and Lombardi, J. (2005). *All Together Now: State Experiences In Using Community-Based Child Care To Provide Pre-Kindergarten*. Center for Law and Social Policy CLASP.
- Schweinhart, L. J., Montie, J., Xiang, Z., Barnett, W. S., Belfield, C. R., and Nores, M. (2004). *The High/Scope Perry Preschool study through age 40: Summary, conclusions, and frequently asked questions*. High/Scope Educational Research Foundation.

- Skibbe, L. E., Connor, C. M., Morrison, F. J., and Jewkes, A. M. (2011). Schooling effects on preschoolers' self-regulation, early literacy, and language growth. *Early Childhood Research Quarterly*, 26(1), 42-49.
- Stone, D. (2008). *Funding the future: States' approaches to pre-k finance*. Washington, DC: Pre-K Now.
- Temple, J. A., and Reynolds, A. J. (2015). Using benefit-cost analysis to scale up early childhood programs through pay-for-success financing. *Journal of benefit-cost analysis*, 6(3), 628-653.
- Vermont Agency of Education. (n.d.). Universal prekindergarten. Retrieved from: <https://education.vermont.gov/student-support/early-education/prekindergarten>
- Vermont Agency of Education and Vermont Agency of Human Services. (2016). *Determination of the Statewide Rate for Pre-K Tuition*. Retrieved from: <https://education.vermont.gov/sites/aoe/files/documents/edu-early-education-prek-draft-statewide-tuition-rate.pdf>
- Vermont Agency of Education and Vermont Agency of Human Services. (2017). *Community-Based Early Childhood Programs: What does Act 166 mean for you?*. Retrieved from: https://education.vermont.gov/sites/aoe/files/documents/edu-early-education-community-based-act166-mean-to-you_0.pdf
- Vermont Agency of Education and Vermont Agency of Human Services. (2018). *The Quality of Prekindergarten Education in Vermont*. Retrieved from: <https://education.vermont.gov/student-support/early-education/prekindergarten>
- Vermont Department of Taxes, (2018). *The Education fund and education finance*. Retrieved from: <https://tax.vermont.gov/sites/tax/files/documents/The%20Education%20Fund%20and%20Education%20Finance.pdf>
- Vermont Department of Taxes. (n.d.). Frequently asked questions: Education tax rates. Retrieved from: <https://tax.vermont.gov/research-and-reports/tax-rates-and-charts/education-tax-rates/faqs>
- Vermont Legislative Joint Fiscal Office. (2018). *Child care and prekindergarten capacity baseline report* (VT LEG #335678 v.3). Retrieved from: https://ljfo.vermont.gov/assets/Uploads/55216da9a8/Child_Care_Capacity_Report.pdf
- Wechsler, M., Kirp, D., Ali, T. T., Gardner, M., Maier, A., Melnick, H., and Shields, P. M. (2016). *The road to high-quality early learning: Lessons from the states*. Palo Alto, CA: Learning Policy Institute.
- Weiland, C. (2016). Launching Preschool 2.0: A road map to high-quality public programs at scale. *Behavioral Science and Policy*, 2(1), 37-46.
- Weiland, C. (2018). Commentary: Pivoting to the "how": Moving preschool policy, practice, and research forward. *Early Childhood Research Quarterly*, 45, 188-192.
- Weiland, C., and Yoshikawa, H. (2013). Impacts of a prekindergarten program on children's mathematics, language, literacy, executive function, and emotional skills. *Child Development*, 84(6), 2112-2130.

- Wen, X., Leow, C., Hahs-Vaughn, D. L., Korfmacher, J., and Marcus, S. M. (2012). Are two years better than one year? A propensity score analysis of the impact of Head Start program duration on children's school performance in kindergarten. *Early Childhood Research Quarterly*, 27(4), 684-694.
- West Virginia Board of Education. (2018). *West Virginia's Universal Pre-K Guidebook*. Retrieved from: <https://wvde.us/wp-content/uploads/2018/05/WV-Universal-Pre-K-Collaboration-Guidebook-April-2018.pdf>
- Whitebook, M. (2003). *Bachelor's Degrees Are Best: Higher Qualifications for Pre-Kindergarten Teachers Lead to Better Learning Environments for Children*. Washington, DC: The Trust for Early Education.
- Wisconsin Department of Public Instruction. (2017). *Policy information advisory 2.17. Subject: Four-year-old kindergarten. Program area: Early childhood*. Retrieved from: [https://dpi.wi.gov/sites/default/files/imce/early childhood/pdf/4K_Bulletin_Aug_2017.pdf](https://dpi.wi.gov/sites/default/files/imce/early%20childhood/pdf/4K_Bulletin_Aug_2017.pdf)
- Wolgemuth, J. R., Cobb, R. B., Winokur, M. A., Leech, N., and Ellerby, D. (2006). Comparing longitudinal academic achievement of full-day and half-day kindergarten students. *The Journal of Educational Research*, 99(5), 260-270.
- Yoshikawa, H., Weiland, C., Brooks-Gunn, J., Burchinal, M. R., Espinosa, L. M., Gormley, W. T., ... and Zaslow, M. J. (2013). *Investing in our future: The evidence base on preschool education*. Washington, D.C.: Society for Research in Child Development
- Zvoch, K., Reynolds, R. E., and Parker, R. P. (2008). Full-day kindergarten and student literacy growth: Does a lengthened school day make a difference?. *Early Childhood Research Quarterly*, 23(1), 94-107.