

Early Care and Education Quality Improvement: A Typology of Intervention Approaches



Early Care and Education Quality Improvement: A Typology of Intervention Approaches

OPRE Research Brief #2014-36
June 2014

Kimberly Boller, Mathematica Policy Research
Kate Tarrant
Diana D. Schaack, San Diego State University

Submitted to:
Ivelisse Martinez-Beck, Ph.D., Project Officer
Office of Planning, Research and Evaluation
Administration for Children and Families
U.S. Department of Health and Human Services

Contract Number: HHSP23320095631WC

Project Director: Kathryn Tout
Child Trends
7315 Wisconsin Avenue
Suite 1200W
Bethesda, MD 20814

This report is in the public domain. Permission to reproduce is not necessary.

Suggested citation: Boller, K., Tarrant, K. & Schaack, D.D. (2014). *Early Care and Education Quality Improvement: A Typology of Intervention Approaches*. OPRE Research Report #2014-36. Washington, DC: Office of Planning, Research and Evaluation, Administration for Children and Families, U.S. Department of Health and Human Services.

This document was prepared to accompany other resources on evaluation of Quality Rating and Improvement Systems (QRIS) and other quality improvement initiatives developed by the Quality Initiatives Research and Evaluation Consortium (INQUIRE).

Disclaimer: The views expressed in this publication do not necessarily reflect the views or policies of the Office of Planning, Research and Evaluation, the Administration for Children and Families, or the U.S. Department of Health and Human Services.

This report and other reports sponsored by the Office of Planning, Research and Evaluation are available at <http://www.acf.hhs.gov/programs/opre/index.html>.



Overview

The purpose of this brief is to support continued innovation and inquiry in early care and education (ECE) quality improvement (QI) efforts by presenting an expanded range of QI alternatives in a novel framework. Despite an increased focus on QI at the federal, state, and local levels, there is little agreement on how to implement QI efforts effectively, particularly within state Quality Rating and Improvement Systems (QRIS). To date, most evaluation designs have largely been unable to disentangle the effects of particular components of QI interventions, which makes evidence-based decision-making difficult for policymakers and practitioners alike. This brief outlines a conceptual framework of QI that captures a broad typology of QI approaches. The brief also includes a scan of the evidence base for QI efforts to identify those supported by a substantial or growing body of evidence, those for which there is little evidence or for which findings are mixed, and those that demonstrate null and negative impacts on global quality, teaching behaviors, or child outcomes.

The brief identifies four types of QI efforts that aim to change behavior and indirectly impact children's outcomes. These QI types and the summary of evidence for each include:

- ECE workforce interventions that target instructional practices, including providing training and relationship-based supports, helping teachers engage in formal education or credentialing, supporting curriculum implementation, using data-driven instruction and decision-making, and providing financial incentives. At this level, the most rigorous evidence of effectiveness exists for some subtypes of relationship-based supports (coaching and consultation), curriculum interventions, and data-driven decision-making (through child progress monitoring).
- Setting-level interventions that target the instructional environment, including reducing child-adult ratios and group sizes, providing grants for facilities and learning materials, improving leadership and administrative practices, developing shared services, providing technical assistance to achieve higher program standards, promoting a culture of continuous quality improvement, and provision of financial incentives. There is a modest amount of rigorous research for this QI type; lower teacher-child ratios and group size requirements have the strongest evidence within this category.
- Family-level interventions that increase families' understanding of ECE quality, including provision of consumer education, financial incentives, tuition credits, and conditional cash transfers. The evidence base on these types of interventions is not yet developed.
- System-level interventions that build, enhance, coordinate or introduce interventions into the system, including developing requirements related to professional development, credentialing and training registries; strengthening higher education; strengthening program licensure and regulations; investing in governance and data-driven decision-making; developing financing strategies; and implementing QRIS. The evidence base on these types of interventions is not yet developed.

The QI framework and the scan of existing literature demonstrate that minimal evidence is available to guide decision-making in ECE outside of a few intervention approaches at the workforce and setting levels. There is tremendous opportunity to advance the field. The brief offers a framework for continuous quality improvement for ECE. Moreover, it encourages the ECE community to build its evidence base through data collection, research, and testing of innovating interventions and strategies.



Early Care and Education Quality Improvement: A Typology of Intervention Approaches

Over the past 25 years, public and private investments in early care and education (ECE) in the United States have increased. Of the 20 million children under age five, 12.2 million (61 percent) spend some time in non-parental care (U.S. Census Bureau, 2011). In fact, the majority of children from low-income families receive child care subsidies (2,506,000 children; ASPE 2010), participate in Early Head Start or Head Start (904,153 children; Office of Head Start, 2011) or state prekindergarten programs (1,323,128 children; Barnett, Carolan, Fitzgerald, Squires, 2010), or are enrolled in privately-funded community-based child care arrangements. Numerous efforts to improve the well-being of children in ECE at state and local levels focus on implementing interventions and developing ECE system-level structures designed to improve program quality, teaching and caregiving practices, and ultimately child social, emotional, and cognitive outcomes. Ideally, ECE quality improvement (QI) efforts would be informed by research and evaluation (Whitehurst, 2013a, b). However, the evidence base for current QI approaches is still in an

early stage of development, and garnering support for investments in new strategies is challenging for practitioners and policymakers.

This brief aims to support continued innovation and inquiry in ECE QI efforts by presenting an expanded range of QI alternatives in a novel framework. The paper proceeds in five parts; we: (1) provide an overview of the current QI context, (2) discuss the methodology for this review, (3) offer a conceptual framework to categorize QI efforts, (4) summarize trends in the evidence base on the effectiveness of different types of QI, and (5) conclude with a broader discussion of potential QI efforts that, guided by research and practice, could augment or replace existing approaches.

To begin with, we define some important terms we use to describe the array of efforts oriented toward ECE quality improvement. Drawing from the What Works Clearinghouse, we define an intervention as a QI effort designed to change the knowledge or behaviors of adults working with and caring for

children or the knowledge and behaviors of children themselves. Such interventions could include teacher training or curriculum implementation.¹ We define a QI strategy as a structure at the ECE system level that is designed to indirectly evoke changes in classrooms, teachers, or children. System-level strategies could include structures such as professional development registries and Quality Rating and Improvement Systems. Interventions can be introduced within system-level structures, such as passing legislation that would increase the requirements for teacher education, which has a direct aim of changing teacher knowledge and practices and thereby children's outcomes. System-level strategies often require changes in the behaviors of actors at multiple levels of the ECE system (e.g., policymakers, advocates) and thus require intermediary outcomes before changes in teaching and learning may be realized. When referring to the overall constellation of QI, which includes interventions and strategies, we use the terms QI efforts or approaches.

The Current Quality Improvement Intervention Context

With increased attention to the quality of care young children receive, early care and education QI efforts have begun to evolve. Historically, QI efforts have focused on training early childhood home-based providers and classroom teachers² and raising program licensing regulations (Paulsell, Porter, Kirby, Boller, Martin et al., 2010; Zaslow, Tout, Halle, Vick Whittaker & Lavelle, 2010). More recently, QI efforts have converged with the advent of Quality Rating and Improvement Systems (QRIS). With this comprehensive system strategy, states typically offer a number of coordinated interventions, including staff professional development and training/technical assistance, financial incentives to settings that improve quality; and conduct parent outreach to help guide their selection of higher-quality ECE settings (Tout et al., 2010). Despite an increased focus on QI at the federal, state, and local levels and consensus on the broad types of QI employed, there is little agreement on how to implement QI efforts effectively. Across states, QI varies with respect to content, delivery mechanism, dosage, and intensity and there is little understanding of how variation in design features and teacher and setting characteristics may affect impact.

The process policymakers use to select QI approaches is complex: it is influenced by state and local politics, budgets, and programmatic context. Research often plays a limited role in informing QI design (Rigby, 2005). Although the evidence base to guide the selection of early care and education QI has increased, relatively few approaches have been rigorously tested and their effectiveness systematically documented and evaluated (Paulsell, Porter, & Kirby, 2010; Paulsell, Avellar, Martin, & Del Grosso, 2010; What Works Clearinghouse Early Childhood Education Reviews³). Economic analyses (cost-benefit in particular) have been done on only a handful of ECE QI interventions (Washington State Institute for Public Policy, 2011). Evidence of effectiveness gleaned from systematic reviews of the literature and from evaluation projects are cited by some policy makers and funders as a criterion for funding or expanding a QI initiative (Orzag, 2009), but overall, pertinent research evidence may not exist or may be underutilized for informing decision-making (Baron & Haskins, 2011). Consequently, many states attempt to take comprehensive approaches to QI and provide multiple QI interventions within a center or family child care home. To date, most evaluation designs have largely been unable to disentangle the effects of particular components of QI interventions. Compounded by the complexity of conducting evaluations of system-level strategies, this leaves the field with a paucity of information about what works and for whom—rendering evidence-based decision-making difficult for policymakers and practitioners alike.

1 <http://ies.ed.gov/ncee/wwc/InsidetheWWC.aspx#process>, accessed June 12, 2014.

2 In this brief, we use the term “teachers” to refer to the range of adults who care for and educate children from birth to age five in ECE settings such as family child care homes, independent community-based child care and early education centers, Head Start programs, and state-funded prekindergarten.

3 Of 77 interventions that met WWC criteria for review (for example, conducted in prekindergarten classroom settings), 14 had some evidence of positive or potentially positive effects on some outcomes (<http://ies.ed.gov/ncee/wwc/Topic.aspx?sid=4>, accessed February 22, 2013).

In light of new federal initiatives, changes in today's ECE context have spurred greater demand for research-based interventions. State child care and education leaders are interested in learning about the evidence for a wide range of QI approaches. To facilitate a deeper understanding of QI, it is timely to elaborate a multi-dimensional conceptual framework of the full typology of QI approaches. The framework aims to lend precision to our understanding of the theories of change that guide QI interventions and strategies. Articulated QI logic models are needed to support implementation and set appropriate expectations for the impact that QI may have on the knowledge, skills, and behaviors of teachers and children, as well as the changes they may evoke in early care and education settings.

Further, there is a need to conduct a scan of the evidence base for different types of QI efforts and identify those supported by a substantial or growing body of evidence, those for which there is little evidence or for which findings are mixed, and those that demonstrate null and negative impacts on global quality, teaching behaviors, or child outcomes. As such, the brief highlights knowledge development and research gaps to aid with the selection of QI approaches and facilitate research to determine the impact of both well-known and innovative strategies. With a deeper understanding of the characteristics of effective QI and their impact on different types of practitioners and settings, government, philanthropy, and community-based organizations may develop a spectrum of supports targeted to diverse aspects of the ECE field.

[Analytic Strategy](#)

The authors engaged in three major activities to develop this policy brief: the elaboration of the QI conceptual framework, a scan and analysis of the QI research base, and verification with critical colleagues. Each step is described below.

[Elaboration of the QI conceptual framework](#)

The authors identified and extended a conceptual framework for describing levels of early care and education interventions developed by Britto, Yoshikawa, and Boller (2011). First, we identified examples of QI interventions and strategies at the workforce, setting, family, and system levels. We limited the review of literature and our typology to examining approaches intended to improve global quality; teacher knowledge, instructional, and caregiving practices; and child social, emotional, and cognitive outcomes. The authors acknowledge that there may be other important outcomes resulting from particular QI efforts (e.g., improved child health and safety) and policy strategies (e.g., increased coordination among agencies). However, we focused on global quality, teacher knowledge, caregiving and instructional practices, and children's social, emotional, and cognitive outcomes, as these are often the outcomes of most interest to policy makers.

Within each of the four overarching QI categories—workforce, setting, family, and system levels—the authors identified types of interventions and strategies and examples of the subtypes that have been used in the United States and other countries. The authors contend that this typology is the start of a larger dialog about the subtypes of QI efforts and examples of them that have been tried or that are emerging from the QI development pipeline. The overarching framework can and should be adapted and expanded as new interventions and strategies emerge.

[Scan and analysis of relevant literature and evidence base](#)

After elaborating the framework, the authors searched publicly available resources for meta-analyses, literature reviews, and studies relevant to each intervention or strategy subtype that examined global

quality, teacher or child outcomes. The authors did not conduct a systematic review of the research—that was beyond the scope of this effort and would be a useful endeavor in future research. When we identified a meta-analysis or literature review, we summarized the findings and did not seek additional evidence. When we did not identify a meta-analysis or literature review, we conducted searches of the academic literature. Using the meta-analyses, literature reviews, and studies, we filled in a detailed matrix with the following information: intervention/strategy subtype, intended behavior change, state of the evidence, links to sample research, key intervention features, and further research on the intervention/strategy needed (available upon request).

The authors defined a continuum of evidence of effectiveness based on the type of study completed from lowest to highest in the following order: descriptive studies (qualitative or correlational), literature reviews, meta-analyses, quasi-experiments, and experiments. Tables 1 through 4 describe each intervention/strategy subtype and provide examples of the interventions/strategies and a brief summary of the evidence base. Guided by criteria developed as part of systematic reviews of the literature, rigor was assessed by whether there are two published experiments (randomized controlled trial) or quasi-experiments that test the intervention against a no-treatment control group. Few studies met this criterion. We also noted if no research was found on a particular QI approach. It is possible that rigorous research exists or is currently in the works, but it was not identified as part of this review. We noted if we found only one rigorous study or two or more. The evidence base scan also includes an overview of whether the rigorous studies demonstrated positive, negative, or mixed impacts on targeted areas of global quality, teacher, or child outcomes.

[Presentation of the findings to critical colleagues and experts](#)

The authors presented the findings from the initial review and analysis at the October 2011 Annual Meeting of the Child Care Policy Research Consortium in Washington, DC and obtained feedback on the typology and the state of the evidence supporting the different QI subtypes from approximately 80 state child care administrators, practitioners, policy analysts, and researchers. Based on their feedback, we added a subtype and reorganized some of the subtypes and examples (mostly consolidating similar subtypes). From this exchange with critical colleagues and members of the intended audience for this brief (e.g., state child care administrators), we concluded that the revised framework, typology, and assessment of the literature had face validity and that the brief would be useful in pointing the field toward a broader range of QI approaches for further consideration and research.

[An Early Care and Education QI Framework](#)

The QI Framework depicts the relationship between different types of interventions and strategies and the pathways that drive improvements in ECE classrooms, teaching, and caregiving quality and, if explicitly intended, child outcomes. It aims to articulate the logic model behind QI in order to improve implementation and support research. It rests on the assertion that all ECE QI efforts require an individual, group, organization, or system to change some aspect of its “behavior.” These changes, either on their own or in combination with others potentially provide the “active ingredients” (Shonkoff & Phillips, 2000) to improve the quality of care and instruction and ultimately bolster children’s outcomes.

Variation in the source of the QI efforts, the target (whose behavior is expected to change), and the scope all impact its effectiveness. Next we highlight key questions associated with each source of variation across

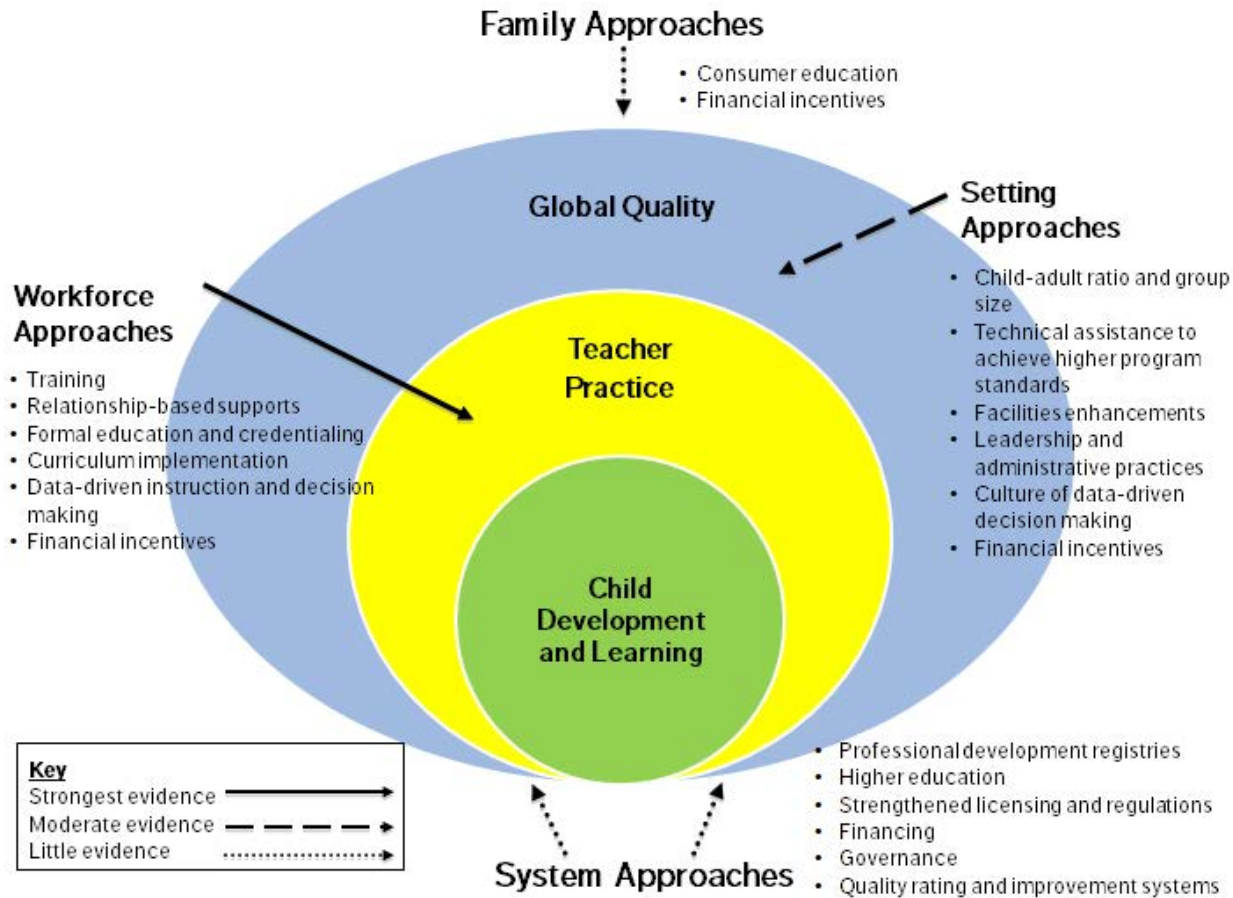
QI approaches. The questions serve as the basis for documenting a QI effort's theory of change (Lugo-Gil, Satter, Ross, Boller, & Kirby, 2011; Zellman, Brandon, Boller, & Kreader, 2011) and here they illustrate key features that decision-makers will want to consider as they make QI investments.

- *Defining the source* - Who funds it and what are the goals, expectations, and requirements for continued funding? Who delivers it, what are their qualifications, and how accountable are they to the funder?
- *Defining the target* - Whose behaviors are expected to change? What specific behaviors are targeted for change?
- *Defining the scope* - How is the intervention provided, at what intensity, and over what period of time? Is any amount of exposure to the QI strategy expected to affect global quality, teaching and caregiving quality, and children's outcomes or is there an expected minimum dosage or intensity of exposure? What are the specific mechanisms used to evoke behavioral change?
- *Defining outcomes* - Are there intermediary changes in behaviors at different levels of the ECE system that are necessary before changes in global quality, teaching, and caregiving quality or children's outcomes can be observed and over what period of time? What are the expected and related outcomes that the approach may evoke and for whom?

Our framework is based on an ecological model (Bronfenbrenner, 1986) and elaborates on Britto, Yoshikawa, and Boller's (2011) conceptualization of quality at the adult (workforce and family), setting (home or center), and systems (local, state, national) levels by providing examples of QI approaches in each category. Each type of QI approach is expected to improve child outcomes, which lie at the center of Figure 1. Moving away from the center, the strategies that are more distal from child outcomes may require more elaborate theories of change, including intermediary outcomes at different levels of the ecology, to impact classroom practices and children's development.

We have identified four types of QI efforts that aim to change behavior and indirectly impact children's outcomes. The figure depicts each type of QI effort and includes examples of the subtypes of interventions that have been developed and in some cases rigorously evaluated. The arrows illustrate the amount and level of evidence for each QI type, which is discussed in the next section.

Figure 1. Early care and education quality improvement framework



At the child level, the outcomes of interest are improved learning and development, which researchers measure through a range of child assessments (for example, vocabulary tests, measures of early reading and early mathematics achievement, and social-emotional competence). Teachers’ knowledge and practice are the outcomes of interest at the second level. Studies that assess teachers’ practices may use tools such as the Classroom Assessment Scoring System (Mashburn et al., 2008) while fewer measures exist that assess teachers’ knowledge. The outer ring depicts global quality. We define global quality in two ways; the first includes global quality at the classroom level, including the classroom physical environment and daily routines. Assessment tools such as the Early Childhood Environment Rating Scale-Revised (ECERS-R; Harms, Clifford, & Cryer, 1998) and their companion measures, and the Assessment Profile (Abbott-Shim & Sibley, 1998) may be used to measure classroom global quality. The second dimension of global quality is aimed at the program level, including how program policies and practices support teacher well-being, retention, and developmentally appropriate classroom practices. Assessment tools such as the Program Administration Scale (PAS; Talan & Bloom, 2011) and the Early Childhood Work Environment Survey (ECWES; Bloom, 2010) may be used to measure this type of global quality (Burchinal, 2010; Hamre & Maxwell, 2011).

The framework focuses primarily on the mode of the QI approach, for example, how it is delivered, and not on the specific content conveyed by the QI effort. Each type of effort and the research on it can further be analyzed by looking at the evidence for mode and content together. That work is beyond the scope of this brief; rather, we highlight the QI types and provide some examples throughout of the content that has been conveyed in a given approach. It is important to note that researchers of recently-tested QI efforts that are focused on the workforce have noted that interventions that use more prescribed content presented in a particular sequence tend to produce larger and more meaningful impacts on children's outcomes (Margaret Burchinal, personal communication, July 2012).

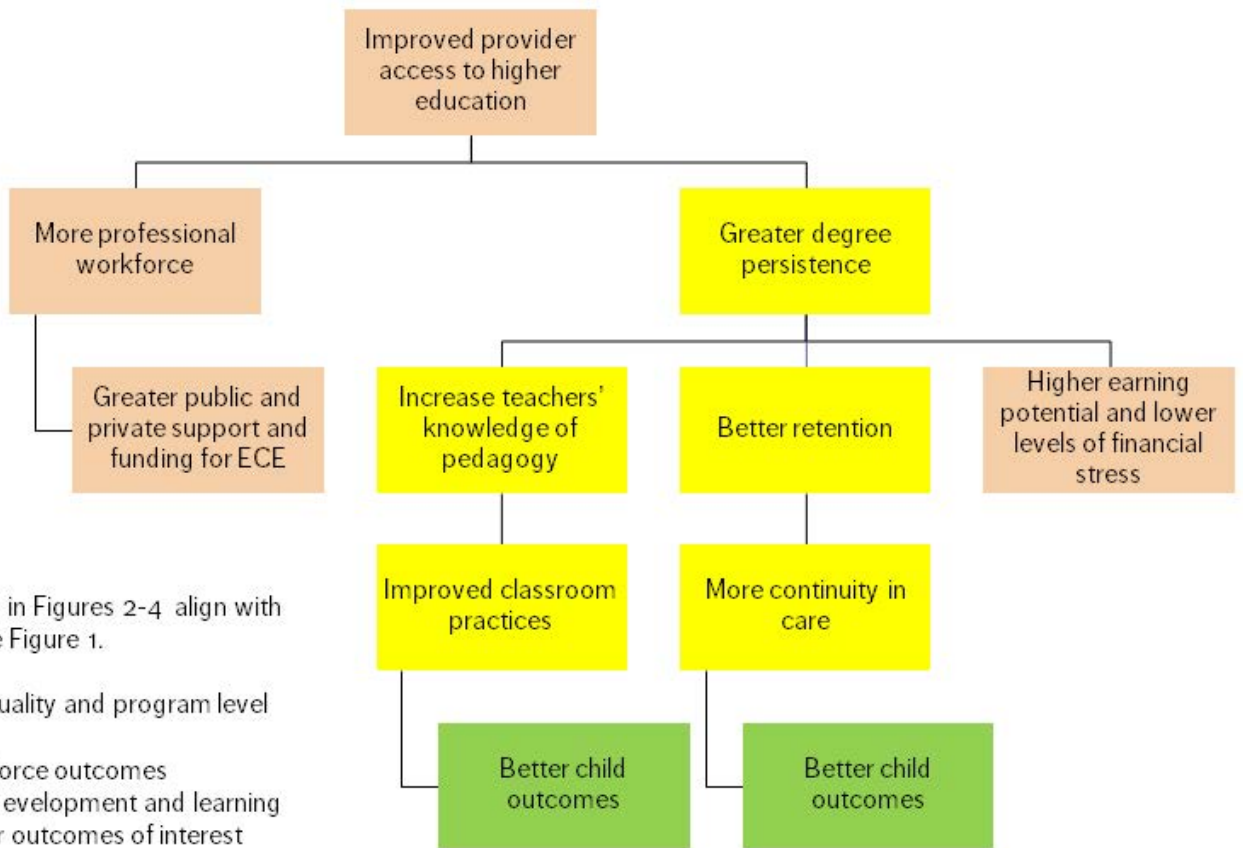
Next, we define each of the four QI types. (See Tables 1 through 4 in the Appendix, which describe the subtypes and provide examples.)

1. Workforce

After parents, teachers have arguably the greatest impact on children's development and therefore many QI efforts focus on changing teachers' caregiving and instructional behaviors. Maxwell, Feild, and Clifford's (2005) conceptual review of professional development as well as the National Association for the Education of Young Children/ National Association for Child Care Research and Referral Agencies' (2011) professional development glossary informed the categorization of workforce strategies.

The authors identified six types of QI that focus on the ECE workforce. The first QI subtype is **training**, which can range from individual workshops (for example, a local child care association's workshop on assessment) to a multi-week series of training sessions. This approach to addressing teachers' practice has characterized teachers' professional development for decades and as a result, there is a substantial research base to inform the design of effective training programs. The second form of workforce interventions are **relationship-based supports**, a set of increasingly popular on-site QI interventions intended to provide teachers with emotional support and often-practice-embedded instructional guidance through modeling and reflective consultation to improve teaching and caregiving practices (Buyse & Wesley, 2005; Joyce & Showers, 2002). Relationship-based supports are interactive, iterative, and driven by the context in which teachers work. Coaching, in particular, is the focus of a number of recent and ongoing evaluations and can be categorized as an intensive (usually weekly or monthly) support for teachers offered ideally by a trained coach or consultant with content knowledge about teaching, learning, and teacher development (Whitebook, Bellm, & Schaack, 2013; Zaslow, Tout & Halle, 2012). Mentoring, peer assistance, family child care networks, communities of practice, mental health consultation, and family child care home visiting also fall into the category of relationship-based supports. The next subtype includes efforts that help teachers engage in **formal education or credentialing systems** through scholarships and other supports, such as release time. These efforts aim to help the workforce overcome barriers to formal education and encourage teachers to take classes toward a Child Development Associate credential, or an associate's, bachelor's, or higher degree. Each of these workforce interventions aim to enhance teachers' knowledge of pedagogy and child development as a precursor to changes in teacher practices (Fukkink & Lont, 2007), such as responsive caregiving and appropriate instructional techniques, which are intended to support improved child outcomes. Figure 2 depicts the links between improvements in staff access to higher education and workforce professionalization, as well as increases in staff knowledge that lead to improved classroom practices and ultimately better child outcomes.

Figure 2. Provider higher education: Example QI theory of change illustrating outcomes at the workforce, teacher, and child levels



Curriculum implementation is a comprehensive subtype of workforce QI that typically encompasses several modes of delivery (e.g., training and coaching). This intervention includes the selection and implementation of a standard and often replicable set of teaching practices and materials that typically focus on a particular domain of children’s learning. In turn, through the curriculum materials and changes in teaching practices, curriculum implementation is expected to result in domain-specific improvements in children’s learning. Because curriculum implementation is a more prescribed QI intervention, it lends itself to the development of an evidence base (in fact, the majority of the early childhood education interventions reviewed by the What Works Clearinghouse are specific curricula).

The use of ongoing child progress monitoring and assessment and **data-driven instruction and decision-making** is a growing area of interest in the field and encompasses another subtype. This QI approach involves teachers collecting information on multiple domains of children’s development to uncover gaps in children’s learning. This information can help teachers individualize instruction and bolster children’s learning in areas of concern. This approach is also intended to inform whole group instruction by allowing teachers to analyze trends across children’s domains of learning (Buysse, Peisner-Feinberg, Soukakou, LaForett, Fettig & Shaaf, 2013; Snyder, Wixson, Talapatra, & Roach, 2008).

Finally, **financial incentives** are a QI subtype focused on attracting and retaining a well-educated, diverse, skilled, and experienced workforce. These efforts address different pathways toward improved teaching and learning. For example, one subtype of financial incentive provides bonuses and increases in compensation and benefits for teachers who stay in the field or in a specific center. Retention-based financial incentives are undergirded by research suggesting that high turnover due to poor compensation creates stress on teachers, decreases their psychological and emotional availability to children, and negatively affects quality and child outcomes, including children's engagement with teachers during instruction (Kagan, Kauerz, & Tarrant, 2008). These financial incentives are designed to help ameliorate turnover and teacher stress and thus promote better care and instructional practices and ultimately improve child learning. Another type of financial intervention focuses on rewarding experienced and highly-educated teachers, as these characteristics have been associated with better global quality, teaching practices, and child outcomes (Burchinal, Cryer, Clifford, & Howes, 2002). In addition, financial interventions are also used to provide bonuses for high-performing teachers who agree to move to settings that serve children at risk of poor outcomes. This subtype of financial intervention is based on the assumption that highly skilled teachers will be more effective than less-skilled teachers in bolstering student learning in populations at risk of later school failure. While this QI approach is currently being studied in K-12 education, few studies have been done in early childhood settings.

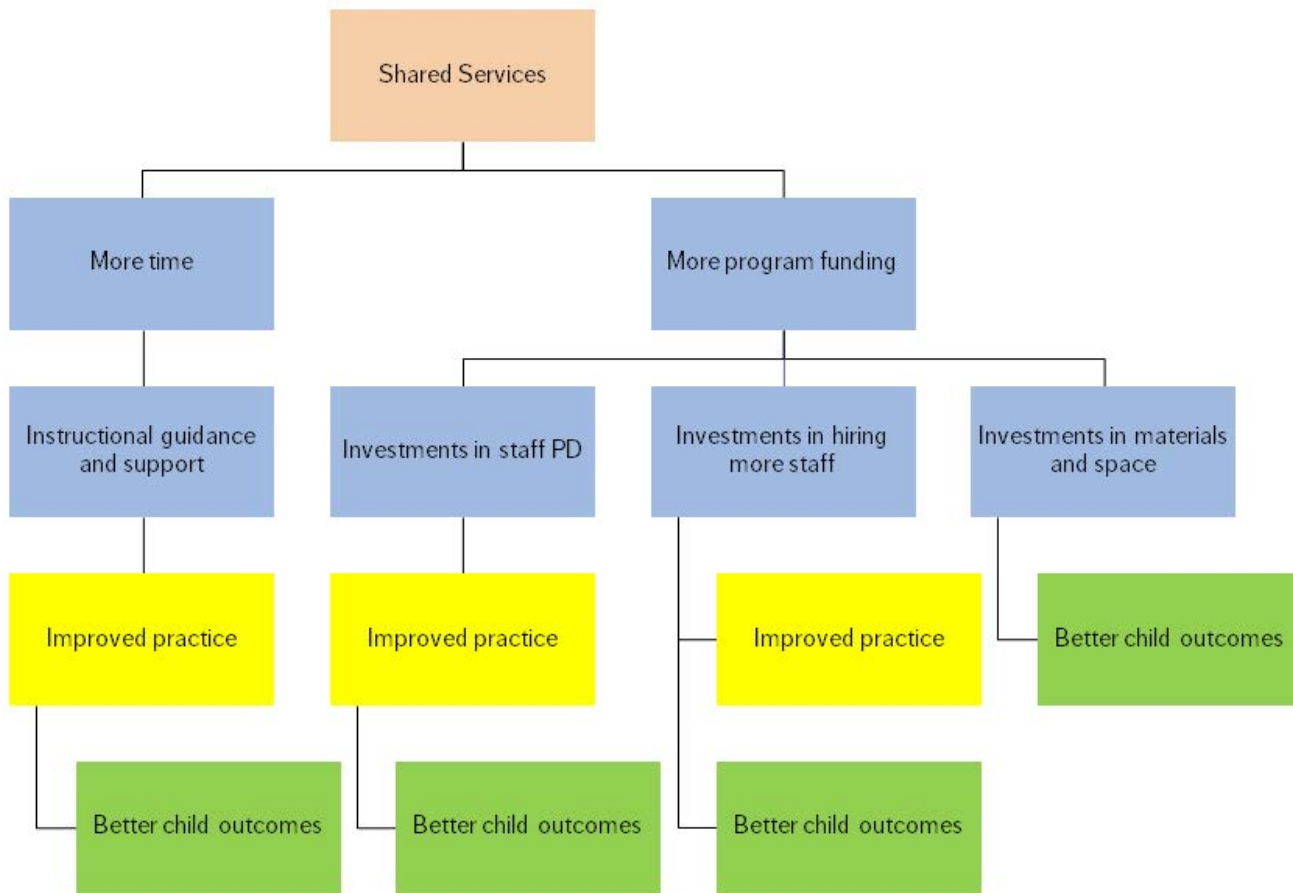
2. Setting

Setting-level interventions target the instructional environment and establish the conditions for quality teaching. Interventions in this category, for example, provide additional staff or provide grants to purchase developmentally appropriate materials to improve the classroom environment. They directly target global quality and indirectly impact teachers' practices and children's development. Reducing **child-adult ratios and group size** is one subtype of setting-focused QI designed to increase a teacher's ability to provide responsive care, facilitate more positive peer interactions, and tailor instruction, which may be constrained by large group sizes and high child-adult ratios (Vandell & Wolfe, 2000). **Facilities and learning material enhancement** grants are interventions that encompass adaptations of the internal or external instructional space or the development of a new space with developmentally-appropriate features. Materials grants are intended to enhance the appropriateness of learning materials in the classroom. Constructivist learning theories suggest that children learn through exploration and manipulation of their environments (Piaget, 1952) and use of appropriate materials guide this QI approach. Educare centers represent an example of learning environments that are specifically tailored to meet the needs of infants and toddlers by providing well-equipped and -designed spaces that facilitate individualized caregiving and learning to promote the school readiness of young children as they proceed to elementary school (Yazejian & Bryant, 2012).

QI approaches focused on improving **leadership and administrative practices** have been developed with several goals: to help programs develop instructional leaders within ECE programs, to assist administrators in developing policies to support teacher development and retention, and to streamline administrative functions. Leadership training is part of this subtype and is often developed to promote the establishment of reflective supervision models in programs, and/or create teacher retention and development policies, such as career ladders for teachers within programs. Approaches targeting teachers' career advancement and pursuit of formal education are intended to enable in-house administrators to support teachers in improving their instructional practices and ultimately child outcomes. **Shared services** is another subtype of administrative intervention that allows groups of home-based care providers or centers, or a mix of both, to share the fixed costs of items such as accounting, payroll, purchasing, and transportation. Such interventions intend to save administrators' time and money: more time allows leaders to focus on service delivery and instructional guidance, and the cost savings may be redirected toward teacher professional

development, hiring additional staff, or enhancing classroom environments that may impact children’s development (Figure 3).

Figure 3. Shared services QI: Example theory of change illustrating outcomes at the setting, workforce, teacher, and child levels



Technical assistance to achieve higher program standards such as licensing or accreditation is another setting-level intervention that may increase professionalism among staff and reduce turnover. Ultimately, these interventions may improve the quality of instructional practices and availability of materials to support learning, and might indirectly impact children’s development. The development of a culture of quality improvement and data-driven decision-making is a setting intervention subtype that is attracting more attention in ECE and is a focus for K-12 education (Bambrick-Santoyo, 2010; Marsh, Pane, & Hamilton, 2006). These interventions train instructional leaders to use data from formal and informal child and family assessments to individualize services and track progress toward outcomes at the child, family, classroom, and center levels. Through this process, technical assistance providers may work with administrators to identify outcomes in need of improvement and implement interventions, such as relationship-based supports, training, and access to higher education opportunities, with the ultimate goal of improving teaching and learning.

Finally, **financial incentives** that target programs are also a setting-level subtype. Funds may be provided for a range of purposes, including classroom equipment or provision of additional professional memberships.

These QI approaches may motivate staff to participate in quality initiatives and improve the learning environment, which may, in turn, impact teacher knowledge and practice. Zero-interest loans from lenders are another example of a financial intervention that may increase the quality of care. Settings that take advantage of such loans could use that funding to enhance overall programmatic quality and the physical learning environment in specific classrooms, or they could offer workforce professional development or targeted services for children. Differential or tiered reimbursement for children receiving subsidy based on the quality level determined by a Quality Rating and Improvement System (QRIS) is another example of a financial intervention specifically designed to incentivize centers and home-based care programs to improve quality. Within such a model, programs that demonstrate that they implement teaching and caregiving practices that have been found to promote children's positive development are rewarded at higher levels to enable them to maintain such practices. In addition, financial incentives provide motivation to programs not yet delivering stellar care and instruction to improve their practices (Schaack, Tarrant, Boller, & Tout, 2013).

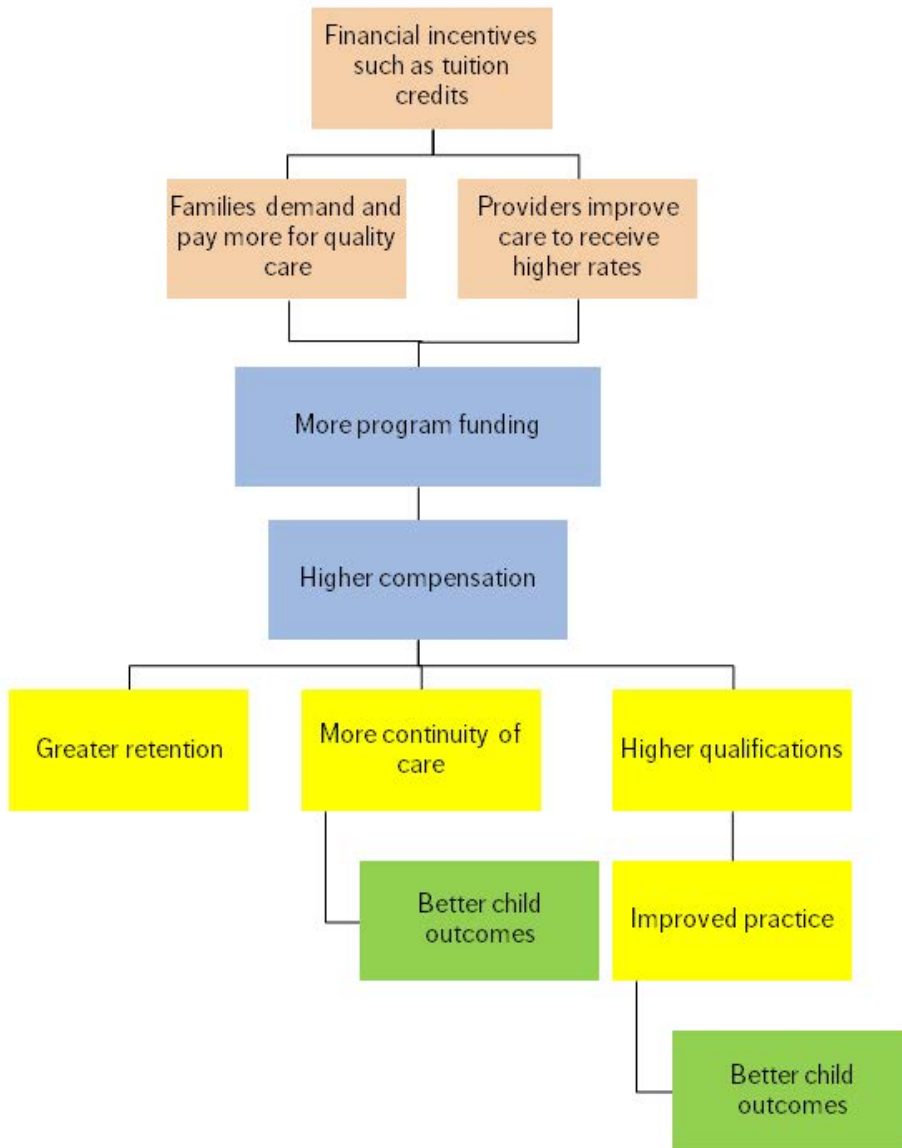
3. Family

Family-level interventions increase families' understanding of the importance of ECE quality and how to identify and access it. The underlying goal of family interventions is to increase the likelihood that parents will demand, select, enroll, and consistently send their children to higher-quality settings, which may indirectly impact ECE global quality, teachers' practices, and ultimately children's outcomes. Better child outcomes theoretically occur in several ways, including by improving families' access to information about the quality of individual programs (e.g., through a QRIS rating) so they will enroll children in development-enhancing programs. In theory, families' selection of more developmentally-supportive programs will either force lower-quality programs to improve care and instructional practices to remain competitive, or will force them to close their doors, elevating the overall quality of ECE in a state (Schaack, et al., 2013).

An important premise behind **consumer education** interventions is that families that know why quality care is important and what to look for as they select their child's care arrangement will be willing to pay more for higher-quality settings. In response, center and home-based care providers theoretically will invest in program enhancements designed to increase the quality of classrooms and care and instructional practices to meet family demand. Consumer education occurs in many ways, such as public information campaigns, engaging families in their child's program, and the publicly-available program quality ratings. This rationale drives support for most states' QRIS.

Financial incentives are another subtype of QI at the family level. Families receive funding in exchange for selecting higher-quality care as measured along dimensions of quality associated with better child outcomes. Financial incentive interventions may raise demand for high-quality ECE and improve access to quality for families that may not be able to afford it (Figure 4). Currently, families can use the federal Child and Dependent Care Tax Credit to help offset child care tuition costs, but the quality of care selected does not factor into whether the credit can be applied (<http://www.irs.gov/uac/Ten-Things-to-Know-About-the-Child-and-Dependent-Care-Credit>), which could be an important new strategy for promoting lower-income families to use higher-quality care. **Tuition credits** linked to program ratings are designed to change family ECE selection behaviors by introducing the quality rating of individual programs into their decision-making; these credits provide tuition support to families who enroll their children in higher-rated programs associated with better developmental outcomes for young children.

Figure 4. Financial incentives: Example QI theory of change illustrating outcomes at the setting, teacher, family, and child levels



Conditional cash transfers are another example of a promising financial strategy that encourages a targeted behavior. This family-level approach provides cash or other types of tangible rewards to families for sending their children to higher-quality settings. The conditionality can be structured in numerous ways. For example, half of the cash payment could be provided upon enrollment and the remainder at the end of the program year. Alternatively, a payment could be made at enrollment and additional payments provided for families with children that meet an ongoing attendance threshold (four days per week on average over three months) at a high-quality setting. Studies of conditional cash transfer programs internationally and in New York City provide evidence that this type of intervention can encourage families to send children to primary school and become engaged in their children’s education (Miller, Riccio, Verma, & Nunez, 2012). Stable

attendance is critical because the dosage of exposure to higher-quality instructional practices has been associated with better academic outcomes for children (Zaslow et al., 2010).

Although ultimately the aim of these family-level approaches is to improve children's outcomes, there may be other desirable outcomes of a specific approach. For example, family stress level could be alleviated with greater access to high quality care and by cost-associated interventions that provide tuition support for selecting higher-quality care.

4. System

The fourth type of QI strategy aims to improve aspects of the ECE system, by building, enhancing, coordinating, or introducing interventions into elements of the system. System-level QI strategies are often distal from classroom, teacher, and child outcomes, but are developed in service of better outcomes in these areas. System strategies frequently require changes in multiple aspects of the ECE system, and these changes affect one another to ultimately reach the level of the family (e.g., the decision about using subsidies to access higher-quality care) and child (e.g., enrollment in a new center made possible by public-private investment that increased the number of slots available). Therefore, when evaluating the effectiveness of these strategies, more-complex evaluations are needed that articulate more-elaborated theories of change and articulate a series of intermediary outcomes (Schaack, et al., 2013). In addition, with multiple changes at different levels of the system needed, it is likely that improvements in teaching outcomes or children's well-being and school readiness may only be realized after an extended period of implementation. Here we review several subtypes of system-level strategies.

Building, encouraging, or requiring the use of **professional development, credentialing, and training registries** is one approach to system-level QI strategies. Within such structures, states articulate the knowledge and often the training or coursework teachers need to provide effective care and instruction. Registries may provide policymakers with systematic data that can be used to determine and address gaps in professional development across a state or community in order to promote better teaching and learning. Interventions can also be introduced into professional development registries. For example, some registries provide scholarships or stipends to encourage teachers to pursue more formal education. Such a strategy is intended to enhance teacher knowledge in pursuit of better instructional and caregiving practices. However, while most states have a registry, many are voluntary and underused. In a 2012 survey of states' registries, 40% of the respondents reported that their state's registry was completely voluntary while the other 60% of registries required participation in some instances (e.g., for scholarship recipients) (National Registry Alliance, 2013).

System QI strategies also focus on **strengthening higher education** to ensure that colleges and universities provide the courses and field experiences that will prepare teachers to connect theory and pedagogy learned in coursework with classroom practices (Darling-Hammond, 2006). Higher-education QI approaches are often designed to improve teachers' access to coursework. For example, some programs have introduced cohort programs in which working students take classes together, at convenient times and locations. The convenience, collegiality, and relevant content of the coursework aimed at those already in the field are intended to promote degree persistence, and hence increase teachers' knowledge of pedagogy necessary for improving classroom practices and children's outcomes (Kipnis, Whitebook, Almaraz, Sakai, & Austin, 2012). Other higher-education QI approaches focus on providing supports for working students, such as mentoring centers, tutors, and early-childhood-education-specific advising to assist in student degree attainment and ultimately better classroom practices (Whitebook, Schaack, Kipnis, Austin, &

Sakai, 2013). Policy strategies aimed at improving articulation from high school coursework to community colleges and from community colleges to universities, including common course numberings, have also been implemented in some states and hold promise for reducing the amount of time and resources teachers spend to meet degree requirements (Gross & Goldhaber, 2009), so as to ensure a pipeline of well-prepared students with the necessary knowledge and skills to facilitate high-quality classrooms.

Interventions focused on **strengthening program licensure and regulations** may also improve quality by raising the floor of acceptable program practices. As demonstrated in multiple studies of Head Start and Early Head Start, strict program performance standards and regulations seem to reduce the range of observed care quality on the lower end, with Head Start generally demonstrating higher quality than community-based child care (Howes, Smith, & Galinsky, 1995). Other studies have also found that with higher standards and increased licensing requirements for community-based centers, teachers are provided with better classroom conditions that enable effective teaching and support children's improved language development (Howes, et al., 1995; Phillips, Bellm, Crowell, Almaraz, & Jo, 2004).

Investing in **governance** designed to improve quality is another QI strategy focused on the early learning system. Well-crafted governance bodies, which integrate stakeholders across early learning sectors and use **data-driven decision-making**, hold the potential to reduce duplication in services (e.g., sharing professional development resources). This cost savings may enable policymakers to direct funds toward interventions that address gaps in teacher preparation and children's achievement.

Financing strategies represent another approach that may be introduced into governance structures. For example, efforts to streamline the complex financing of care (some centers receive funding from federal, state, local sources as well as parent tuition—making administration of these programs quite complex) may also result in a reduction in the complexity of program administration, allowing administrators to spend more time in instructional leadership roles, and may enable cost saving associated with braided funding to be directed toward quality improvements. Governance strategy changes that incentivize child care businesses and agencies that share governance and administration may also reduce management costs and make those resources available for investment in quality.

Finally, **Quality Rating and Improvement Systems (QRIS)** and related high stakes accountability strategies are another subtype of QI strategy. QRIS are often referred to as a framework for many of the QI interventions described in the workforce, setting, and family levels described in this typology. For instance, at the setting level, some states have implemented tiered reimbursement that pays higher CCDF subsidy rates to providers with higher quality ratings (designated by the QRIS). At the workforce level, some states have implemented relationship-based interventions through the QRIS that provide teachers with practice-embedded guidance to improve teaching and caregiving practices that aligns with the quality indicators in the QRIS. Many QRIS also coordinate numerous interventions so that each element (or agency delivering the intervention) works together in support of a shared definition of quality practice (Schaack, et al., 2013). In addition, well-designed QRIS depend on the development of system infrastructure, including a data system, which is intended to enable decision-makers to identify trends in areas of lower quality service delivery and direct resources toward those areas. QRIS also provides an accountability system that holds programs to meeting specific standards. As such, program ratings may influence decision-makers' understanding of ECE as a service that promotes school readiness, prompting them to invest more in improving quality in ways that enhance development and learning. Additionally, ratings may provide philanthropy and government with an accountability mechanism for their funding and thus a rationale to direct more investments toward improving ECE quality.

In its entirety, the conceptual framework presented in this brief organizes the universe of policy strategies designed to impact ECE quality and children’s developmental outcomes. The conceptualization serves two purposes: it highlights the complex and often distal relationships between QI efforts and their objectives, and it also underscores the wide range of strategies in place to improve the conditions of young children’s care and learning. As policymakers and others weigh QI alternatives, the research base on QI effectiveness can influence financing decisions in terms of where to invest and whether to incorporate research into funding allocations. We now turn to the evidence for the QI approaches articulated within the framework.

State of the Evidence Base for QI Interventions

In describing the state of the evidence based on the scan of the literature, the authors considered three factors. First, we considered the amount of research conducted on a particular intervention or system-level strategy. Some, such as training, have been extensively examined and evaluated, though not always in the context of a statewide initiative. Others, like shared services, are more recent innovations that have yet to be systematically evaluated. Second, we considered the rigor of the research base on a particular intervention or strategy, which is also quite varied across those documented in the detailed matrixes developed for our analysis. In some instances, researchers have conducted randomized control trials (the gold standard in evaluation research). Discrete interventions, such as curriculum implementation, are more compatible with this research design. Other QI strategies, such as communities of practice, have a strong theoretical grounding and qualitative support but have not been quantitatively evaluated. Third, the authors considered the results of the research to date. We describe whether the intervention or strategy had a positive impact, mixed results, negative impact, or no impact on global quality, teacher practice, or child outcomes.

As depicted in Figure 1 above, the arrows from each type of QI approach to the inner rings depicts whether there are studies that provide evidence of effectiveness in improving teacher knowledge and practice. The solid arrow indicates that for workforce approaches, there are a number of studies of some of the interventions listed and that the research of effectiveness is strongest and growing in this area. The general logic of the workforce approaches has been widely accepted and articulated. As the most proximal intervention level to child development outcomes, a number of measures of teachers’ practices exist, as do evaluations of the impact of these interventions on teachers’ knowledge and behavior. The evidence base at the other levels is less robust.

The dashed arrow from the setting approaches to the global quality ring indicates that there are some studies of the listed approaches that provide moderate evidence of effectiveness. The dotted arrows from family approaches and system strategies indicate that there are few studies and little evidence that the types of QI relate to global quality, teacher knowledge and practice, or child outcomes.

Tables 1 through 4 in the Appendix summarize the evidence base that provides additional detail about the state of the literature analyzed for this brief and supports the evidence displayed in Figure 1. Overall, the most rigorous evidence exists for some subtypes of relationship-based supports (coaching and consultation), curriculum/practice interventions, and data-driven decision-making (also known as child progress monitoring and individualization) at the workforce level. At the setting level, the most evidence exists for group size and ratio reduction as interventions that enhance child outcomes. The research base for family interventions and system strategies is minimal. We found no rigorous studies for these two levels.

Limitations

This paper was designed to inspire new thinking about QI interventions and strategies by providing a framework for consideration and an assessment of the extant literature. However, the paper has limitations that should be noted. Our review of the evidence relied heavily on existing literature reviews and meta-analyses. These summary articles and reports varied in their scope and rigor. For instance, one review may have included publications in peer-review journals whereas another may have included government-commissioned reports. Nevertheless, we summarize their overall conclusions similarly.

When we were unable to find summary reviews on a particular type of QI approach, we looked to the literature in academic journals and reports in search of exemplary research. A complete review of all the literature on a particular QI effort, while much needed, falls outside the scope of this brief. Indeed, thorough literature reviews and meta-analyses are needed for the popular QI interventions that have a research base that has not been synthesized. Pertinent research studies may exist or may be underway that are not included in this paper. As such, the overall assessment of the interventions' evidence base will evolve.

Another shortcoming of the paper relates to the diversity of the early childhood service delivery system. The findings from studies conducted with one age group, in one state, in one program type may not translate to other settings. Many of the studies reported herein were conducted with preschool-aged children; their relevance to younger populations is uncertain. Studies conducted in Head Start, with its own set of enrollment criteria and regulations, may not fully translate to a state-funded prekindergarten or community-based child care contexts. The way an intervention is designed and delivered, often not described in research reviews, varies with each implementation, further clouding the overall claims we can make about a particular intervention. Despite the variations in context, the authors looked across studies and made a determination about the evidence for an intervention's impact.

Conclusions and Implications for Decision-Making

Evidence-based decision-making that focuses on the quality of research is on the rise. Moreover, policymakers and early childhood stakeholders are eager to learn from relevant findings about how investments relate to targeted outcomes. The development of the QI framework and typology and the review of the existing literature presented in this brief demonstrate that there is little evidence available to guide decision-making about interventions in the early care and education field, outside of a few intervention approaches at the workforce and setting levels. At the same time, the brief also points to tremendous opportunity to advance the field. It offers a framework for continuous quality improvement for ECE. Moreover, it encourages the ECE community to build its evidence base through data collection, research, and development.

As policymakers, intervention developers, and ECE system builders consider different QI approaches, there is a need to clarify the sources, targets, scope, and outcomes of different efforts as well as test the feasibility and cost of implementation. The field also needs new evaluation tools to consider impacts of interventions and strategies at each level of the framework. Evidence is needed about QI dosage, fidelity, and training needs in order to scale up those efforts that show promise. By understanding what works for whom, the field may develop a spectrum of QI approaches that can adequately support the wide variety of teachers in the ECE workforce. To foster innovation and quality improvement, the field requires an ongoing commitment to documenting implementation and effectiveness of promising QI efforts. Precision regarding scope, theory of change, and current evidence of effectiveness is crucial to developing the research base and informing policy and practice decisions.

References

- Abbott-Shim, M., & Sibley, A. (1998). *Assessment profile for early childhood programs. Research Edition II*. Atlanta, GA: Quality Assist.
- ASPE (2010). *Estimates of child care eligibility and receipt for fiscal year 2006*. Washington, DC: Author. Retrieved October 15, 2012 from <http://aspe.hhs.gov/hsp/10/cc-eligibility/ib.shtml>
- Bambrick-Santoyo, P. (2010). *Driven by data: A practical guide to improve instruction*. San Francisco, CA: Wiley.
- Barnett, W.S., Carolan, M.E., Fitzgerald, J., & Squires, J.H. (2011). *State of preschool 2011: State preschool yearbook*. New Brunswick, NJ: National Institute of Early Education Research. Retrieved October 15, 2012 from <http://nieer.org/yearbook>.
- Baron, J. & Haskins, R. (2011). Reduce the budget deficit through innovation. Retrieved November 10, 2012 from <http://coalition4evidence.org/wordpress/wp-content/uploads/Reduce-the-budget-deficit-through-innovation-published-in-The-Hill-11-1-11.pdf>
- Bloom, P. J. (2010). *Measuring work attitudes: Technical manual for the Early Childhood Job Satisfaction Survey and the Early Childhood Work Environment Survey* (2nd ed). Wheeling, IL: McCormick Center for Early Childhood Leadership, National Louis University.
- Britto, P.R, Yoshikawa, H., & Boller, K. (2011). Quality of early childhood development programs and policies in global contexts: Rationale for investment, conceptual framework and implications for equity. *Society for Research in Child Development: Social Policy Report*, 25(2).
- Bronfenbrenner, U. (1986). Ecology of the family as a context for human development: Research perspectives. *Developmental Psychology*, 22, 723-742.
- Burchinal, M. (2010). *Differentiating among measures of quality: Key characteristics and their coverage in existing measures*, OPRE Research-to-Policy, Research-to-Practice Brief OPRE 2011-10b, Washington, DC: Office of Planning, Research and Evaluation, Administration for Children and Families, U.S. Department of Health and Human Services.
- Burchinal, M.R., Cryer, D., Clifford, R.M., & Howes, C. (2002). Caregiver training and classroom quality in child care centers. *Applied Developmental Science*, 6(1), 2-11.
- Buysse, V., Peisner-Feinberg, E., Soukakou, E., LaForett, D., Fetting, A., & Shaaf, J. (2013). Recognition & response: A model of response to intervention to promote academic learning in early education. In V. Buysse and E. Peisner-Feinberg (Eds). *Handbook of response to intervention in early childhood*. Baltimore, MD: Paul H. Brookes Publishing.
- Buysse, V., & Wesley, P. W. (2005). *Consultation in early childhood settings*. Baltimore, MD: Paul H. Brookes Publishing.
- Darling-Hammond, L. (2006). *Powerful teacher education: Lessons from exemplary programs*, San Francisco: Jossey-Bass.

- Duggar, R., & Litan, R. (2012). *Early childhood "Pay-For-Success" social impact finance: A PKSE bond example to increase school readiness and reduce special education costs*. ReadyNation Working Group on Early Childhood Finance Innovation.
- Gross, B. & Goldhaber, D. (2009). *Community college transfer and articulation policies: Looking beneath the surface*. Center on Reinventing Public Education, Working Paper No.1.
- Ford Foundation. (n.d.) Asset building for social change: Pathways to large-scale impact. New York, NY: Author. Retrieved from January 29, 2013 from <http://www.racialequitytools.org/resourcefiles/fordfoundation.pdf>
- Fukkink, F., & Lont, A. (2007). Does training matter? A meta-analysis and review of caregiver training studies. *Early Childhood Research Quarterly*, 22(3), 294-311.
- Hamre, B. K., & Maxwell, K. L. (2011). *Best practices for conducting program observations as part of Quality Rating and Improvement Systems*, Research-to-Policy, Research-to-Practice Brief OPRE 2011-11b. Washington, DC: Office of Planning, Research and Evaluation, Administration for Children and Families, U.S. Department of Health and Human Services.
- Harms, T., R.M. Clifford, and D. Cryer. (1998). *Early childhood environment rating scale: Revised edition*. New York, NY: Teachers College Press.
- Howes, C., Smith, E. & Galinsky, E. (1995). *The Florida child care quality improvement study: Interim Report*. Available from the Families and Work Institute, New York, NY.
- Joyce B, & Showers B. (2002). *Student achievement through staff development*. 3rd ed. Alexandria, VA: Association for Supervision and Curriculum Development.
- Kagan, S. L., Kauerz, K., & Tarrant, K. (2008). *The early care and education teaching workforce at the ful-crum: An agenda for reform*. New York: Teachers College Press.
- Kipnis, F., Whitebook, M., Almaraz, M., Sakai, L., & Austin, L. (2012). *Learning together: A study of eight B.A. degree cohort programs*. Berkeley, CA: The Center for the Study of Child Care Employment, University of California at Berkeley.
- Lugo-Gil, J., Satter, S., Ross, C., Boller, K., Kirby, G. (2011). *The Quality Rating and Improvement System (QRIS) Toolkit*, Washington, D.C.: U.S. Department of Health and Human Services, Administration for Children and Families, Office of Planning, Research, and Evaluation.
- Marsh, J., Pane, J. & Hamilton. L. (2006). *Making sense of data-driven decision making in education: Evidence from recent RAND research*. (OP-170). Santa Monica, CA: RAND Corporation.
- Mashburn, A.J., Pianta, R., Hamre, B.K., Downer, J.T., Barbarin, O., Bryant, D., Burchinal, M., Clifford, R., Early, D., Howes, C. (2008). Measures of classroom quality in pre-kindergarten and children's development of academic, language and social skills. *Child Development*, 79, 732-749.
- Maxwell, K. L., Feild, C. C., & Clifford, R. M. (2005). Defining and measuring professional development in early childhood research. In M. Zaslow & I. Martinez-Beck (Eds.), *Early childhood professional development and*

children's successful transition to elementary school. Baltimore, MD: Paul H. Brookes Publishing.

Miller, C., Riccio, J., Verma, N., & Nunez, S. (2012). Reducing poverty across generations: Four-year findings from New York City's conditional cash transfer program. Paper presented at the *Association for Public Policy Analysis & Management*, Baltimore, MD, November 8-10, 2012.

National Registry Alliance. (2013). *State of registries survey 2012: A survey of the nation's early childhood and school-age registries*. Washington, DC: Author.

National Association for the Education of Young Children/ National Association for Child Care Research and Referral Agencies. (2011). *Early childhood education professional development: Training and technical assistance glossary*. Washington, DC: Author. Retrieved January 25, 2013 from http://www.naeyc.org/GlossaryTraining_TA.pdf.

Office of Head Start (2011). Head Start program fact sheet fiscal year 2010. Washington DC: Author. Retrieved October 15, 2012 from <http://eclkc.ohs.acf.hhs.gov/hslc/mr/factsheets>

Orzag, P. (2009). *Building rigorous evidence to drive policy*. Retrieved November 16, 2012 from <http://www.whitehouse.gov/omb/blog/09/06/08/BuildingRigorousEvidencetoDrivePolicy/>

Paulsell, D., Avellar, S.A., Martin, E.S., & Del Grosso, P. (2010). *Home visiting evidence of effectiveness review: Executive summary*. Washington, DC: U.S. Department of Health and Human Services, Administration for Children and Families, Office of Planning, Research and Evaluation.

Paulsell, D., Porter, T., Kirby, G. (2010). *Supporting quality in home-based child care: Final brief*. Final report submitted to the Administration for Children and Families, Office of Planning, Research and Evaluation. Princeton, NJ: Mathematica Policy Research.

Paulsell, D., Porter, T., Kirby, G., Boller, K., Martin, E.S., Burwick, A., Ross, C., & Begnoche, C. (2010). *Supporting quality in home-based child care: Initiative design and evaluation options*. Final report submitted to the Administration for Children and Families, Office of Planning, Research and Evaluation. Princeton, NJ: Mathematica Policy Research.

Piaget, J. (1952). *The origins of intelligence in children*. New York, NY: International Universities Press.

Rigby, E. (2005). Linking research and policy on Capitol Hill: Insights from research brokers. *Evidence and Policy*, 1(2), 25-45.

Schaack, D., Tarrant, T., Boller, K., & Tout, K. (2012). Quality rating and improvement systems: Alternative approaches to understanding their impact on the early learning system. In S.L. Kagan and K. Kaurez (Eds.). *Early childhood systems: Transforming early learning* (pp. 71 – 86). New York, NY: Teacher's College Press.

Shonkoff, J., Phillips, D. (Eds.). (2000). *From neurons to neighborhoods: The science of early childhood development*. Washington, DC: National Academy Press.

Snyder, P.A., Wixson, C.S., Talapatra, D., & Roach, A.T. (2008). Assessment in early childhood: Instruction-focused strategies to support response-to-intervention frameworks. *Assessment for Effective Intervention*, 34(1), pp. 25–34.

- Talan, T.N. & Bloom, P. (2011). *Program Administration Scale*, 2nd ed. New York, NY: Teachers College Press.
- Tout, K., Starr, R., Soli, M., Moodie, S., Kirby, G., & Boller, K. (2010). *Compendium of quality rating systems and evaluations*. Prepared for the U.S. Department of Health and Human Services, Administration for Children and Families, Office of Planning, Research and Evaluation. Washington, DC: Child Trends.
- United States Census Bureau (2011). *Who's minding the kids? Child care arrangements: Spring 2010*. Washington, DC: Author. Retrieved October, 15, 2012 from <http://www.census.gov/hhes/childcare/index.html>
- United Way of Salt Lake. (2013). United Way of Salt Lake announces results-based financing for low-income preschool students. Retrieved November 19, 2013 from http://www.uw.org/news-events/media-room-/news-releases/uw_resultsbasesfinancingnr.pdf
- Vandell, D. L., & Wolfe, B. (2000). *Child care quality: Does it matter and does it need to be improved?* Washington, D.C.: Office of the Assistant Secretary for Planning and Evaluation: U.S. Department of Health and Human Services.
- Washington State Institute for Public Policy (2011). *Return on investment: Evidence-based options to improve statewide outcomes*. Olympia, WA: Washington State Institute for Public Policy.
- What Works Clearinghouse. Early Childhood Education Reviews. Retrieved November 20, 2012 from <http://ies.ed.gov/ncee/wwc/FindWhatWorks.aspx>
- Whitebook, M., Bellm, D., Schaack, D. (2013). *Supporting teachers as learners: A handbook for coaches and mentors*. Washington, D.C.: American Federation of Teachers.
- Whitebook, M., Phillips, D., Bellm,, D., Crowell, N., Almaraz, M., & Jo, Y. *Two years in early care and education: A community portrait of quality and workforce stability*. Berkeley, CA: Center for the Study of Child Care Employment, University of California at Berkeley.
- Whitebook, M., Schaack, D., Kipnis, F., Austin, L., & Sakai, L. (2013). *From aspirations to attainment: Practices that support educational success: Los Angeles Universal Preschool's Child Development Workforce Initiative*. Berkeley, CA: The Center for the Study of Child Care Employment: University of California at Berkeley.
- Whitehurst, G. J. (2103a). *Can we be hard-headed about preschool? A look at universal and targeted pre-k*. Brookings Brown Center Chalkboard. Retrieved January 28, 2013 from <http://www.brookings.edu/blogs/brown-center-chalkboard/posts/2013/01/23-prek-whitehurst>
- Whitehurst, G. J. (2103b). *Can we be hard-headed about preschool? A look at Head Start*. Brookings Brown Center Chalkboard. Retrieved January 28, 2013 from <http://www.brookings.edu/blogs/brown-center-chalkboard/posts/2013/01/16-preschool-whitehurst>
- Yazejian, N., & Bryant, D. M. (2012). *Educare implementation study findings- August, 2012*. Chapel Hill: Frank Porter Graham Child Development Institute, UNC-CH.
- Zaslow, M., Tout, K., & Halle, T. (2012). *On-site approaches to quality improvement in Quality Rating and Improvement Systems: Building on the research on coaching*. Research-to-Policy, Research-to-Practice Brief OPRE 2012-40

Zaslow, M., Tout, K., Halle, T., Vick Whittaker, J., & Lavelle, B. (2010). *Toward the identification of features of effective professional development for early childhood educators*. Prepared by Child Trends for the U.S. Department of Education, Office of Planning, Evaluation, and Policy Development.

Zellman, G.L., Brandon, R.N., Boller, K., & Kreader., J.L. (2011). *Effective evaluation of Quality Rating and Improvement Systems for early care and education and school-age care*. Research-to-Policy, Research-to-Practice Brief, OPRE 2011-11a. Washington, DC: Office of Planning Research and Evaluation, Administration for Children and Families, U.S. Department of Health and Human Services.

Appendix Table 1. Workforce Approaches: Evidence Base

Sub-Type	Examples	Evidence Base Summary
<p>Training: Professional development that does not result in credits toward a higher education degree in which an expert delivers information to teachers</p>	<ul style="list-style-type: none"> ■ Workshops and one-time sessions on specific topics ■ Training programs 	<p>Two or more studies indicate that training that is current, sequenced, manualized, and combined with practice opportunities can improve teachers' knowledge, skills, and child outcomes. Studies of one-time workshop sessions do not find a correlation with improved child outcomes.</p>
<p>Relationship-based support: An interactive and iterative process between adults in which the support is informed by the teachers' context</p>	<ul style="list-style-type: none"> ■ Coaching and consultation ■ Mentoring ■ Mental health consultation ■ Peer support ■ Community of practice ■ New teacher induction ■ FCC Networks ■ FCC Home Visiting 	<p>Two or more experimental studies indicate that particular models of coaching/consultation improve teachers' knowledge and teaching practices and impact child outcomes. Research on the other sub-types includes experimental studies, literature reviews, and quasi-experimental studies; the results from these studies are positive or mixed.</p>
<p>Formal education and credentialing: Support to help individuals attain credit-bearing professional development</p>	<ul style="list-style-type: none"> ■ Scholarships ■ Cohort model 	<p>Although there are many studies of the association between formal education and quality of practice, few studies focus on interventions designed to increase teacher preparation and formal education.</p>
<p>Curriculum/practice implementation: Support to teachers that targets instructional practices intended to address particular domains of children's development</p>	<ul style="list-style-type: none"> ■ Branded curriculum (Ladders to Literacy; Tools of the Mind) ■ Practice (dialogic reading; phonological awareness training) 	<p>Two or more experimental and quasi-experimental studies of specific curricula and practices indicate positive impacts on teaching and child outcomes.</p>
<p>Data-driven decision-making: The use of ongoing child progress monitoring and assessment to guide instruction</p>	<ul style="list-style-type: none"> ■ Individualization of instruction based on formal and informal assessment ■ Formative assessment ■ Response to Intervention 	<p>Two or more experimental studies provide evidence of the positive impact of using child progress monitoring to inform instruction on teaching practices and child outcomes.</p>
<p>Financial incentives: Interventions that award teachers for their participation in professional development and their commitment to their workplace or the field</p>	<ul style="list-style-type: none"> ■ Wage supplements ■ Retention and transfer bonuses ■ Loan forgiveness 	<p>No research found</p>

Appendix Table 2. Setting Approaches: Evidence Base

Type	Examples	Evidence Base Summary
Child-adult ratio and group size: Reductions in the number of children per teacher and the class size designed to improve teacher-child interactions, improve health and safety, and reduce child and adult stress through more positive peer interactions	<ul style="list-style-type: none"> ■ Group size reduction ■ Assignment of primary caregivers 	One literature review indicates that changes in ratios and group size are related to teachers' practices, specifically health and safety practices and the classroom social and emotional environment.
Technical assistance to achieve program standards: Individualized support to help programs at the classroom and program levels to reach higher standards	<ul style="list-style-type: none"> ■ Licensing ■ Accreditation 	No research found
Facilities enhancement: Adaptations of the internal or external instructional and play space or the development of a new space with developmentally-appropriate features	<ul style="list-style-type: none"> ■ Provision of safe and stimulating indoor and outdoor spaces ■ Creation of classroom activity centers 	One implementation study of Educare shows that developmentally-appropriate facilities, along with other program elements, are associated with global quality, teachers' practices, and child outcomes.
Leadership and administrative practices: Assistance to help agencies streamline their administrative functions and ensure that staff are well-supervised and motivated to provide high quality care and instruction	<ul style="list-style-type: none"> ■ Shared services ■ Leadership development 	No research found
Culture of data-driven decision-making: Training or other supports for instructional leaders to use data from formal and informal child and family assessments to individualize services and track progress toward outcomes at the child, family, classroom, and center levels	<ul style="list-style-type: none"> ■ Leadership training ■ Use of data systems that link curriculum, assessments, and practice for use by program leaders 	No research found
Financial incentives: Funding to support overall program expenses, including facilities enhancements, teacher purchases of classroom equipment, provision of additional training, professional memberships, or subscriptions (classroom grants)	<ul style="list-style-type: none"> ■ Zero-interest loans ■ Tiered reimbursement ■ Business investment tax credits linked to program quality 	No research found

Appendix Table 3. Family Approaches: Evidence Base

Type	Examples	Evidence Base Summary
Consumer education: Strategies to support families' understanding of the importance of quality care, how to identify it, and the expectation that higher quality may cost more	<ul style="list-style-type: none"> ■ Consumer education about ECE quality of individual programs ■ Family engagement in programs ■ Social learning 	No research found
Financial incentives: Awards or credits for families in exchange for their use of higher-quality care and education settings	<ul style="list-style-type: none"> ■ Tuition credits/Scholarships ■ Tax credits ■ Conditional cash transfers 	No research found

Appendix Table 4. System Approaches: Evidence Base

Type	Examples	Evidence Base Summary
Professional development registries: A repository of data on qualifications of the ECE program staff and trainers	<ul style="list-style-type: none"> ■ Development or use of voluntary or mandatory registries 	No research found
Higher education: Ensuring that colleges and universities provide the courses and field experiences that will prepare teachers to provide high-quality care and education	<ul style="list-style-type: none"> ■ Improvements in articulation across colleges and universities ■ Mapping course offerings to higher education standards, licensing requirements, and practice 	No research found
Licensing and regulations: Efforts to raise the floor of acceptable program practices	<ul style="list-style-type: none"> ■ Head Start performance standards ■ Contract modifications (RFP) 	One quasi-experimental study found positive impact of more stringent regulations on teachers' knowledge of child development, caregiving practices and child outcomes.
Governance: Strategies to simplify and make governance and funding more efficient	<ul style="list-style-type: none"> ■ Creation of new unified state agency ■ Integration of ECE within existing state agency 	No research found
Financial incentives: Funding to encourage the provision of high-quality care	<ul style="list-style-type: none"> ■ Asset building ■ Social impact bonds 	No research found
Quality Rating and Improvement Systems: Development of system elements including a data system and accountability system (e.g., quality ratings), and commitment of resources for educating the field and parents about program quality data	<ul style="list-style-type: none"> ■ QRIS 	One experimental study found 6-month impacts of QRIS on observed quality but not on changes in QRIS rating levels.