



Making Connections

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Quality improvement efforts among early childhood education programs participating in Iowa's Quality Rating System

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Key findings

This study examined quality improvement activities among Iowa's early childhood education programs and the relationships between those activities and ratings on the state's Quality Rating System (QRS). The study found that:

- Early childhood education programs participating in Iowa's QRS used in-person training more than other types of quality improvement activities, and the most common topic of professional development was health and safety practices.
- Financial supports were the most common quality improvement support received by programs and staff.
- Participation in quality improvement activities was often hindered by logistical barriers such as travel distance, training schedule, and cost.
- Having staff complete at least 15 hours of training per year and professional development on management topics were both positively related to increases in Iowa QRS rating.
- Professional development on child development topics was negatively related to rating increases.



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Summary

States have prioritized documenting and improving the quality of early childhood education programs by developing quality rating and improvement systems (QRISs).¹ QRISs have two major components: systematic ratings of program quality, and integrated quality improvement supports and activities. This report describes the quality improvement efforts of early childhood education programs participating in Iowa's voluntary quality rating and improvement system, the Iowa Quality Rating System (QRS).

To effectively allocate resources to support quality improvement efforts, state administrators need information about how programs use quality improvement supports and activities. The Iowa Quality Rating System Oversight Committee, which includes representatives of early childhood education programs and several state agencies and organizations in Iowa, requested Regional Educational Laboratory (REL) Midwest's assistance in examining program quality improvement efforts in Iowa and how these efforts relate to increases in Iowa QRS ratings.

Data for the study came from two sources: administrative records on programs participating in Iowa's QRS ratings system and responses from administrators in 390 of 600 early childhood education programs invited to respond to a 2014 survey about quality improvement supports and activities in the previous year (a 65 percent response rate).

Survey responses indicated that staff in almost all programs participating in the Iowa QRS (97 percent) received training the previous year. At least some staff in almost two-thirds of programs (65 percent) received coaching the previous year. The most common topic of professional development reported by survey respondents was health and safety practices, followed by child development and classroom practices. Staff in approximately one-third of programs (36 percent) pursued a degree or credential the previous year, and about three-quarters of programs offered orientation (78 percent) and mentoring (77 percent) to new staff. The amount and types of quality improvement activities varied by staff type; for example, assistants, especially those working in home-based settings, participated in few activities.

Among the supports received by programs to participate in quality improvement activities, survey respondents reported more use of financial incentives (for example, financial supports for education or training costs, or release time) than of nonfinancial incentives (for example free or discounted materials). Programs also reported that logistical factors such as distance and travel time to training sites, inconvenient training schedules, training costs, and the availability of training on specific topics were the most common barriers to participation in quality improvement activities.

In addition, ratings tended to increase over time among programs that participated in the Iowa QRS long enough to receive a second rating. Ninety-seven percent of programs that had two ratings either maintained the same rating (52 percent) or received a higher rating (45 percent). Of the 10 quality improvement activities, 3 were significantly related to rating increases. Ratings tended to increase over time for programs that provided key staff with 15 or more training hours per year, but the increases may be due partly to the fact that the training hours themselves are factored into a program's rating. Ratings also tended to increase over time for programs in which providers received professional development

on topics related to program management. In contrast, staff professional development on child development topics was negatively related to rating increases.

The findings of this study provide an overview of the landscape of quality improvement activities among early childhood education programs participating in the Iowa QRS and their relationship with increased ratings. The results suggest that in-person training is the most common type of quality improvement activity in Iowa, perhaps partly because annual in-person training hours are required to maintain home provider registration or center licensing. Yet fewer than half the programs met the study team's adaptation of the National Institute for Early Education Research benchmark of providing an average of at least 15 hours of training for key staff (Barnett, Carolan, Squires, Brown, & Horowitz, 2014). Meeting this benchmark was positively and statistically significantly related to rating increases, suggesting that the benchmark is meaningful for improving program quality within the Iowa QRS. However, many survey respondents identified long distance and travel time as barriers to participation in quality improvement activities, and web-based trainings may be one solution to overcoming these barriers. In addition, about two-thirds of programs reported that staff received coaching, though only 15 percent of programs reported that staff received ongoing coaching, and coaching was not statistically significantly related to increased ratings.

Among topics in training and coaching, only professional development for providers on management topics was related to rating increases, although the most common were health and safety and child development. This positive relationship suggests that the state may wish to conduct further research to examine whether the management training is leading to improvements in program quality or whether other factors may explain the observed relationships. Also, the counterintuitive negative relationship between teacher professional development in child development topics and ratings should be interpreted with caution because the results may be explained by other factors. For example, the programs that did not focus on child development topics may have staff with prior expertise in child development, and that expertise might also help drive rating increases.

These findings can help Iowa QRS administrators in planning and allocating resources to improve program quality. The findings can also help administrators of quality rating and improvement systems in other states understand more clearly the types of quality improvement activities to which programs are drawn naturally, as well as factors that may facilitate or impede programs in their pursuit of quality.

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Why this study?

States have prioritized documenting and improving the quality of early childhood education programs by developing quality rating and improvement systems (QRISs). This report describes the quality improvement efforts of early childhood education programs participating in Iowa's Quality Rating System (QRS; see box 1 for definitions of key terms). It identifies supports and barriers to quality improvement and examines how quality improvement supports and activities relate to changes in program quality ratings across time.

Box 1. Key terms

Center. A center-based early childhood education program offering education or care in a group setting that is not located in a home, including licensed child care centers, preschools, public preK, and center-based Head Start and Early Head Start programs.

Domain. Early childhood education programs that participate in the Iowa Quality Rating System earn points by meeting criteria in specific domains: professional development, health and safety, environment, and family and community partnerships for centers and homes, and also leadership and administration for centers only.

Home. A home-based early childhood education program offering education or care in a group setting located in a registered (licensed) provider's home, including small and large family child care homes.

Iowa Quality Rating System (Iowa QRS). Iowa's quality rating and improvement system. Programs earn points by meeting criteria in specific domains. The sum of the domain scores determines the program's rating; an independent observation is also required for a level 5 rating. Program participation is voluntary.

Levels of barriers to quality improvement. Information derived from survey items that asked respondents to rate the effect that nine factors have had on their program's level of participation in professional development and other quality improvement activities, with ratings of no effect (1), small effect (2), medium effect (3), or large effect (4).

Odds ratio. The likelihood of an outcome occurring (in this case, an increase in the QRS rating) through exposure to some event (professional development on management topics) in comparison with the likelihood of the outcome occurring without exposure to the event. An odds ratio of 1 typically indicates no relationship, whereas odds ratios greater than 1 indicate positive relationships, and odds ratios less than 1 indicate negative relationships. (See appendix C for details on data and methods.)

Program. An early childhood education program (center or home) offering education or care in a group setting.

Quality rating and improvement system (QRIS). A system that uses multiple data sources on early childhood education programs to calculate ratings of program quality to document and disseminate reliable information about program quality and encourage quality improvement.

Staff and key staff. Staff refers to managers, teachers, and assistant teachers in centers and providers and assistants in homes. Key staff refers to managers and teachers in centers and providers in homes. (See box C1 in appendix C for additional detail.)

This report identifies supports and barriers to quality improvement for early childhood education programs participating in Iowa's Quality Rating System and examines how quality improvement supports and activities relate to changes in program quality ratings across time

What is known about quality rating and improvement systems

Research highlights the importance of high-quality early childhood education to reduce school readiness gaps and improve developmental outcomes among children (for example, Howes et al., 2008; Yoshikawa & Zaslow, 2013). Accordingly, national policymakers have made early childhood education program quality a priority (Yoshikawa & Zaslow, 2013), and states have developed QRISs. (See appendix A for a more detailed review of the literature on QRISs.) The number of states with a QRIS has grown rapidly in the last decade, and by 2014 all states but one were planning, piloting, or implementing a QRIS (Build Initiative & Child Trends, 2015; QRIS National Learning Network, 2015). All seven states in the Regional Educational Laboratory (REL) Midwest Region (Illinois, Indiana, Iowa, Michigan, Minnesota, Ohio, and Wisconsin) have established a QRIS, although the states are at different stages of implementation.

QRISs have two primary components: systematic ratings of program quality, and integrated quality improvement supports and activities. The second component aims to help programs make improvements and raise quality and QRIS ratings (Schaack, Tarrant, Boller, & Tout, 2012). States differ in the type and amount of quality improvement supports and activities available to programs and in the extent to which the supports and activities are required or accessible to all participating programs (Holod, Faria, Weinberg, & Howard, 2015). Quality improvement activities include professional development (training and coaching), continuing education, and new staff orientation. Quality improvement supports include both financial and nonfinancial incentives to encourage programs and their staff to improve program quality (see box 2 for detailed descriptions of quality improvement supports and activities and information about what Iowa offers). Professional development topics describe the content of training and coaching. (See appendix C for additional information about the professional development topics examined in this study.) States also differ in their approaches to systematic ratings, including differences in the types of data used for the ratings, the methods used to calculate ratings, the program types included in the QRIS, and the way ratings are disseminated (Build Initiative & Child Trends, 2015).

State QRIS administrators need information about how programs use quality improvement supports and activities to improve services. To date, much of the research on QRISs has focused on validating the QRIS ratings. These validation studies examine whether ratings from a QRIS accurately measure program quality as intended and differentiate higher and lower quality programs (for example, Hawkinson et al., 2015; Hestenes et al., 2015; Karoly, Zellman, & Perlman, 2013; Le, Schaack, & Setodji, 2015; Sabol & Pianta, 2015; Tout et al., 2011). Most validation studies have found that programs with higher ratings demonstrate better performance on observational measures of the quality of classroom interactions, but QRISs have yet to differentiate programs in ways that consistently predict child outcomes (Karoly, 2014).

States rely on the quality improvement supports and activities component of the QRIS to help programs attain higher QRIS ratings. Although many research studies have examined the relationship between quality improvement supports and activities and classroom outcomes, few studies have examined the relationship between specific quality improvement supports and activities and QRIS ratings (see appendix A). Using administrative data on supports and activities offered in Miami and QRIS ratings, Yazejian and Iruka (2015)

States differ in the type and amount of quality improvement supports and activities available to programs

Box 2. Description of quality improvement activities and supports

Quality improvement activities

Quality improvement activities are activities intended to improve the quality of program services, such as professional development (training and coaching), continuing education, and new staff orientation.

- *Professional development.* A blanket term for training and coaching. This study examines professional development topics covered in training and coaching. Training covers professional development instruction (or workshops) provided to a group of early childhood education program staff on specific job-related topics, conducted in person or in a web-based format. In Iowa, regional Child Care Resource and Referral agencies and other entities offer training for any early childhood education program.¹ Programs may also receive training from other organizations. Coaching covers individualized professional development support (often called technical assistance or consultation) provided by an individual to early childhood education program staff, conducted in person, using video or web-based platforms, or through informal communications such as telephone, email, and text messaging. Coaching may include classroom support for teaching staff and program support for management staff. Ongoing coaching refers to coaching occurring at least monthly.

Example from Iowa: Early childhood education programs in Iowa can request free consultations on the QRS rating process and quality improvement plans (with a QRS consultant), and on health and safety practices (with a nurse consultant). Programs may receive coaching from agencies not affiliated with the state.

- *Continuing education.* Credit-bearing coursework toward any credential, degree, or certificate by actively employed early childhood education program staff.

Example from Iowa: Staff in Iowa programs can obtain early childhood apprenticeship certificates, Child Development Associate credentials, administrator credentials that do not yield a college degree, and administrator credentials for program directors. Iowa's higher education institutions also offer associate's, bachelor's, and master's degrees in early childhood education.

- *New staff orientation.* The provision of information, training, and other supports to new staff. Includes mentoring and guidance and support offered to new staff by colleagues or a professional mentor.

Example from Iowa: Iowa State University Extension offers free orientation materials to Iowa's center-based programs. Programs may also provide their own orientation or access other orientation resources.

Quality improvement supports

Quality improvement supports are resources intended to support quality improvement efforts, including financial incentives and nonfinancial incentives received by programs or by individual staff.

- *Financial incentives.* Monetary incentives that are available both to programs (such as grants, awards, and tiered reimbursements) and to individual staff members (such as scholarships).

Example from Iowa: Early childhood education programs in Iowa can receive monetary awards for completing the Iowa QRS rating process (based on their rating level). Program staff can apply for Teacher Education and Compensation Helps Early Childhood Iowa scholarships for continuing education, and programs can apply for grants or other support from various entities.²

- *Nonfinancial incentives.* Nonmonetary resources to support quality improvement efforts, including materials (such as books or games) and equipment (such as playground structures or cribs) that programs may receive for free or at a discount.

Example from Iowa: Programs in Iowa may be eligible for free or discounted materials or equipment from the state.

Notes

1. Iowa State University and Early Childhood Iowa also offer training in Iowa. Information on Iowa-specific supports and activities was provided by members of the Iowa Quality Rating System (Iowa QRS) Oversight Steering Committee.

2. Teacher Education and Compensation Helps (T.E.A.C.H.) is a national initiative to increase access to higher education among early educators working with young children. It provides scholarships and other supports for degree and certification programs. Each state operates its own T.E.A.C.H. program. More information about T.E.A.C.H. in Iowa is available at: <http://www.iowaaeyc.org/teach.cfm>.

found that scholarships for continuing education were associated with rating increases for center-based early childhood education programs but not for home-based programs. A study in Pennsylvania found higher QRIS rating increases among low-rated programs that participated in an intensive quality improvement activity program involving coaching, improvement funds, and other supports (Warner-Richter, Lowe, Tout, Epstein, & Li, 2016). Additional research is needed on a broader range of supports and activities and representing other geographic areas. States need information about each type of quality improvement support and activity among programs in QRIS and about the relationship between these supports and activities and QRIS rating increases, so that administrators can determine how to allocate resources most effectively to support quality improvement efforts.

Iowa's Quality Rating System

Members of the Iowa Quality Rating System Oversight Committee² requested REL Midwest's assistance in examining quality improvement efforts of early childhood education programs and the relationship of these efforts to increases in programs' Iowa QRS ratings. The Iowa QRS was launched in 2006 and recalibrated in 2010 (see box 3 and appendix B for details about the Iowa QRS ratings). The Iowa QRS is administered by the Iowa Department of Human Services and governed by the Iowa Quality Rating System Oversight Committee, which includes representatives of early childhood education programs and several state agencies. Members of the Iowa Quality Rating System Oversight Committee identified key quality improvement supports and activities offered in Iowa (see box 2) and then sought REL Midwest's assistance in examining how the programs used these supports and activities and how that use relates to changes in Iowa QRS ratings.

The primary audience for this report is Iowa QRS stakeholders, including members of the Iowa Quality Rating System Oversight Committee, state agency administrators, policymakers, regional Child Care Resource and Referral agency staff, technical assistance providers, and higher education institutions that offer early childhood education degree and certification programs. State-level stakeholders can use the study findings to inform decisions about the funding and distribution of quality improvement supports and activities. Early childhood education program managers in Iowa may be interested in reviewing the findings of this report as they consider their decisions about quality improvement activities. QRIS stakeholders in other states may also be interested in the results of this study and in collecting similar data on quality improvement activities among programs in their own QRISs. The diverse community of QRIS advocates and researchers is another audience for this study, particularly given the limited research to date on the issues explored in this report.

State-level stakeholders can use the study findings to inform decisions about the funding and distribution of quality improvement supports and activities

Box 3. Iowa Quality Rating System ratings

Early childhood education programs eligible to participate in the Iowa Quality Rating System (QRS) fall into two categories:

- Centers that offer any type of center-based early childhood development care, including licensed child care centers, preschools, public preK, center-based Head Start or Early Head Start, and after-school programs. Centers typically rely on teachers and assistant teachers in each classroom and a manager who may also be a teacher.
- Homes that are registered family child care homes. Homes rely on a provider who teaches and manages the program, sometimes with the help of assistants.

Participation in the Iowa QRS is voluntary, and ratings are valid for two years. Iowa counts 1,438 licensed centers, 541 public schools with preK programs, and 3,227 registered child care homes operating within the state (Iowa Department of Human Services, 2015; U.S. Department of Education, National Center for Education Statistics, 2015). In 2014, 1,294 programs were participating in the Iowa QRS, including 646 centers (33 percent of licensed centers and preK programs) and 648 homes (20 percent of registered homes).

The Iowa QRS has five ratings, ranging from 1 (lowest) to 5 (highest). The criteria for each rating differ for centers and homes. A hybrid approach is used for calculating ratings based on a combination of mandatory standards that all programs must meet for ratings 1 and 2 and more flexible point-based requirements for the higher ratings. Programs earn points by meeting criteria in specific domains (professional development, health and safety, environment, and family and community partnerships for centers and homes, and also leadership and administration for centers only). The sum of the domain scores determines the program's rating, and an independent observation is also required for a rating of 5. (See appendix B for rating standards and criteria.)

What the study examined

The study team developed the following research questions for this study in partnership with stakeholders in Iowa. Among early childhood education programs participating in the Iowa QRS:

1. What are the quality improvement activities in which they participate?
2. What topics are covered in professional development?
3. What are the supports and barriers to participation in quality improvement activities?
4. What information do they use to make decisions about quality improvement activities?
5. Do ratings rise among programs that renew their Iowa QRS participation?
6. What is the relationship between quality improvement supports and activities and increases in QRS ratings and domain scores?

The research questions reflect the Iowa Quality Rating System Oversight Committee's need to learn how programs participating in the Iowa QRS approach quality improvements, to identify supports and barriers to quality improvement efforts, and to determine if

there are correlations between quality improvement approaches and outcomes. To address these questions, the study team examined programs' responses to a survey administered in October and November 2014 and the statistical relationships between these responses and programs' QRS ratings across time (see box 4 for details; more details on methodology are in appendix C).

Box 4. Data and methods

Data

The study team addressed the research questions by analyzing two types of data.

- *Programs' responses to a survey about quality improvement supports and activities during the previous year.* In fall 2014 Iowa's Department of Human Services administered a survey to a stratified random sample of 600 early childhood education programs throughout the state, and 390 of 600 randomly sampled programs completed the survey, a 65 percent response rate. (Survey items are provided in appendix D; two programs did not answer all items, resulting in analyses with 388 programs.) The study team worked with the Iowa Quality Rating System Oversight Committee to develop the survey instrument and provided technical assistance during data collection by supplying guidance on sampling and data collection procedures. The sample of respondents mirrored the population of QRS programs in terms of ratings, program type (center or home), and region in Iowa, but the sample underrepresented school-based centers and overrepresented community-based centers. The survey collected data about quality improvement activities among staff (managers, teachers, and assistant teachers in centers and about providers and assistants in homes). The number of managers, teachers, and assistant teachers varies in centers, and homes include those with and without assistants. (See appendix C for definitions of staff types and details about the data.)
- *Administrative data on program characteristics and the Iowa QRS ratings.* These data are collected by Iowa's Department of Human Services. Data include program type, location, region in the state, funding sources, Iowa QRS ratings as of September 2013 and December 2014, and domain scores used for the ratings.

Methods

Research questions 1–4 ask about the quality improvement activities of Iowa's early childhood education programs, the supports and barriers that programs experience in improving quality, and the sources of the information programs use to make decisions about quality improvement activities. These questions were addressed using descriptive statistics and creating tables and charts summarizing the survey responses. The study team also summarized survey responses according to program characteristics. To address research question 5, which asks about rating increases among re-rated programs, the study team used descriptive cross-tabulations of ratings at two points in time (September 2013 and December 2014). Logistic regression analysis was used to address research question 6 on whether specific activities and supports are related to increases in Iowa QRS ratings.

What the study found

The following sections summarize the study findings, drawing from analyses of survey and administrative data. (More detailed findings are provided in appendix E.)

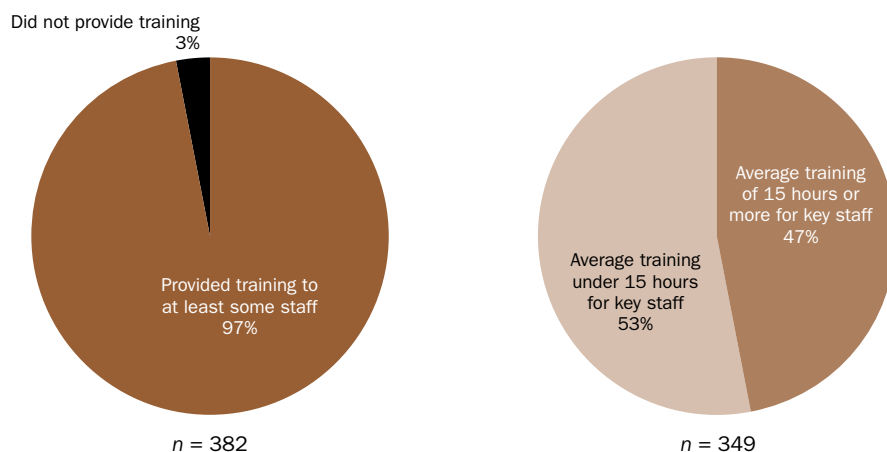
Among participating programs, the most common quality improvement activity reported by survey respondents was in-person training

Staff in almost all programs (97 percent) had participated in some type of training during the year before they completed the survey. Nearly all programs support staff participation in training (97 percent), but slightly less than half of programs (47 percent) reported that key staff met or exceeded the quality benchmark of 15 average annual hours of training (figure 1; see also table E1 in appendix E).³ Most staff in the surveyed programs (95 percent) participated in in-person training, and nearly half of staff (49 percent) in the surveyed programs participated in web-based training. Fewer programs (21 percent) reported providing follow-up supports after either in-person or web-based training.

Most staff in the surveyed programs (95 percent) participated in in-person training, and nearly half of staff (49 percent) in the surveyed programs participated in web-based training

Survey responses were examined separately for centers and homes and by Iowa QRS rating (see appendix E for information on difference in training by initial QRS rating). Homes and centers did not differ significantly in the attendance of staff at in-person training or any training at all, but a higher percentage of staff at centers (60 percent) than at homes (39 percent) participated in web-based training (see table E1 in appendix E). A higher percentage of staff in centers than of staff in homes also received follow-up after trainings (see table E1 in appendix E). Although participation in quality improvement activities was generally higher among centers than among homes, a larger percentage of key staff in homes met the 15-hour benchmark. This may be partly because the state requires more

Figure 1. Almost all programs participating in the Iowa Quality Rating System provided training to staff, but just slightly less than half provided an average of at least 15 hours of training to key staff, fall 2014



Note: The National Institute for Early Education Research identifies a minimum of 15 hours of training annually for teachers as a quality benchmark (Barnett et al., 2014). This study adapted the benchmark to an average of 15 hours of training during the previous year for key staff.

Source: Authors' analysis of data from a survey administered in fall 2014 by the Iowa Department of Human Services, in partnership with regional Child Care Resource and Referral agencies.

hours of training annually for registered home providers than for staff in licensed centers.⁴ Furthermore, most homes have only a single staff member (the provider), whereas centers typically have multiple staff and may distribute training opportunities across more staff.

At least some staff in 65 percent of programs in the Iowa QRS received coaching. The degree to which program staff worked with professional coaches varied. Few programs (15 percent) had ongoing coaching, defined as coaching that occurs once a month or more (figure 2; see also table E1 in appendix E). Among all surveyed programs, 57 percent had staff who had worked with coaches in person, and 34 percent had staff who had worked with coaches using informal communication methods, such as telephone, email, or text messages. Only 7 percent of programs used web-based or video coaching for quality improvement.

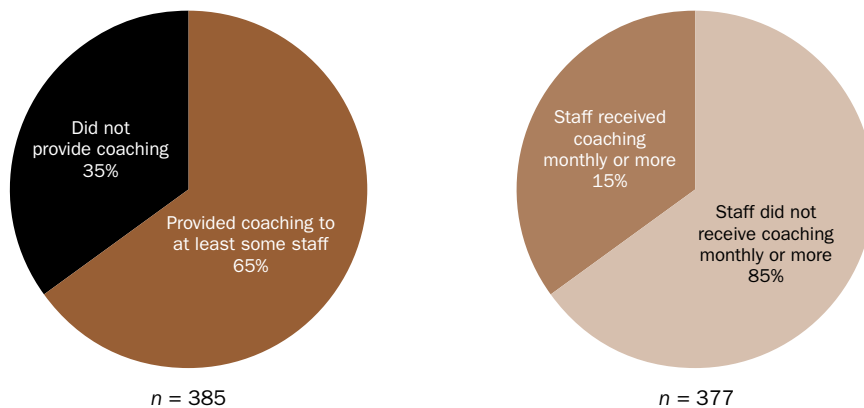
Although centers and homes did not differ in whether staff received at least some coaching in the previous year, a higher share of staff at centers (19 percent) than of staff at homes (11 percent) received ongoing coaching once a month or more (see table E1 in appendix E). Programs' initial QRS rating was not significantly associated with the provision of any coaching during the previous year, but the percentage of programs in which staff received coaching every month or more frequently was highest among programs with a rating of 5.

Staff at approximately one-third of programs were pursuing a degree or a credential. At least some staff at 36 percent of the programs participated in continuing education (see table E2 in appendix E). The share of staff pursuing a degree or credential was much higher among centers (55 percent) than among homes (19 percent). Participation in continuing education was more common among staff in programs with an initial QRS rating of 5 than among staff in programs with lower ratings.

About three-quarters of programs offered orientation and mentoring to new staff. Among programs, 78 percent provided orientation to new staff (excluding homes with no assistants), and 77 percent offered mentoring (see table E2 in appendix E). A large majority of centers provided orientation (93 percent) and mentoring (92 percent) to new staff, but

Among all surveyed programs, 57 percent had staff who had worked with coaches in person, and 34 percent had staff who had worked with coaches using informal communication methods, such as telephone, email, or text messages

Figure 2. Two-thirds of programs participating in the Iowa Quality Rating System provided coaching to staff, but few programs had ongoing coaching once a month or more, fall 2014



Source: Authors' analysis of data from a survey administered in fall 2014 by the Iowa Department of Human Services, in partnership with regional Child Care Resource and Referral agencies.

the shares were less than a third among homes with assistants (33 percent and 30 percent). The provision of orientation and informal mentoring to new staff rose with higher Iowa QRS ratings. The duration of orientation varied, generally ranging from one to four hours.

The amount and type of quality improvement activities varied by staff type, with assistants, especially in homes, participating in few activities. Assistants, especially in homes, tended to receive less training and coaching than other types of staff (figure 3). More than half of homes with assistants provided no training to the assistants, and assistants in homes who received training averaged fewer hours than any other type of staff.

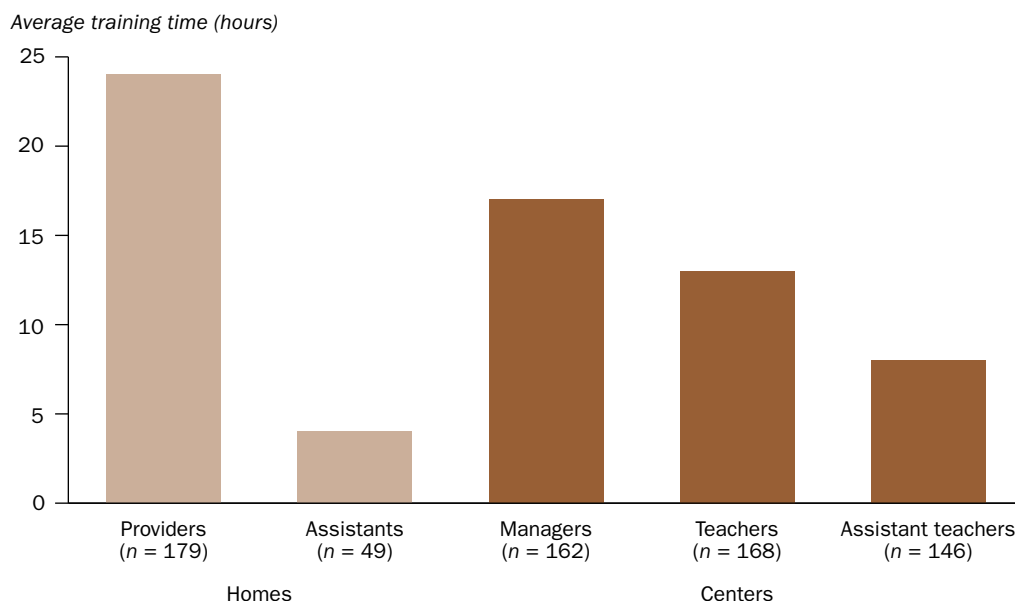
More than half of homes with assistants provided no training to the assistants, and assistants in homes who received training averaged fewer hours than any other type of staff

Only 14 percent of homes with assistants provided coaching to the assistants, while 39 percent of centers provided coaching to at least some assistants. The percentage of staff in centers who engaged in continuing education was higher among teachers (38 percent) and assistant teachers (43 percent) than among managers (19 percent), whereas in homes the percentage was higher among providers (19 percent) than among assistants (5 percent).

The most common topic of professional development reported by survey respondents was health and safety practices

Almost all programs (92 percent) reported that their staff received professional development (either training or coaching) on health and safety practices in the year before they completed the survey. Other common topics of professional development among program staff were child development (85 percent of programs) and classroom practices (76 percent; figure 4; see also table E3 in appendix E).

Figure 3. Among programs participating in the Iowa Quality Rating System, providers in homes received more training on average than did any type of staff in centers and far more training than assistants in homes, fall 2014

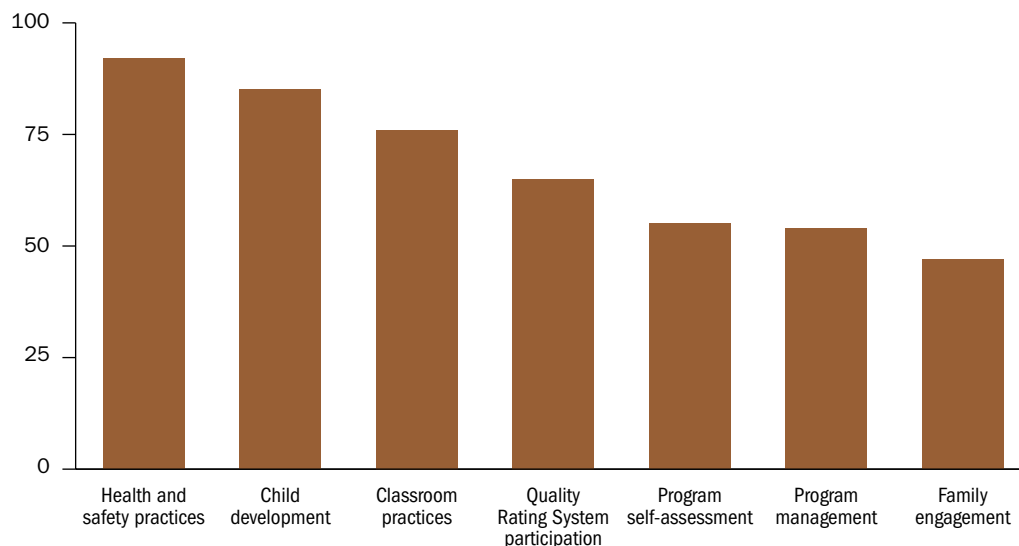


Note: The number of programs that responded in each staff category varies because some programs do not have all listed staff types.

Source: Authors' analysis of data from a survey administered in fall 2014 by the Iowa Department of Human Services, in partnership with regional Child Care Resource and Referral agencies.

Figure 4. Among survey respondents in programs participating in the Iowa Quality Rating System, health and safety practices was the most common topic of professional development among staff, followed by child development, fall 2014

Percent of programs with staff who received professional development on each topic



Note: $n = 376$. See table C6 in appendix C for definitions of the professional development (coaching and training) topics.

Source: Authors' analysis of data from a survey administered in fall 2014 by the Iowa Department of Human Services, in partnership with regional Child Care Resource and Referral agencies.

In five of the seven topics investigated in the survey, the percentage of staff receiving professional development was higher in centers than in homes, with the differences particularly large for classroom practices, program self-assessment, and program management topics (see table E3 in appendix E). The percentage of programs in which staff received professional development differed considerably by Iowa QRS rating for classroom practices, program self-assessment, and family engagement. The percentage was particularly high for programs with an initial rating of 5.

Managers and providers in homes received professional development in a broad range of classroom- and program-related topics; assistants rarely received professional development on topics other than health and safety practices (figure 5; see also table E4 in appendix E). In centers, teachers and assistant teachers most commonly received professional development on classroom-related topics.

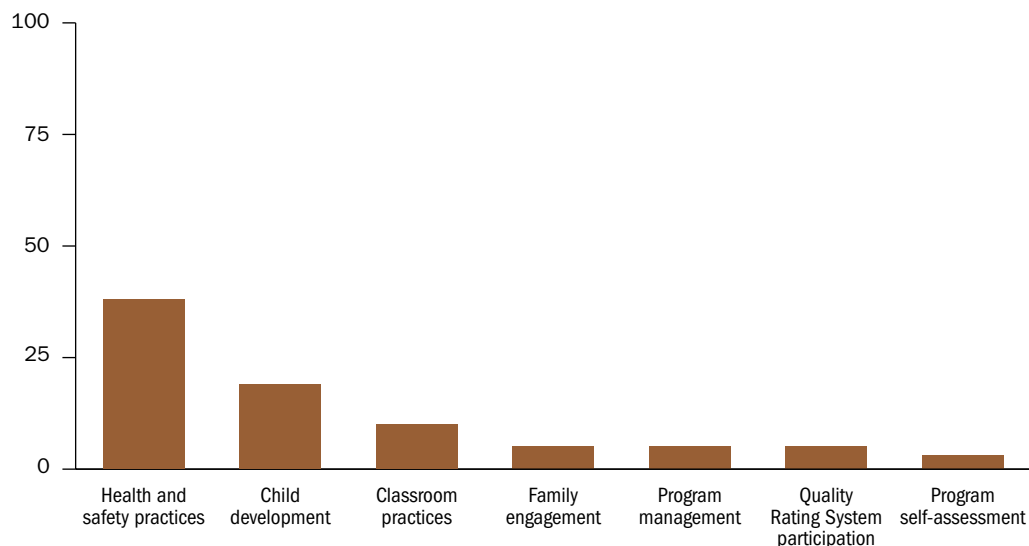
Survey respondents indicated that financial supports were the most common type of quality improvement support received by programs and staff but that travel distance, scheduling, cost, and other logistical barriers often impeded participation

Among quality improvement supports received by programs, financial incentives were more common than nonfinancial incentives. Approximately three-quarters of programs reported receiving at least one type of incentive in the year before the survey (74 percent; see table E5 in appendix E). More than half the programs responding to the survey (56 percent) reported receiving monetary awards for achieving or maintaining their Iowa QRS ratings.⁵ Almost two-fifths of programs (39 percent) received a grant to support specific quality

In five of the seven topics investigated in the survey, the percentage of staff receiving professional development was higher in centers than in homes, with the differences particularly large for classroom practices, program self-assessment, and program management topics

Figure 5. Among programs participating in the Iowa Quality Rating System, few assistants in homes received professional development on topics other than health and safety practices, fall 2014

Percent of homes with assistants in which assistants received professional development on each topic



Managers and providers in homes received professional development in a broad range of classroom- and program-related topics; assistants rarely received professional development on topics other than health and safety practices

Note: $n = 58$. See table C6 in appendix C for definitions of the professional development (coaching and training) topics.

Source: Authors' analysis of data from a survey administered in fall 2014 by the Iowa Department of Human Services, in partnership with regional Child Care Resource and Referral agencies.

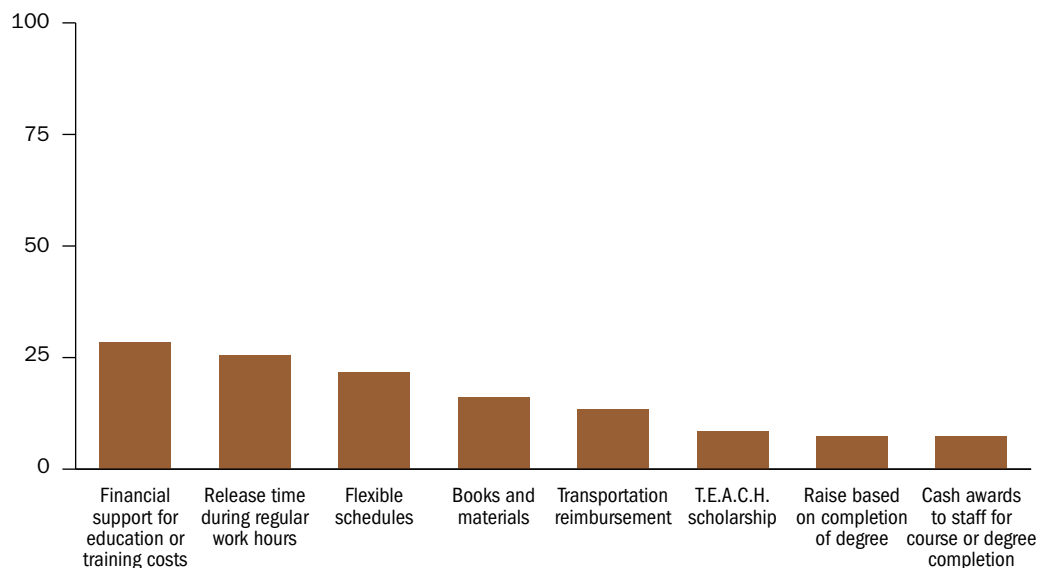
improvements or a grant that required Iowa QRS participation or achieving a minimum rating. Nonfinancial incentives were less common at the program level: 16 percent of programs received free or discounted equipment and materials in the previous year.

A higher percentage of centers (79 percent) than of homes (70 percent) received a program-level financial or nonfinancial incentive in the previous year (see table E5 in appendix E). The percentage was lowest among programs with a rating of 1, and lower rated programs typically received nonfinancial incentives, while higher rated programs typically received financial incentives.

Financial support for education or training costs and release time were the most common quality improvement supports received by program staff. Across all programs the most common support received by staff was financial support for education or training costs (28 percent of programs), followed by release time during regular work hours (25 percent of programs; figure 6; see also table E6 in appendix E). There were large differences in the percentages of centers and homes in which staff received supports, including financial support for education or training costs, release time during regular work hours, flexible schedules, transportation reimbursement, and a raise or salary adjustment based on completion of a degree or credentialing program. However, the absence of staff other than the registered provider in homes probably means that fewer formal supports would be offered to (or needed by) homes. There was no relationship between the programs' initial QRS rating and the supports for quality improvement received by staff.

Figure 6. Among programs participating in the Iowa Quality Rating System, financial support for education or training costs and release time were the most commonly reported quality improvement supports received by program staff, fall 2014

Percent of programs with staff receiving each type of support



T.E.A.C.H. is Teacher Education and Compensation Helps.

Note: n = 373.

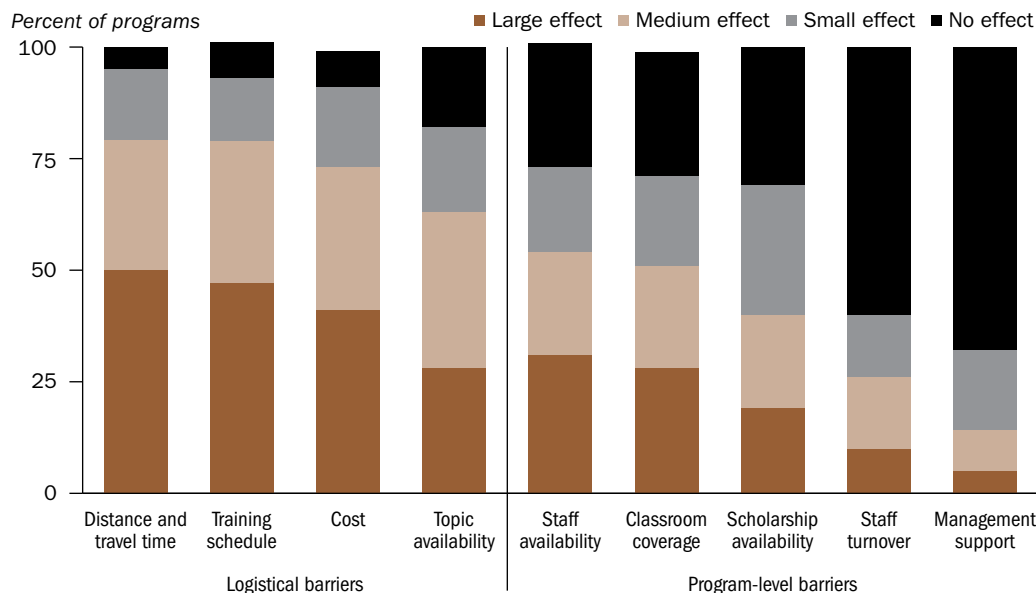
Source: Authors' analysis of data from a survey administered in fall 2014 by the Iowa Department of Human Services, in partnership with regional Child Care Resource and Referral agencies.

There were large differences in the percentages of centers and homes in which staff received supports, including financial support for education or training costs, release time during regular work hours, flexible schedules, transportation reimbursement, and a raise or salary adjustment based on completion of a degree or credentialing program

Among barriers to quality improvement efforts, logistical factors such as distance to training sites and availability of needed training were reported more often than program-related factors, such as staff turnover. The survey asked whether certain logistical or program-related barriers had no effect, a small effect, a medium effect, or a large effect on quality improvement efforts at the program level. At least 63 percent of survey respondents indicated that logistical barriers (especially distance and travel time, training schedule, and cost) had a medium or large effect on staff participation in quality improvement efforts (figure 7). Fewer than 55 percent of programs reported that program-related barriers (especially staff turnover and management support) had a medium or large effect. These responses on management support may be biased because most survey respondents were managers. Managers may underreport the effect of management support on quality improvement activities.

Centers reported higher levels of barriers than did homes, but there was no statistically significant relationship between initial Iowa QRS rating and reported barriers (figure 8; see also table E7 in appendix E).

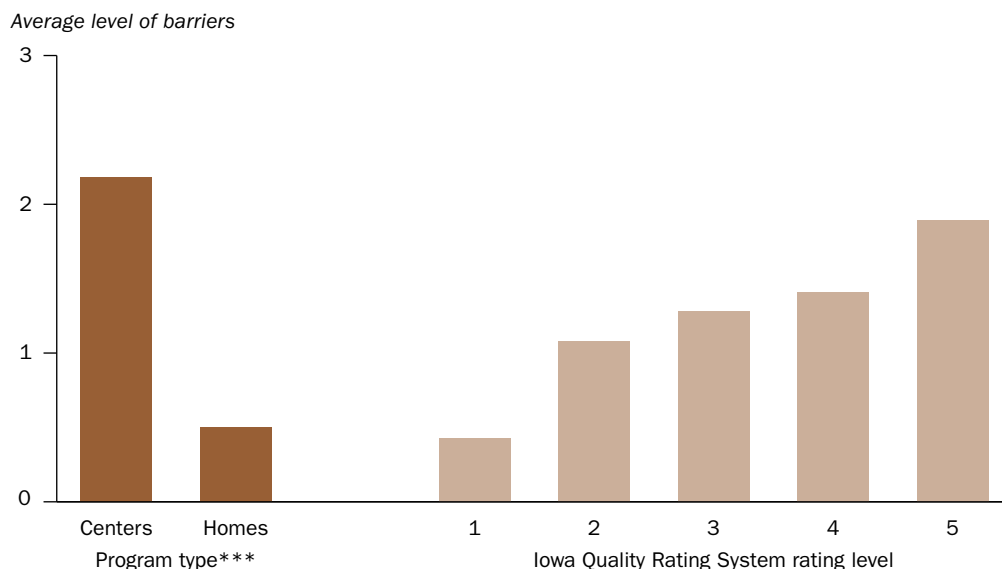
Figure 7. A high percentage of programs participating in the Iowa Quality Rating System reported large effects of logistical barriers on staff participation in professional development and other improvement activities, fall 2014



Note: $n = 357-370$.

Source: Authors' analysis of data from a survey administered in fall 2014 by the Iowa Department of Human Services, in partnership with regional Child Care Resource and Referral agencies.

Figure 8. Among programs participating in the Iowa Quality Rating System, the average level of barriers to quality improvement activities was significantly higher among centers than among homes, but did not differ significantly by rating level, fall 2014



*** Statistically significant at $p < .001$.

Note: $n = 361$. Levels of barriers are measured on a four-point scale: no effect (1), small effect (2), medium effect (3), or large effect (4). Iowa Quality Rating System ratings range from 1 (lowest) to 5 (highest), and the criteria for each rating differ for centers and homes; see box 3, appendix B, and table C10 in appendix C.

Source: Authors' analysis of data from a survey administered in fall 2014 by the Iowa Department of Human Services, in partnership with regional Child Care Resource and Referral agencies.

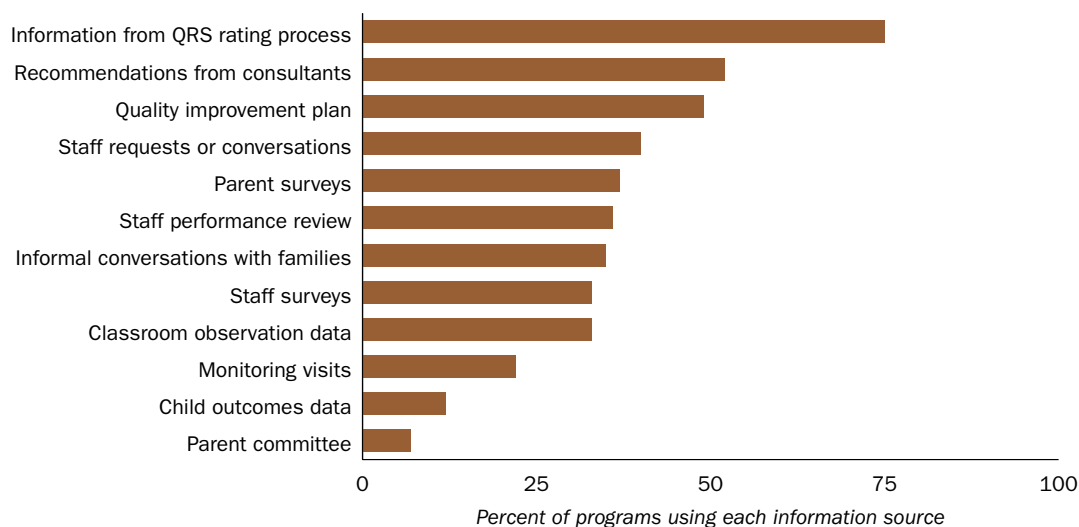
Information from the Iowa Quality Rating System rating process was the most commonly reported source that programs used to determine their professional development needs

Three-quarters of survey respondents (75 percent) reported using information from the Iowa QRS rating process to determine professional development needs (figure 9; see also table E8 in appendix E). Approximately half the respondents reported using recommendations from consultants or coaches (52 percent) and quality improvement plans (49 percent) to determine professional development needs; other sources of information were reported less commonly.⁶

Centers reported using more varied types of information to determine their professional development needs than did homes (see table E8 in appendix E), although homes with no staff other than the registered provider would not need to rely on all sources of information measured in the survey. The percentage of programs using information from the Iowa QRS rating process, recommendations from consultants or coaches, quality improvement plans, parent surveys, and classroom observation data differed significantly by Iowa QRS rating; the highest percentages were among programs with a rating of 5.

Approximately half of survey respondents reported using recommendations from consultants or coaches (52 percent) and quality improvement plans (49 percent) to determine professional development needs; other sources of information were reported less commonly

Figure 9. Information from the Iowa Quality Rating System rating process was the most commonly reported source that participating programs used to determine their professional development needs, fall 2014



Note: *n* = 373.

Source: Authors' analysis of data from a survey administered in fall 2014 by the Iowa Department of Human Services, in partnership with regional Child Care Resource and Referral agencies.

Nearly all programs (98 percent) rated twice either maintained the same rating or received a higher rating

Programs participating in Iowa QRS are re-rated every two years, and ratings tended to increase among programs that receive a second rating (figure 10; see also table E9 in appendix E). About half the programs (52 percent; 90 of 172 programs) that were assessed twice obtained the same rating the second time, and 45 percent (78 of 172 programs) obtained a higher rating the second time. Only 2 percent of programs (4 of 172 programs) received lower scores at their second assessment. Rating increases were more common among programs that started at lower ratings and were less common among programs that started at higher ratings.⁷

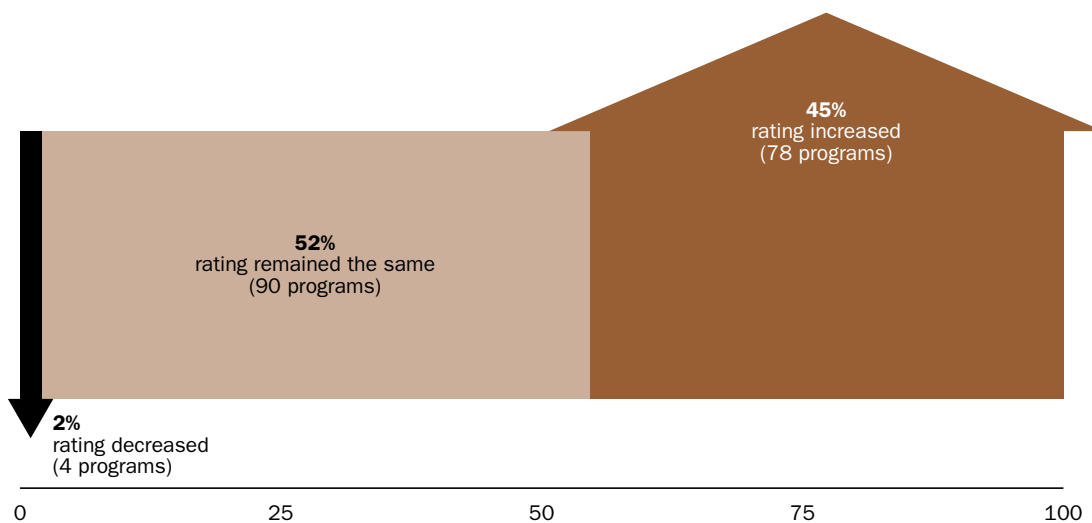
Professional development on management topics and staff with at least 15 hours of training were positively related to increases in Iowa Quality Rating System rating, and professional development on child development topics was negatively related to rating increases

There were mixed results for how the quality improvement activities were related to increases in Iowa QRS rating.

Programs in which managers or providers received professional development on topics related to program management tended to increase their Iowa Quality Rating System ratings. Programs in which managers or providers received professional development on management topics had significantly higher odds of increasing their rating (odds ratio of 3.01) than did programs in which managers or providers did not receive that professional development (figure 11; see also table E12 in appendix E). The relationship holds even after taking into account program characteristics (including the program's initial Iowa QRS rating) and other types of quality improvement activities.

About half the programs (52 percent; 90 of 172 programs) that were assessed twice obtained the same rating the second time, and 45 percent (78 of 172 programs) obtained a higher rating the second time

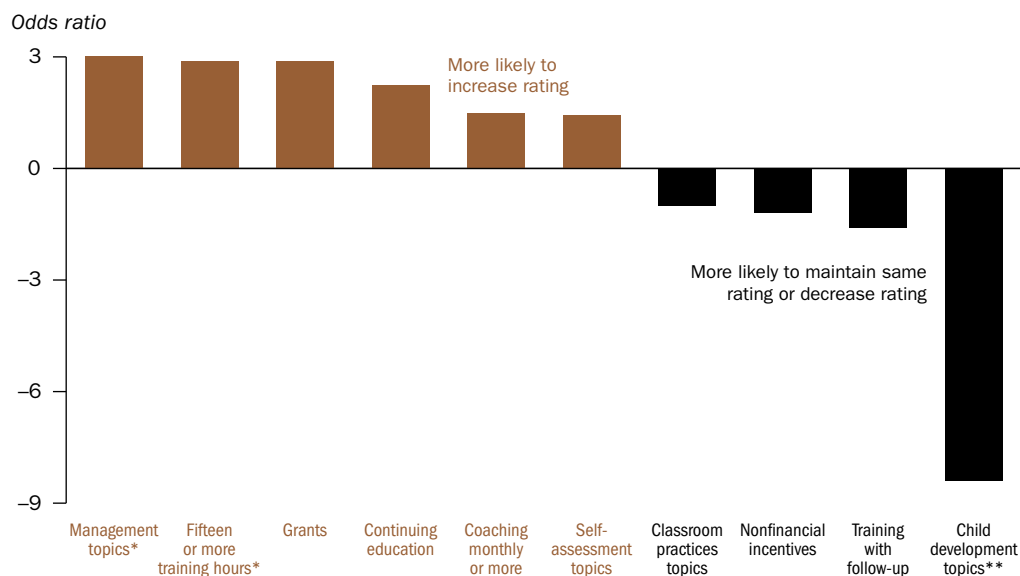
Figure 10. Just under half the programs participating in the Iowa Quality Rating System increased their rating at the second time point, and very few programs received a lower rating, 2011–15



Note: $n = 172$. Percentages do not sum to 100 because of rounding. The first rating occurred in 2011, 2012, or 2013, and the second rating occurred two years later.

Source: Iowa Quality Rating System administrative data.

Figure 11. Among programs participating in the Iowa Quality Rating System, the odds of increasing the rating were higher among programs that provided professional development on management topics and programs that provided staff with 15 or more hours of training, 2011–15



* Significant at $p < .05$; ** significant at $p < .01$.

Note: $n = 146$. This chart provides a graphic representation of the results of logistic regression model 1 reported in table E12 in appendix E. The odds ratio bars above the center line indicate the odds of increasing the program’s rating at the second time point if a program completed the quality improvement activity. The odds ratio bars below the center line are inversions of the odds ratios presented in table E12, and these bars indicate the odds of not increasing the program’s rating at the second time point if a program completed the quality improvement activity. The odds ratios were inverted so that the bars below the center line would be comparable in relative magnitude to the bars above the center line.

Source: Authors’ analysis of administrative data on program characteristics and Iowa QRS ratings from Iowa Department of Human Services and analysis of data from a survey administered in fall 2014 by the Iowa Department of Human Services, in partnership with regional Child Care Resource and Referral agencies.

Programs that provided key staff with 15 or more training hours per year also increased their ratings, though such increases may partly reflect how training hours are factored into the Iowa Quality Rating System rating. The National Institute for Early Education Research recommends that key staff in early childhood education programs receive at least 15 hours of training per year (Barnett et al., 2014). The findings of this study support this recommendation: programs in which key staff received an average of at least 15 hours of training in the previous year were more likely to increase their rating (odds ratio of 2.90) than were programs that did not provide such training (see figure 11; see also table E12 in appendix E), holding constant program characteristics, initial Iowa QRS rating, and other types of quality improvement activities.

However, the positive relationship between at least 15 hours of training and rating increases may be partly due to how the rating is calculated. Some programs obtain a higher professional development domain score because the number of points earned in the professional development category of the Iowa QRS rating is partly determined by hours of training, and the professional development domain score is one of the criteria used to determine ratings 3, 4, and 5. That means that the number of training hours may be helping programs increase their ratings simply because hours are counted directly in the rating score

Programs in which key staff received an average of at least 15 hours of training in the previous year were more likely to increase their rating (odds ratio of 2.90) than were programs that did not provide such training

rather than through the impacts of the training. Analyses of the relationship between at least 15 hours of training and increases in the professional development domain score find even stronger relationships, further suggesting that this may be the case.

Programs in which staff receive professional development in child development were less likely than programs in which staff did not receive professional development in child development to increase their Iowa Quality Rating System ratings. Although these analyses do not examine causal relationships, they identified this negative relationship after accounting for program characteristics, initial rating, and other types of quality improvement activities (see table E12 in appendix E).

Domain score analyses suggest a limited relationship between quality improvement activities and increases in Iowa Quality Rating System rating. Ratings are based on domain scores for programs eligible for a rating of 3 or higher (see box 3 and appendix B). Among the subset of programs with domain scores, the study examined the relationship between quality improvement activities and increases in domain scores for domains that are common to both centers and homes. The logistic regression models found relatively few significant relationships between quality improvement activities and domain score increases (table 1). However,

Table 1. The logistic regression models showed some differences in the relationships between the quality improvement activities of participating programs and each Iowa Quality Rating System outcome, 2011–15

Key quality improvement activity	Improvement in Iowa Quality Rating System rating (n = 146)	Improvement in health and safety score (n = 109)	Improvement in environment score (n = 109)	Improvement in professional development score (n = 109)
Management topics	+ *	+	+	+
Fifteen or more training hours	+ *	+	–	+ *
Grants	+	+	–	+
Continuing education	+	–	–	+
Coaching monthly or more	+	–	–	–
Self-assessment topics	+	+	+	–
Classroom practices topics	–	+	+	–
Nonfinancial incentives	–	–	–	+
Training with follow-up	–	+	+	–
Child development topics	– **	–	– *	–

* Significant at $p < .05$; ** significant at $p < .01$.

+ indicates a positive relationship between the quality improvement activity (table rows) and the Iowa Quality Rating System (Iowa QRS) outcome (columns).

– indicates a negative relationship between the quality improvement activity and the Iowa QRS outcome.

Note: The table shows the direction of the relationships in logistic regression models that account for the listed quality improvement activities and that control for initial Iowa QRS rating, program type, public preschool or Head Start funding, and receipt of child care subsidies. For detailed model results, see model 1 in table E12 in appendix E for increases in Iowa QRS rating, model 3 in table E12 for increases in health and safety score, model 5 in table E12 for increases in environment score, and model 9 in table E12 for increases in professional development score. The results are not included for increases in family and community partnerships scores because model fit statistics indicated a poor fit to the data, and the results should therefore not be interpreted, though they can be viewed in table E12.

Source: Authors' analysis of data from a survey administered in fall 2014 by the Iowa Department of Human Services, in partnership with regional Child Care Resource and Referral agencies.

While professional development on management topics was related positively related to increased ratings, professional development on child development topics was negatively related to increases in Iowa QRS ratings

the five statistically significant relationships observed in these analyses provide additional information to help interpret the relationship between quality improvement activities and changes in the overall ratings (because the domain scores are part of the overall ratings for more highly rated programs). It may be interesting to explore these issues in future research.

An average of 15 or more training hours among key staff was significantly and positively related to increases in Iowa QRS ratings and also to increases in the professional development domain score but not in other domain scores. This underlines the possibility that the significant relationship between 15 or more training hours and increases in Iowa QRS ratings may be driven by the way training hours are factored in to scores on the professional development domain. The provision of professional development on child development topics to teachers or providers was significantly and negatively related to increases in Iowa QRS ratings and to increases in environment scores. The provision to managers or providers of professional development on child development topics was not significantly related to increases in other domain scores. The provision of professional development on management topics was positively associated with Iowa QRS rating increases but not significantly related to any domain score increases. There were no other significant relationships between quality improvement supports and increases in domain scores or Iowa QRS ratings.

Implications of the study findings

The descriptive findings of this study provide an overview of the landscape of quality improvement activities among early childhood education programs participating in the Iowa QRS. The results suggest that in-person training is the most common type of quality improvement activity in Iowa, perhaps partly because annual in-person training hours are required to maintain home provider registration or center licensing. While staff in almost all programs completed in-person training, staff in approximately half the programs participated in web-based training. However, many survey respondents identified long distance and travel time as barriers to participation in quality improvement activities such as training. Members of the Iowa Quality Rating System Oversight Committee suggested that programs could increase overall staff training hours by encouraging staff to use web-based training after meeting the minimum requirements for in-person training. Because web-based training requires access to appropriate technology, the state may wish to examine the accessibility of web-based training options for staff in programs across Iowa.

Although staff in almost all programs participated in training, fewer than half the programs met the study team's adaptation of the National Institute for Early Education Research benchmark of providing an average of at least 15 hours of training per year for key staff (Barnett et al., 2014). The regression analyses suggest that meeting the 15-hour benchmark is associated with a higher likelihood of increasing the Iowa QRS rating, although the analyses do not provide information on whether additional training leads to increases in rating (the increases could be caused by other factors not accounted for in the study). Furthermore, the number of points earned in the professional development category of the Iowa QRS rating is partly determined by hours of training. That means that the number of training hours may be helping programs increase their ratings simply because hours are counted directly in the rating score rather than through the impacts of the training. The state may wish to investigate the value of encouraging training hours beyond the minimum requirements for licensing or registration and the potential role of web-based training in supporting more training among program staff.

The state may wish to investigate the value of encouraging training hours beyond the minimum requirements for licensing or registration and the potential role of web-based training in supporting more training among program staff

About two-thirds of programs reported that staff received coaching. Coaching provided on an ongoing basis (once a month or more) allows programs to engage with the coach in continuous quality improvement, and less frequent consultation with a coach can help programs address a particular issue or meet a particular need. Only 15 percent of programs reported that staff received ongoing coaching. The regression analysis did not find a significant relationship between ongoing coaching and increases in Iowa QRS ratings, but coaching may positively affect the classroom practices of coaching participants in ways that are not reflected in program-level Iowa QRS ratings. Because other research has found positive relationships between coaching and classroom quality (Isner et al., 2011; Muenchow et al., 2013; Neuman & Cunningham, 2009; Tout et al., 2011), the state may wish to investigate how coaching affects classroom quality.

The findings indicate that staff in 92 percent of the programs received professional development on health and safety topics and that staff in 85 percent of the programs received professional development on child development topics. Though these shares are high, members of the Iowa Quality Rating System Oversight Committee expressed surprise that participation in training on these topics is not universal among programs, given the emphasis on these topics by early childhood funding agencies within the state. The regression results find a counterintuitive negative relationship between teacher professional development in child development topics and increases in Iowa QRS ratings. This result should be interpreted with the same caution as the other regression-based results because the results may be explained by other factors. For example, the programs that did not focus on child development topics may have staff with prior expertise in child development, which might also help drive rating increases. The study did not have data on prior child development training or on the expertise of teachers and so could not examine this possibility empirically. Domain score analyses suggest that the negative relationship between professional development in child development topics and Iowa QRS rating increases is reflected in an even stronger negative relationship with environment score increases. The state may wish to conduct additional research to understand this finding more clearly.

Staff in about half the programs received professional development in self-assessment and management topics. The regression analysis findings indicate that professional development among managers on management topics was positively correlated with Iowa QRS rating increases. This positive relationship suggests that the state may wish to conduct further research to examine whether the management training is leading to improvements in program quality or whether other factors explain the observed relationships. Should the state decide to offer more management training opportunities, it would be helpful to pilot the offerings within a subset of programs to study the impact on QRS ratings.

Staff in about one-third of programs pursued a degree or credential in the year before the survey, a fairly small percentage. Not all early childhood education program staff require continuing education, particularly if they have already completed a degree appropriate for the job, but the state may wish to investigate access to continuing education among early childhood education program staff.

Centers engaged in some types of quality improvement activities more often than did homes, including web-based training, monthly coaching, continuing education, and new staff orientation and mentoring. Home providers participated in a higher number of annual training hours, on average, than did centers, but this difference may be due to the larger

The state may wish to conduct further research to examine whether the management training is leading to improvements in program quality or whether other factors explain the observed relationships

number of training hours required for home providers or to the availability of fewer staff to send for training. Homes offered fewer supports for staff participation in professional development and continuing education. Many homes have only one lead provider, and so they may not feel the need to offer formal supports for professional development or education. Yet even homes with assistants make little use of quality improvement activities such as new staff orientation. It could be that home providers find it difficult to participate in activities that require absence from the program if they have no staff to cover for staff absent for training. The state may wish to consider ways to increase access to quality improvement activities among homes, such as developing quality improvement activities and materials targeted specifically to homes, developing coaching supports that count toward annual training hours, or providing web-based or video coaching that does not require travel.

Programs with an initial rating of 5 were more likely than programs that received lower ratings to participate in some quality improvement activities, such as monthly coaching and continuing education. Other quality improvement activities increased steadily with each higher Iowa QRS rating, such as new staff orientation and mentoring. It is not surprising that programs with high ratings were most likely to engage in quality improvement activities. The state may wish to consider ways to encourage participation in quality improvement activities among programs at lower Iowa QRS ratings, the programs that are most in need of improvement. For example, the state could offer incentives to encourage programs with a rating of 1 or 2 to participate in quality improvement.

Among the staff supports for quality improvement activities measured in the survey, even the most common ones were used in less than 30 percent of programs. Many of these supports could lower the logistical barriers to quality improvement reported by many programs; for example, by providing transportation reimbursement, flexible schedules, and release time. The state may wish to consider ways to expand the availability of supports to help early childhood education program staff participate in quality improvement activities.

Information from the Iowa QRS rating process was used widely by programs to determine their professional development needs, suggesting that participation in the Iowa QRS is useful to programs in identifying needs and planning quality improvements.

The state may wish to consider ways to expand the availability of supports to help early childhood education program staff participate in quality improvement activities

Limitations of the study

This study has a number of limitations that should be considered when reviewing the study's findings:

- All information about quality improvement activities was self-reported by programs that participated in a survey administered by the Iowa Department of Human Services, and the accuracy of the self-reported information has not been independently verified.
- The information about quality improvement activities was collected from a subset of randomly selected programs that completed the survey and may not represent the activities completed by all programs participating in the Iowa QRS.
- The survey asked respondents about quality improvement activities conducted during the previous 12 months. Programs may have done other quality improvement activities during the other 12 months of the QRS rating cycle that may not be reflected in the findings.

- The analyses employed in this study are intended to describe the use of quality improvement activities and the relationships between those activities and increases in QRS ratings. However, the study was not designed to support causal inference about the impacts of specific quality improvement activities on program quality. To determine whether the activities have effects on program quality, a randomized controlled trial would need to be performed.
- The regression analyses examine how quality improvement activities relate to Iowa QRS ratings and domain scores rather than to direct child outcomes, and relationships between these activities and Iowa QRS ratings may not reflect how quality improvement activities affect child learning and development.

Appendix A. Supplemental literature review

This appendix supplements the brief literature review included in the main body of the report.

The literature suggests that quality improvement supports and activities among early childhood education programs have the potential to improve children's early learning experiences

Quality improvement activities include training, coaching, mentoring, and continuing education. Quality improvement supports include financial incentives, such as tiered reimbursements and rating bonuses, and nonfinancial incentives, such as access to materials and equipment. Box A1 summarizes the research (mostly correlational) on each type of quality improvement activity and early childhood education program outcome, outside the context of quality rating and improvement systems (QRISs).

The literature suggests that quality improvement activities have the potential to improve program quality and possibly also child outcomes, although less is known about how variation in the specific quality improvement activities may influence the effectiveness of these activities. In addition, some research suggests that comprehensive interventions combining training and coaching may be more effective at improving classroom practices and child outcomes than either type of quality improvement support alone (Landry, Anthony, Swank, & Monseque-Bailey, 2009; Landry, Swank, Anthony, & Assel, 2011). However, these studies examine quality improvement activities outside the context of QRISs, and programs participating in a QRIS may use quality improvement activities differently than programs that do not participate in QRISs. Furthermore, these studies typically focus on how quality improvement activities affect interactions between staff and children. QRISs are multidimensional in nature, and the ratings typically combine data on program and staff characteristics, the program environment, and in some cases interactions between staff and children. For this reason, the findings of the literature reviewed here do not necessarily generalize to the QRIS setting and do not inform states about the relationship between quality improvement activities and changes in QRIS ratings.

To date, few studies have described how programs in quality rating and improvement systems use quality improvement supports and activities or how these supports and activities relate to changes in ratings

A handful of studies describe the types of quality improvement activities available to or used by programs participating in a QRIS. Programs participating in a QRIS tend to receive more professional development than programs that do not (Isner et al., 2011; Muenchow et al., 2013; Smith, Robbins, Schneider, Kreader, & Ong, 2012; Smith, Schneider, & Kreader, 2010; Tout et al., 2011). Conducting case studies with four local and pilot QRISs, Isner and colleagues (2011) found that QRIS administrators and directors of quality improvement services reported that QRIS programs emphasized on-site professional development processes relatively more, including in the duration and intensity of the processes. In addition, survey data gathered from technical assistance providers in 17 states indicate that less highly rated programs participating in QRISs were less likely to access on-site technical assistance supports, although half the technical assistance providers reported that they targeted quality assistance visits to programs with greater needs (Smith et al., 2010, 2012). Across these studies, small sample sizes, the reliance on qualitative interview data, and the concerns inherent in self-reported data limit the generalizability.

Box A1. There is a sizable body of literature on quality improvement supports and activities and early childhood education program outcomes

Training refers to professional development administered to a group of early childhood education program staff, conducted through workshops or professional meetings that do not accrue higher education credits (Zaslow, Tout, Halle, Whittaker, & Lavelle, 2010). Some studies find that training, especially if it is intensive, content specific, and focused on child-teacher interactions, is associated with improvements in classroom practices, observed program quality, and caregiver competency (for example, Fukkink & Lont, 2007; Hamre et al., 2012; Raikes et al., 2006; Zaslow et al., 2010). However, other studies find no impact of training alone, suggesting that training is most effective if it includes follow-up supports, such as on-site technical assistance or coaching (Tout, Epstein, Soli, & Lowe, 2015). In some research, training had positive effects on some teaching practices but not on others, suggesting that training alone may not be sufficient to change the practice in some areas, although the training program did have a positive effect on child language outcomes (Piastra et al., 2012). A large experimental study of the Program for Infant/Toddler Care, an on-site training program that also includes some coaching, found no impacts on global program quality, adult-child interactions, or child outcomes, although the study also found that staff in many programs did not complete the full 56 hours of training and thus did not receive the full program (Weinstock et al., 2012).

Coaching (as well as mentoring and on-site technical assistance) refers to individualized task-oriented professional development strategies typically conducted one-on-one with staff, often in the program setting. Studies suggest that coaching is associated with higher observed program quality and improved classroom practices, but there is mixed evidence on the relationship between coaching and child developmental outcomes in language, literacy, math, and behavior (Aikens & Akers, 2011; Bryant et al., 2009; Hamre, Pianta, Mashburn, & Downer, 2012; Isner et al., 2011; Muenchow et al., 2013; Neuman & Cunningham, 2009; Tout et al., 2011; Tout et al., 2015; Wasik & Hindman, 2011). Although some studies have examined the mechanisms through which coaching may be most effective and suggest better outcomes from more sustained coaching (Pianta et al., 2014; Wasik & Hindman, 2011), additional research is needed on specific elements of coaching (such as type, duration, and frequency) and on the characteristics of the coaches to understand more clearly the most effective way to implement coaching (Aikens & Akers, 2011; Isner et al., 2011; Muenchow et al., 2013).

Continuing education refers to the pursuit of credentials, credits, or degrees by employed early childhood education program staff. Findings are mixed on the relationship between educational attainment or credentials and program quality. Some studies find no association, and others find positive associations; there is little evidence of a relationship between teacher education level and child outcomes (Early et al., 2006; Tout, Zaslow, & Berry, 2001, Zaslow et al., 2010). Some evidence suggests that the relationship between education level and program quality may vary according to the characteristics of the degree program and the characteristics of the early childhood education program, but additional research is needed to unpack how variation within specific types of training and other professional development is related to improvements in quality (Vu, Jeon, & Howes, 2008; Zaslow et al., 2010).

Incentives for quality improvement include financial incentives (which encompass monetary awards such as scholarships, bonuses, or tiered reimbursements) and nonfinancial incentives (which include nonmonetary rewards such as equipment and materials). There is little research examining financial incentives and how they relate to program quality or child outcomes (Mitchell, 2012), but some studies suggest that financial incentives facilitate accreditation and are associated with developmentally appropriate practices and beliefs (Adams, Bierbrauer, Edie, Riley, & Roach, 2003; Cassidy, Buell, Pugh-Hoese, & Russell, 1995; Gormley & Lucas, 2000). Research is needed especially on nonfinancial incentives and quality.

A few studies have performed descriptive analyses employing administrative data to examine how programs use quality improvement activities within QRISs. In California, Muenchow et al. (2013) found that, across local and statewide QRISs, participating programs consistently invested in coaching and mentoring, while training and formal education supports also enjoyed widespread use as quality improvement strategies. Tout et al. (2011) found that fully rated programs participating in Minnesota's pilot QRIS most commonly accessed quality improvement supports intended to improve QRIS-related documentation and their performance in Environment Rating Scale observations. In addition, preliminary analyses conducted by Yazejian and Iruka (2015) described the distribution of technical assistance hours, awards, and scholarships to QRIS-participating programs in Miami-Dade County, Florida. They found that programs received 5 hours a month of technical assistance, on average. Findings from these studies must be interpreted cautiously given that states often face limitations in their ability to collect reliable administrative data that documents how programs access and participate in quality improvement efforts. This restricts a state's ability to understand how quality improvement efforts are linked to QRIS program ratings (for example, because of problems in linking data across systems). Furthermore, states do not have the resources and systems in place to verify the accuracy of administrative data. Therefore, states lack sufficient information about the specific quality improvement supports and activities in which programs in the QRIS engage.

Research focused specifically on the relationship between quality improvement activities and QRIS outcomes is limited. Some QRIS research funded through state Race to the Top–Early Learning Challenge awards are examining relationships between quality improvement activities within the context of QRIS and various outcomes, including QRIS rating changes, program quality outcomes, and child developmental outcomes. However, this research is still under way and has not yet been published in most states. Other studies provide limited information about the relationship between quality improvement activities and rating increases.

Analyzing administrative data for 412 center- and home-based programs in Miami's QRIS, Yazejian and Iruka (2015) studied the relationship between three types of quality improvement supports (on-site technical assistance, nonfinancial incentives in the form of materials and equipment, and scholarships for credentials or degrees) and subsequent QRIS ratings. Among centers, the authors found that only scholarships had a small positive relationship with subsequent QRIS ratings and that the relationship was slightly larger among programs that had been in the QRIS for less time. Among homes, there were no significant relationships between quality improvement supports and QRIS ratings, but home programs that had been in the QRIS for less time showed a slightly larger relationship between scholarships and QRIS ratings. The study found that quality improvement supports are related only weakly to ratings improvements, although the use of administrative data on a small subset of quality improvement activities curbs the extent to which conclusions can be drawn from this research.

Other studies have examined the effects of specific combinations of quality improvement activities and supports that are provided to programs in a QRIS. One study examined the QRIS rating outcomes among programs participating in Pennsylvania's Success by 6 program, an intensive quality improvement program that includes intensive coaching, program improvement funds, and other supports designed to help the programs reach a rating of 3. Using a matched comparison design with propensity score matching, the study

compared rating increases among programs with a rating of 2 that did and did not voluntarily participate in the Success by 6 quality improvement program. It found substantially higher rates of rating increases among programs participating in the Success by 6 program (Warner-Richter et al., 2016). Another study used a program-level random assignment design to examine the impacts of the quality improvement supports offered as part of Washington’s Seeds to Success QRIS—including quality improvement grants, funding for professional development, and coaching using the Consultative Coaching Program model—on program quality and QRIS rating outcomes. The study found positive impacts on observed quality, but no impact on the overall QRIS rating (Boller et al., 2015). These studies provide useful information about the potential benefits of quality improvement supports for programs in QRISs, but the studies were not designed to capture the specific aspects of the quality improvement interventions that were most effective, and the results cannot be generalized to other QRISs offering quality improvement supports that do not follow the same program model.

Additional research is needed on quality improvement activities and QRIS outcomes.

Appendix B. Iowa Quality Rating System rating criteria

This appendix includes the Iowa Quality Rating System (QRS) rating guidelines for centers and homes, based on documents provided by the Iowa Quality Rating System Oversight Committee.

Guidelines for centers include criteria for five ratings

The Iowa QRS rating criteria for centers are presented below.

Rating of 1 and 2

1

- Full licensing OR a provisional license with no action to revoke or deny OR operates under the authority of an accredited school district or nonpublic school

2

- Full licensing only with no action to revoke or deny OR the program operates under authority of an accredited school district or nonpublic school
- If eligible, participation in federal food program (Child and Adult Care Food Program)
- Each room has at all times at least one staff member present who has completed mandatory reporting of child abuse, universal precautions and infectious disease control, cardiopulmonary resuscitation, and first aid
- Basic orientation for all staff prior to beginning work
- Director and staff perform self-assessments of each individual's skills and one of the center overall

Rating of 3–5

The amount of points from the menu below is required to receive a rating of 3–5:

3	17–26 points
4	27–33 points
5	Minimum of 34 points and minimum Environment Rating Scale (ERS) assessment score of 5.0 in each assessed room. The assessment must be completed by Iowa State University.

Professional development Maximum points = 30	
Credential—programs may earn a maximum of 5 points	Points
Center director has one of the following: <ul style="list-style-type: none"> · Valid National Administrator Credential (NAC) · Valid Aim4Excellence credential · Valid license as a preK principal issued by the Board of Educational Examiners · OR · Staff has completed the Head Start Management Acceleration Program (MAP) 	5
Education and experience—programs may earn a maximum of 25 points Each staff member shall indicate the highest applicable education and experience qualification, and the total points of all staff will be divided by the number of staff.	Points
15 hours of annual approved training beyond regulatory requirements	2
30 hours of annual approved training beyond regulatory requirements and at least 5 years of experience working in a child care facility or a program operating under the authority of an accredited school district or nonpublic school	4
At least 9 college credit hours in education specific to age group for whom care is provided	5
Iowa Board of Educational Examiners paraeducator certificate at level 2, early childhood, plus 2 years of experience in early childhood education under the supervision of a licensed early childhood teacher	6
Child Development Associate (CDA) credential	6
Apprenticeship certificate	7
1-year diploma in early childhood education	8
An associate's degree in education specific to age group for whom care is provided	10
A bachelor's degree in education specific to age group for whom care is provided	20
A master's degree in education specific to age group for whom care is provided	25

Health and safety Maximum points = 19	
	Points
Director, assistant director, or on-site supervisor completes 3-semester-hour health, safety, and nutrition class through community or 4-year college (must have been completed within the past 5 years)	5
Other approved health and safety training option (must have been completed within the past 2 years)	2
Development and implementation of an emergency preparedness plan	2
Development and implementation of enhanced health and safety policies	2
Completion of injury prevention checklist with child care nurse consultant Visit completed—1 point Starting process of making recommended corrections—2 points All corrections completed—3 points	1-3
Completion of child record review with child care nurse consultant Visit completed—1 point Development of a plan of action to secure health services for children—2 points	1-2
Completion of health and safety assessment with child care nurse consultant Visit completed—1 point Development of a plan of action to correct deficiencies—2 points All corrections completed—3 points	1-3

Environment Maximum points = 27	
Training and self-assessment—programs may earn a maximum of 9 points	
Center director or assistant director completes Iowa State University Extension ERS training appropriate to the ages of children in care	2
After completing ERS training, the facility director or assistant director completes a self-assessment and score sheet for at least one-third of the facility's classrooms, including at least one classroom in each age group served by the facility.	2
After completing ERS training, the facility director or assistant director completes a child care center improvement plan for each room in which the self-assessment was completed.	2
After completing Iowa Quality Preschool Program Standards training, center director or assistant director completes Iowa Quality Preschool Program Standards self-assessment and develops quality improvement plan	3
Enhanced ratios—programs may earn a maximum of 3 points	
Meets National Association for the Education of Young Children or National AfterSchool Association standards for group/class size appropriate to setting (only for programs not accredited by National Association for the Education of Young Children or National AfterSchool Association)	3
Accreditation preparation—programs may earn a maximum of 5 points	
Accreditation self-assessment approved by National Association for the Education of Young Children (only for programs not accredited by National Association for the Education of Young Children)	5
Accreditation—programs may earn a maximum of 18 points. Programs may receive points for one of the three options below:	
Program is verified by Iowa Quality Preschool Program Standards	5
Compliance with Head Start Program Performance Standards	6
Accreditation by National Association for the Education of Young Children, Council on Accreditation (after-school or 8th edition standards), or National AfterSchool Association	18

Family and community partnerships Maximum points = 8	
Points	
Program or director is a member of a professional organization specific to age group for whom care is provided	1
Orientation provided for new parents	1
Annual conferences are held with parents	1
At least one group parent meeting is held annually	1
Parent advisory board meets quarterly	2
Annual parent surveys are collected, and results are used to inform program practices	2

Leadership/administration Maximum points = 7	
Points	
All staff receive yearly written evaluation	2
Development and annual updating of an overall center improvement plan	1
All staff have completed professional development plans with the center's overall skill needs in mind	1
All staff who have direct contact with children complete the Iowa State University Extension New Staff Orientation training within 4 months of starting employment	3

ERS is Environment Rating Scale.

Source: Documents provided by the Iowa Quality Rating System Oversight Committee.

Guidelines for homes include criteria for five ratings

The Iowa QRS rating criteria for homes are presented in this section.

Rating of 1 and 2

1

- Provider is registered with the Department of Human Services.

2

The provider:

- Is registered with the Department of Human Services.
- Completes and maintains ChildNet certification.
- Participates in federal food program (Child and Adult Care Food Program).
- Completes a self-assessment of own professional development.
- Writes professional development plan.

Rating of 3–5

The amount of points from the menu below is required to receive a rating of 3 5:
(at least one point must be earned from each category)

3	14–18 points
4	19–24 points
5	Minimum of 25 and FCCERS-R assessment score of 5.0 or greater. The assessment must be completed by Iowa State University.

Professional development

Maximum points = 34

Experience and training—programs may earn a maximum of 4 points	Points
At least 2 years of child care experience and 10 hours of additional approved training per year beyond regulatory requirements	2
At least 5 years of child care experience and 20 hours of additional approved training per year beyond regulatory requirements	4
Additional professional development—programs may earn a maximum of 5 points	Points
Completion of Positive Behavioral Interventions and Supports training, modules 1 and 2 (minimum of 12 hours training)	2
Completion of Program for Infant and Toddler Care, modules 1–4	3
Education—programs may earn a maximum of 25 points— points will be awarded for only one of the following criteria:	Points
At least 9 college credit hours in education specific to age group for whom care is provided	5
Child Development Associate (CDA) credential	6
Apprenticeship certificate	7
1-year diploma in early childhood education	8
An associate's degree in education specific to age group for whom care is provided	10
A bachelor's degree in education specific to age group for whom care is provided	20
A master's degree in education specific to age group for whom care is provided	25

Health and safety Maximum points = 19	
	Points
Completion of 3-semester-hour health, safety, and nutrition class through community or 4-year college (must have been completed within the past 5 years)	5
Other approved health and safety training option (must have been completed within the past 2 years)	2
Development and implementation of an emergency preparedness plan	2
Development and implementation of enhanced health and safety policies	2
Completion of injury prevention checklist with child care nurse consultant Visit completed—1 point. Starting process of making recommended corrections—2 points. All corrections completed—3 points.	1–3
Completion of child record review with child care nurse consultant Visit completed—1 point. Development of a plan of action to secure health services for children—2 points.	1–2
Completion of health and safety assessment with child care nurse consultant Visit completed—1 point. Development of a plan of action to correct deficiencies—2 points. All corrections completed—3 points.	1–3

Environment Maximum points = 23	
	Points
Completion of Iowa State University Extension training on FCCERS-R	2
After completing approved training on how to use the FCCERS-R, completes self-assessment and score sheet by using FCCERS-R	2
After completing approved training on how to use the FCCERS-R, completes child development home improvement plan based on FCCERS-R self-assessment	2
No more than two children under age 2 are in care at any one time, and no more than six children total are in care at any one time, including the provider's own children under school age	2
Accreditation by the National Association for Family Child Care	15

Family and community partnerships Maximum points = 6	
	Points
Membership in a professional organization specific to age group for whom care is provided	1
Orientation provided for new parents	1
Annual conferences are held with parents.	1
At least one group parent meeting is held annually.	1
Annual parent surveys are collected, and results are used to inform program practices.	2

FCCERS-R is Family Child Care Environment Rating Scale—Revised.

Source: Documents provided by the Iowa Quality Rating System Oversight Committee.

Appendix C. Data and methodology

This appendix provides detailed information about the study data and methodology.

Sampling strategy

For the descriptive analyses (research questions 1, 2, and 3), the sample consisted of all respondents to the quality improvement survey administered by the Iowa Department of Human Services (Iowa DHS), in partnership with regional Child Care Resource and Referral (CCRR) agencies, in October and November 2014. The survey was sent to 600 randomly selected early childhood education programs participating in the Iowa Quality Rating System (Iowa QRS); 390 programs responded to the survey. For the regression analyses (research questions 5 and 6), the sample consisted of the 146 programs that responded to the entire survey, received a new Iowa QRS rating during the period January 2014 to March 2015, and had at least one previous Iowa QRS rating.

The sampling frame for the survey consisted of the 972 programs in Iowa (including 508 family child care homes and 464 centers) with active Iowa QRS ratings in September 2014 (shortly before survey administration) that had been participating in the system since at least December 2013. The sampling frame excluded an additional 272 programs with active ratings in September 2014 that had entered the system in 2014 because the survey was designed to measure quality improvement activities across the course of the previous 12 months. The study team constructed the sampling frame by using state administrative data on Iowa QRS ratings across multiple time points. The sampling frame data files include a unique study identifier, program name, program address, license or registration numbers, program email address, county, region of the state (1–5), program type, data from multiple time points on the Iowa QRS domain and total scores (points earned based on Iowa QRS standards), Iowa QRS rating, date of rating application and expiration date, and amount of bonus award based on QRS rating.

To determine the total sample size of 600 programs for the survey invitations, the study team first conducted power analyses to estimate the number of programs needed for the study's regression analyses (360) and then increased that number assuming a survey response rate of approximately 60 percent. The random sample of 600 programs was stratified by program type (center and family child care) and Iowa QRS rating (1, 2, 3, 4, and 5) to increase the precision of the survey estimates. The study team determined the number of programs to select from each stratum by calculating the percentage of programs in each stratum in the full population of 972 eligible programs and applying these percentages to the desired sample size of 600. The number of programs selected in each stratum is illustrated in table C1; a total of 600 programs were selected.

The Iowa DHS and the Iowa CCRR agencies received 390 survey responses, a response rate of 65 percent. To gauge the likelihood that the survey results are representative of all programs participating in the Iowa QRS, the Regional Educational Laboratory (REL) Midwest study team conducted a nonresponse bias analysis comparing characteristics of the 390 survey respondents with the full sample of 600 programs that were randomly selected for the survey. The distribution of survey respondents across each of the sampling strata is similar to the distribution in the full sample of programs selected for the survey and does not differ significantly from the expected distribution (table C2). These

Table C1. Number of programs participating in the Iowa Quality Rating System that were randomly selected for the survey, by program type and rating, September 2014

Program type	Iowa QRS rating					All levels
	1	2	3	4	5	
Centers	3	58	64	133	28	286
Homes	18	149	52	86	9	314
All programs	21	207	116	219	37	600

QRS is Iowa Quality Rating System.

Source: Authors' analysis of data from a survey administered in fall 2014 by the Iowa Department of Human Services, in partnership with regional Child Care Resource and Referral agencies.

Table C2. Percentage of programs participating in the Iowa Quality Rating System among survey respondents and full sample of programs selected for the survey by program type and rating, September 2014

Iowa Quality Rating System rating	Survey respondents (n = 390)			Full sample selected for survey (n = 600)		
	Home	Center	Total	Home	Center	Total
1	1.79	0.77	2.56	3.00	0.50	3.50
2	22.05	9.49	31.54	24.83	9.67	34.50
3	10.00	10.77	20.77	8.67	10.67	19.33
4	17.69	20.00	37.69	14.33	22.17	36.50
5	1.79	5.64	7.44	1.50	4.67	6.17
Total	53.33	46.67	100.00	52.17	47.83	100.00

Note: The χ^2 analyses comparing the distribution of survey respondents in the sampling strata with the expected number of respondents based on the distribution of the full sample showed no significant differences ($\chi^2 = 9.398, p = .4014$).

Source: Authors' analysis of data from a survey administered in fall 2014 by the Iowa Department of Human Services, in partnership with regional Child Care Resource and Referral agencies.

data provide evidence that the programs that responded to the survey are representative of programs across the state for the two program characteristics prioritized for sampling.

Additional analyses compare other characteristics of survey respondents to the full sample of randomly selected programs invited to participate in the survey and also to nonrespondents in the randomly selected sample (tables C3 and C4). Response bias is assessed according to the raw percentage point difference between all randomly selected programs and responding programs and the percent relative difference, which divides the raw percentage point difference by the percentage among all randomly selected programs (Garrison-Mogren, Bullis, & Falls, 2007). In addition, the study team tested the hypothesis of independence between each characteristic and participation status using a chi-square statistic at the 5 percent level. These analyses employed data on program characteristics in the state administrative data files that were used to construct the sampling frame.

Table C3. Number and percentage of programs participating in the Iowa Quality Rating System that participated or did not participate in the fall 2014 survey, by fall 2013 program characteristics

Characteristic	All randomly selected programs (n = 600)		Responding programs (n = 390)		Nonresponding programs (n = 210)		Percentage point difference between responding programs and all selected programs	Relative difference between responding programs and all selected programs ^a (percent)	Chi-square p-value
	Number	Percent	Number	Percent	Number	Percent			
Program type									
Center	286	47.7	182	46.7	104	49.5	-1.0	-2.1	.807
Home	314	52.3	208	53.3	106	50.5	1.0	1.9	
Total	600		390		210				
Iowa Quality Rating System rating as of fall 2013									
1	21	3.5	10	2.6	11	5.2	-0.9	-26.7	.701
2	207	34.5	123	31.5	84	40.0	-3.0	-8.6	
3	116	19.3	81	20.8	35	16.7	1.4	7.4	
4	219	36.5	147	37.7	72	34.3	1.2	3.3	
5	37	6.2	29	7.4	8	3.8	1.3	20.6	
Total	600		390		210				
Geographic region									
Region 1	126	21.0	98	25.1	28	13.4	4.1	19.5	.498
Region 2	131	21.9	89	22.8	42	20.1	1.0	4.3	
Region 3	100	16.7	54	13.8	46	22.0	-2.8	-17.1	
Region 4	128	21.4	78	20.0	50	23.9	-1.4	-6.4	
Region 5	114	19.0	71	18.2	43	20.6	-0.8	-4.3	
Total	599		390		209				
Program auspice									
School-based	48	8.0	19	4.9	29	13.8	-3.1	-39.1	.074
Other	552	92.0	371	95.1	181	86.2	3.1	3.4	
Total	600		390		210				
Bonus amount based on rating^b									
No bonus	24	4.0	13	3.4	31	14.8	-0.7	-16.7	.966
200-400	245	41.0	156	40.2	94	45.0	-0.8	-2.0	
600-1,000	162	27.1	111	28.6	61	29.2	1.5	5.4	
1,200-2,000	105	17.6	70	18.0	23	11.0	0.5	2.6	
2,400-4,000	61	10.2	38	9.8	0	0.0	-0.4	-4.1	
Total	597		388		209				

Note: Percentages may not sum to 100 because of rounding.

a. The percentage point difference between all randomly selected programs and responding programs, divided by the percentage of all randomly selected programs, multiplied by 100.

b. Bonus amounts are determined by program type, the Iowa Quality Rating System (QRS) rating, and the program's prior rating.

Source: Authors' analysis of data from a survey administered in fall 2014 by the Iowa Department of Human Services, in partnership with regional Child Care Resource and Referral agencies.

Table C4. Number and percentage of programs participating in the Iowa Quality Rating System that participated or did not participate in the fall 2014 survey, by initial program ratings

Program earned at least one third of possible points on Iowa Quality Rating System scoring domain ^a	All randomly selected programs (n = 600)		Responding programs (n = 390)		Nonresponding programs (n = 210)		Percentage point difference between responding programs and all selected programs	Relative difference between responding programs and all selected programs ^b (percent)	Chi-square p-value
	Number	Percent	Number	Percent	Number	Percent			
Health and safety domain									
Yes	78	21.3	54	21.2	24	21.6	-0.1	-0.6	1.00
No	288	78.7	201	78.8	87	78.4	0.1	0.2	
Total	366		255		111				
Professional development domain									
Yes	117	31.9	72	28.1	45	40.5	-3.8	-11.8	.359
No	250	68.1	184	71.9	66	59.5	3.8	5.5	
Total	367		256		111				
Environment domain									
Yes	61	16.6	41	16.0	20	18.0	-0.6	-3.6	.920
No	306	83.4	215	84.0	91	82.0	0.6	0.7	
Total	367		256		111				
Family and community partnerships domain									
Yes	229	62.4	165	64.5	64	57.7	2.1	3.3	.663
No	138	37.6	91	35.5	47	42.3	-2.1	-5.5	
Total	367		256		111				

Note: Initial program ratings include Quality Rating Systems ratings from 2011, 2012, and 2013.

a. Only programs seeking an Iowa Quality Rating System rating of 3 or higher have data on domain score points earned; so the sample size is lower than the full sample size. After examining the distribution of points on each domain, the study team determined that earning one-third or more points was a good cutpoint for differentiating programs. For the health and safety domain, homes and centers earning seven or more points were flagged as earning at least a third of the points. For the professional development domain, homes earning 12 or more points and centers earning 11 or more points were flagged. For the environment domain, homes earning 8 or more points, and centers earning 10 or more points were flagged. For the family and community partnerships domain, homes and centers earning 3 or more points were flagged. Information about total points available in each domain is included in appendix B.

b. The percentage point difference between all randomly selected programs and responding programs, divided by the percentage for all randomly selected programs, multiplied by 100.

Source: Authors' analysis of data from a survey administered in fall 2014 by the Iowa Department of Human Services, in partnership with regional Child Care Resource and Referral agencies.

Tables C3–C4 show the percentage distribution of some defining program characteristics of responding and nonresponding programs. These are characteristics that may be related to the level of quality improvement supports measured by the survey, and, if the sample differed significantly from the population on many of these characteristics, the results could be biased. The sample of programs from which survey data were obtained is similar to all programs in the randomly selected sample in terms of program type, Iowa QRS rating, region of the state, school-based program location, Iowa QRS rating bonus amount, and points on specific Iowa QRS domains, with no statistically significant differences in any of these characteristics. The differences in raw percentages are 4.1 percent or lower for all characteristics in the bias analyses, although the relative differences are large for low-incidence characteristics such as school-based programs (39 percent relative difference) and Iowa QRS ratings of 1 (27 percent relative difference). Despite larger relative differences, the comparison of survey respondents with the full sample of randomly selected programs on these diverse program characteristics does not show any large differences in raw percentages.

Statewide administrative data for Iowa QRS include an indicator of whether programs in the Iowa QRS are located in a school, but do not include information on program funding sources. Information about program funding sources was collected in the quality improvement survey. According to the survey data, participating programs received funding from a variety of sources, both public and private (table C5). Approximately one program in four (85 of 375 programs, or 23 percent) receives any of four types of public preschool funding: Statewide Voluntary Preschool, Shared Visions, Head Start, or other funding for preschool through the Iowa Department of Education.

Data sources, instruments, and collection methods

The Iowa DHS provided the data used for the study, including quality improvement survey data collected by state agency staff in Iowa in fall 2014 and administrative data collected by the Iowa DHS on programs participating in the Iowa QRS.

The quality improvement survey. The study team and the Iowa Quality Rating System Oversight Committee co-developed the quality improvement survey instrument in 2014 (appendix D). In April 2014 they developed a matrix of constructs to include in the survey and created a draft survey that was reviewed by the Iowa Quality Rating System Oversight Committee and the Institute of Education Sciences. The study team also conducted cognitive interviews with nine early childhood education program directors participating in the Iowa QRS, and the Iowa DHS piloted the survey with 21 early childhood education program directors representing diverse program types, geographical areas, and each Iowa QRS rating. REL Midwest worked with the Iowa Quality Rating System Oversight Committee to finalize the quality improvement survey on the basis of these sources of

Table C5. Funding sources among programs participating in the Iowa Quality Rating System that responded to the fall 2014 survey

Funding source	Survey respondents (n = 375)	
	Frequency	Percent
Tuition paid by families	277	73.87
Copayments or fees paid by families	168	44.80
Early Head Start or Head Start	9	2.40
Statewide Voluntary Preschool program	64	17.07
Shared Visions preschool funding	3	0.80
Other funding for preschool through the Iowa Department of Education, such as Title I	17	4.53
Child Care Assistance (children receiving subsidies attend your program)	193	51.47
Early childhood education Iowa funding	41	10.93
Area Education Agency early childhood education funding	9	2.40
Federal food program (Child and Adult Care Food Program)	255	68.00
Early Childhood Special Education (including Individuals with Disabilities Act Parts B and C)	11	2.93
Other Iowa Department of Human Services funding	34	9.07

Note: Programs may receive funding from multiple sources among the sources listed.

Source: Authors' analysis of data from a survey administered in fall 2014 by the Iowa Department of Human Services, in partnership with regional Child Care Resource and Referral agencies.

feedback. The quality improvement survey collected information about quality improvement activities and supports in seven categories:

- Training.
- Coaching.
- Professional development topics.
- Continuing education.
- New staff orientation.
- Financial incentives.
- Nonfinancial incentives.

The study team developed definitions for each of these categories of quality improvement activities and supports (table C6). In addition, the survey collected information about barriers to quality improvement, quality improvement planning and decisionmaking, program funding sources, and respondent characteristics.

The survey asked about these activities in the 12-month period prior to survey administration. The format and response options of the survey questions included counts (such as number of staff who participated in specific activities), checklists (such as yes/no endorsements of supports received), extent scales (such as satisfaction ratings and ratings of the extent of specific barriers), and categorical responses. There were some open-ended questions as well, but they were not analyzed for this project.

Table C6. Definitions of quality improvement activities and supports in the fall 2014 survey of programs participating in the Iowa Quality Rating System

Type of quality improvement support or activity	Definition
Training	Professional development instruction (or workshops) provided to a group of early childhood education program staff on specific job-related topics, conducted in person or in a web-based format
Coaching	Individualized professional development support (often called <i>technical assistance</i> or <i>consultation</i>) provided by an individual to early childhood education program staff, conducted in person, using video or web-based platforms, or through informal communication such as telephone, email, and text messaging; coaching may include classroom-level support for teaching staff and program-level support for management staff
Topics of professional development	Professional development is a blanket term for training and coaching; the survey asks about professional development topics, referring to content covered in training or coaching received by program staff
Continuing education	Credit-bearing coursework toward any credential, degree, or certificate by actively employed early childhood education program staff
New staff orientation and mentoring	The provision of information, training, and other supports to new staff. This includes mentoring, or guidance and support offered to new staff by colleagues or a professional mentor
Financial incentives	Monetary incentives that are available to programs (such as grants, awards, and tiered reimbursements) and to individual staff members (such as scholarships)
Nonfinancial incentives	Nonmonetary resources to support quality improvement efforts, including materials (such as books or games) and equipment (such as playground structures or cribs) that programs may receive for free or at a discount

Source: Regional Educational Laboratory Midwest and Iowa Quality Rating System co-developed survey.

The section of the survey on topics of professional development collected information about eight topics covered in training or coaching received by program staff:

- Health and safety practices (such as infant and child first aid and cardiopulmonary resuscitation, child abuse reporting, disease control, nutrition and food preparation, playground and equipment safety).
- Child development (such as general child development, stages of learning).
- Classroom practices (such as instructional techniques and activities, specific curricula or technology tools, interactions with children, classroom management, assessment of children).
- Program self-assessment (such as the Environment Rating Scales, continuous quality improvement, strengths and areas of improvement).
- Program management (such as business practices, working with adults and staff, early learning program standards, training on Head Start standards, National Association for the Education of Young Children standards, and preK standards).
- Family engagement (such as cultural competence, family involvement in early learning, encouragement of parents to attend events and parent–teacher meetings).
- QRS participation (such as preparing for Iowa QRS participation, working toward a higher Iowa QRS score).

Three versions of the survey were created: one for centers, one for homes with assistants or other staff in addition to the licensed providers, and one for homes with no additional staff. The primary differences are in terminology and in the staff categories included in questions and response options (see box C1 for definitions of the staff types included in the versions of the survey for centers and homes). The primary terminology difference is the reference to program in the center version and to provider in both of the home versions. An example of a difference in response options occurs in questions about training topics. For centers, the questions include response spaces for center managers, teachers, and assistants. These questions have response spaces for providers and assistants in homes with staff and a response space for the provider only in homes without staff. All questions on the survey appear in all three versions of the survey, with the exception of the following:

- Questions about mentoring appear only in the version of the survey for centers on the basis of feedback from cognitive interviews and the Iowa Quality Rating System Oversight Committee indicating that mentoring is not offered in homes.
- Questions about new staff orientation do not appear in the version of the survey for homes without assistants because they do not have staff to orient; this decision was based on feedback from the Iowa Quality Rating System Oversight Committee to avoid irrelevant questions for these programs.

Appendix D includes the final quality improvement survey that Iowa administered in fall 2014, formatted as a table with the complete set of items and response options for the center version of the survey and for the versions of the survey for homes with and without assistants.

The Iowa DHS collected survey data in partnership with the five regional Iowa CCRR agencies, with guidance from the study team. The Iowa DHS identified the CCRR agency region of each of the 600 programs that were selected randomly for survey participation and provided the five CCRR agency regional directors with a list of programs located within their region. Because all programs in the Iowa QRS had an email address listed in the administrative data files, the state decided to collect the data through a web survey only. Iowa CCRR agency staff in each of the five regions reviewed and tested all program

Box C1. Definitions of staff types in homes and centers

Definitions of staff types in centers

Manager. Staff with a management role in the center, including center directors, assistant directors, supervisors, coordinators, specialists, and other managers.

Teacher. Teaching staff with primary responsibility for their classrooms, including teachers, lead teachers, and co-teachers.

Assistant teacher. Teaching staff with support roles in their classrooms, including assistant teachers, aides, and floating staff.

Definitions of staff types in homes

Provider. Registered provider, owner, or person who serves as lead caregiver in the home.

Assistant. A paid employee who helps the provider with caregiving on a regular basis.

email addresses for programs within their region and updated the file with correct email addresses where necessary prior to data collection. In October 2014 the director of each Iowa CCRR agency sent email invitations to each program's email address. In addition, each region identified the Iowa CCRR agency consultant assigned to work with each program in the randomly selected sample, and the consultant sent a personal email to each program's contact, encouraging the program contacts to check their inboxes (as well as their junk mail folders) for the survey invitation. Respondents were entered into one of 50 lotteries for a \$100 gift certificate to purchase education supplies.

There were 390 responses to the survey (a 65 percent response rate). Among the 286 centers selected for the survey, 182 responses were obtained (a 64 percent response rate). Among the 314 homes selected for the survey, there were 208 responses (a 66 percent response rate). The survey response rate can be attributed at least partly to the state's commitment to ensure best practices in survey research. Item response rates ranged from 92 percent to 100 percent. The study team did not use statistical adjustments to account for missing data because the item response rates were high. Items from a list of nine barriers to quality improvement had slightly lower response rates (92–95 percent) than other items in the survey (94–100 percent); however, 96 percent of the respondents completed at least one item from the list of nine barriers.

The quality improvement survey collected data about respondent characteristics. There was little racial/ethnic diversity among survey respondents; 97 percent reported race/ethnicity as White (table C7). For comparison, the statewide population estimates for 2014 indicate that the race/ethnicity of 87 percent of the population in Iowa is White (U.S. Census Bureau, 2015).

Among survey respondents, 80 percent had more than five years of experience teaching (table C7). For homes, the survey instructions asked the registered provider to complete the survey, and the survey did not collect data on the respondents' role in homes. For centers the survey instructions recommended that a director or manager complete the survey. According to survey responses, 81 percent of center respondents were managers or teachers with a management role in the program, and 19 percent were teachers (table C7).

Table C7. Characteristics of program staff who completed the fall 2014 survey of programs participating in the Iowa Quality Rating System

Characteristics of staff who completed survey	Survey respondents	
	Frequency	Percent
Race/ethnicity		
White	358	97.02
Hispanic	7	1.90
Black	2	0.54
More than one race/ethnicity	2	0.54
Total	369	
Years of experience teaching		
None	35	9.38
5 or fewer	39	10.46
6–15	155	41.55
16–25	92	24.66
More than 25	52	13.94
Total	373	
Role in the program (centers only)		
Management role only (center director, assistant director, supervisor, coordinator, specialist, other manager)	126	72.83
Teaching role only (teacher, assistant teacher)	33	19.08
Combined management and teaching role	14	8.09
Total	173	

Note: Role in the program was asked only of the 182 respondents in centers, because the state expected that the provider would always be the respondent in homes. Percentages may not sum to 100 because of rounding.

Source: Authors' analysis of data from a survey administered in fall 2014 by the Iowa Department of Human Services, in partnership with regional Child Care Resource and Referral agencies.

Centers participating in the Iowa QRS tended to be relatively large, with an average of five teachers, while about 70 percent of homes had only a single provider (tables C8 and C9).

Administrative data were shared by the Iowa Department of Human Services for this project. The administrative data files included data on program type, contact information, region, Iowa QRS rating, the date of each rating, points earned in each Iowa QRS domain, and total points earned if applicable (for programs with a rating of 3, 4, or 5), Environment Rating Scale scores if applicable (for programs with a rating of 5), and other miscellaneous

Table C8. Average number of each staff type among centers participating in the Iowa Quality Rating System and responding to the fall 2014 survey

Center staff	Number	Percent of total	Mean	Median	Standard deviation	Minimum	Maximum
Directors	173	96	1.83	1	2.52	0	30
Teachers	178	98	4.55	3	5.39	0	45
Assistant teachers	155	86	6.48	3	10.04	0	80
Total staff	181	100	12.86	8	15.92	1	155

Source: Authors' analysis of data from a survey administered in fall 2014 by the Iowa Department of Human Services, in partnership with regional Child Care Resource and Referral agencies.

Table C9. Categories of staff types among homes participating in the Iowa Quality Rating System and responding to the fall 2014 survey

Home staff	Survey respondents	
	Frequency	Percent
Total staff	205	
One provider	146	71
Multiple staff		
Two providers	7	3
Two providers and assistants ^a	8	4
One provider and assistants ^a	44	21

Note: Percentages do not sum to 100 because of rounding.

a. The number of assistants ranged from zero to four.

Source: Authors' analysis of data from a survey administered in fall 2014 by the Iowa Department of Human Services, in partnership with regional Child Care Resource and Referral agencies.

data. Although the administrative data files contain the domain scores for programs with a rating of 3, 4, or 5, the data files do not contain the raw data about which Iowa QRS standards were met to achieve the score. The Iowa DHS provided the study team with historical administrative data files, which contain current and expired Iowa QRS ratings with rating dates from 2006 (when the QRS was launched) to March 2015.

The Iowa DHS collects these data on programs participating in the Iowa QRS for the purpose of assigning and tracking the Iowa QRS ratings. To enroll in the Iowa QRS, programs complete an application that includes self-reported data on whether the program meets each of the Iowa QRS standards, and programs must provide specific documentation for some of the standards, such as photocopies of staff degrees and credentials, training completion certificates, and health and safety review forms signed by a state assessor. To apply for a rating of 5, programs also must present documentation of classroom observations conducted by trained observers working for Iowa State University Extension, which oversees all Iowa QRS classroom observations and trains and ensures the reliability of observers. Once programs have completed the documentation for the rating for which they wish to apply, an Iowa QRS regional specialist employed by the regional Iowa CCRR agencies reviews the completed application for accuracy and completeness of required documentation and assigns a rating using the Iowa QRS rating standards (included in appendix B).

Iowa QRS ratings range from 1 (lowest) to 5 (highest), and rating criteria differ for centers and family child care homes. The Iowa QRS rating calculation approach is referred to as a hybrid rating approach, which means that program ratings are determined using a combination of mandatory standards that all programs have to meet for certain ratings (referred to as blocks), as well as more flexible point requirements for some ratings. Programs must be licensed or registered to receive a rating of 1 and also must participate in the federal food program and meet some professional development criteria for a rating of 2. Higher ratings are determined by the number of points earned in meeting standards in any of several domains (professional development, health and safety, environment, and family and community partnerships, plus leadership and administration [centers only]), and, for a rating of 5, programs also must earn a 5 or higher on the ERS classroom observation instruments. Table C10 summarizes the requirements for each rating, and the complete rating guidelines and standards for centers and homes are included in appendix B.

Table C10. Requirements for Iowa Quality Rating System ratings

Rating	Type of rating requirement	Specific requirements
1	Block	Programs must be registered or licensed or operated by an accredited school.
2	Block	All requirements for a rating of 1, plus specific requirements related to the federal food program, self-assessment, and professional development.
3	Points	Centers must earn between 17 and 26 total points across five domains, and homes must earn between 14 and 18 total points across four domains, with at least 1 point earned in each applicable domain. In addition, programs must meet all requirements for a rating of 2.
4	Points	Centers must earn between 27 and 33 total points across five domains, and homes must earn between 19 and 24 total points across four domains, with at least 1 point earned in each applicable domain. In addition, programs must meet all requirements for a rating of 2.
5	Points and block	Centers must earn at least 34 total points across five domains, and homes must earn at least 25 total points across four domains, with at least 1 point earned in each applicable domain. Programs also must earn a score of 5.0 or higher on an independent Environment Rating Scale observation and meet all requirements for a rating of 2.

Note: Domains include professional development, health and safety, environment, and family and community partnerships for both centers and homes, plus leadership and administration for centers only. See appendix B for the detailed standards used to determine points earned in each domain.

Source: Iowa Quality Rating System rating guidelines.

Measures used for the study: rating increases, quality improvement activities, and program characteristics

The study team constructed the analysis variables using the quality improvement survey data and the administrative data. All analysis variables were identified and defined during study planning.

The study team used Iowa Quality Rating System ratings from two points in time to determine whether the ratings changed. The analyses for research question 6 examine the relationship between quality improvement supports and activities and increases in Iowa QRS ratings, as well as the relationship between quality improvement supports and activities and increases in the Iowa QRS domain subscores, if applicable (only programs with a rating of 3 or higher receive domain scores). For eligible programs with ratings at two time points, the study team created analysis variables indicating whether the programs increased their rating and each of their domain subscores or remained at the highest possible rating (because programs cannot achieve a rating higher than 5).

Programs were eligible for inclusion in the indicator for increase in Iowa QRS rating if they had obtained a valid rating in January 2014 or later (after the start of the period in which quality improvement supports and activities were measured on the survey, from September 2013 to September 2014) and also one previous rating that had been assigned after 2010. (Iowa QRS ratings were recalibrated to their current rating criteria in 2010; so any earlier ratings would not be comparable with the current valid ratings.) Programs were flagged as increasing if the second rating was higher than the first rating or if programs began at the highest rating (5) and remained there (although there were no instances of programs remaining at the highest rating in the study sample). Of the 172 programs eligible for the indicator for rating increase, 78 (45 percent) increased to a higher rating. The

rating indicator variable is binary and does not identify programs that received a lower rating at the second time point. Decreases in rating were rare, occurring for only four programs in the sample (2 percent); so the study team would not be able to reliably estimate the relationship between quality improvement activities and rating decreases.

Programs were eligible for inclusion in the indicators for domain increase if they were eligible for the indicator for increase in Iowa QRS rating and had an Iowa QRS rating of 3 or higher at the second time point, meaning that they would have domain scores available. Domain score increase indicators were created for each domain measured in both centers and homes (health and safety, professional development, environment, and family and community partnerships; see appendix B for additional information about these domains). Programs were flagged as increasing if the second domain score was higher than the first score, if programs began at the highest possible score for the program type and remained there (although there were no instances of this in any domain in the study sample), or if programs did not receive a domain score in the first rating time point but did receive a domain score in the second rating time point (this occurred in the case of 41 programs). Of the 128 programs eligible for indicators for domain score increase, 83 increased in the health and safety domain (65 percent), 84 increased in the professional development domain (66 percent), 70 increased in the environment domain (55 percent), and 91 increased in the family and community partnerships domain (71 percent).⁸

The study team constructed some variables to represent quality improvement activity, support, and barrier variables. The quality improvement supports and activities variables included some variables that were exactly as measured in the survey and some variables that the study team constructed using survey responses to one or more survey items. In addition, the study team used survey data to construct two aggregated variables representing the number of quality improvement supports available to the program staff and the average level of barriers experienced by programs and their staff in accessing quality improvement activities.

The staff quality improvement support variable was drawn from survey items that asked whether program staff had received eight separate types of support for professional development or higher education: release time, flexible schedules, Teacher Education and Compensation Helps (T.E.A.C.H.) scholarships, financial support for education or training costs, books and materials, transportation reimbursement, a cash award or bonus for degree attainment, or a salary increase for degree attainment. The study team created a count variable by summing the number of quality improvement supports on this list that the program reported their staff had received. The study team examined the ordinal coefficient alpha of the group of items to assess the internal consistency of the full set of eight items as well as two subgroupings of items on the basis of how costly the supports would be to the programs.⁹ The alpha of the full set of eight items was .89, suggesting a high level of internal consistency. The subgroupings of items had lower internal consistency (.70 and .77) and were therefore not included in study analyses. The quality improvement support variable ranged from 0 to 8 and had a mean of 1.29 and a standard deviation of 1.72.

The barriers to quality improvement variable drew from survey items that asked respondents to rate the effect that nine factors had on their program's level of participation in professional development and other quality improvement activities, with ratings of no effect (1), small effect (2), medium effect (3), or large effect (4). The nine factors are cost, distance and travel time, timing and scheduling of training, availability of professional

development on needed topics, classroom coverage, support from management, staff turnover, staff availability to participate in professional development, and availability of scholarships. The study team created a scaled variable by using the average of the numeric responses to the nine items. It examined the ordinal coefficient alpha of the group of items to assess the internal consistency of the full set of nine items as well as two subgroupings that group items into barriers related to the logistics of the available training options (that is, cost, distance, timing, and availability of topics) and those that are program-level factors (that is, classroom coverage, support by management, staff turnover, staff availability to participate, and scholarships). The alpha of the full set of nine items was .817, suggesting a reasonably high level of internal consistency. The subgroupings of items had somewhat lower internal consistency (.738 and .816) and were therefore not included in study analyses. The barriers to quality improvement variable ranged from 1 to 4 and had a mean of 2.54 and a standard deviation of 0.62.

Program characteristics were gathered from administrative data and survey information. The program characteristics used in the study analyses were identified from administrative data and the survey data. Administrative data on program characteristics include data of the Iowa CCR agency region in which the programs were located, whether the program was a center or a home, and whether the program was located in a school building or another type of site. The survey collected data on program funding sources, and the study team used these data to create a variable identifying programs that received child care subsidies and a variable identifying programs that received public preschool funding (including Iowa's Statewide Voluntary Preschool program, Shared Visions preschool, or other preschool funding from the Iowa Department of Education) or Head Start funding.

Analysis methods used in the study: descriptive and multiple regression analysis methods

This section first describes the approach to answering the first four research questions. Among early childhood education programs participating in the Iowa QRS:

- What are the quality improvement activities in which they participate?
- What topics are covered in professional development?
- What are the supports and barriers to participation in quality improvement activities?
- What information do they use to make decisions about quality improvement activities?

The study team used descriptive summary statistics to address these research questions by using analysis variables constructed from the quality improvement survey responses and administrative data on program ratings and characteristics. The study team tabulated the frequency of responses to binary, count, and ordinal analysis variables on the basis of the survey items and calculated the mean and standard deviation of continuous and extent scale original analysis variables on the basis of the survey items (see detailed results tables in appendix E).

The program subgroups examined in the study are based on program characteristics measured in the administrative data or in the survey, including program type (centers or homes) and baseline Iowa QRS ratings (ratings 1–5). The study team conducted significance tests of subgroup differences.

The study team used descriptive analysis methods examining the Iowa QRS ratings at two time points to address research question 5:

- Do ratings rise among programs that renew their Iowa QRS participation?

First, the study team identified programs in the administrative data that had been re-rated with a new Iowa QRS rating during the period January 2014–March 2015 and that had at least one previous Iowa QRS rating. The study team then cross-tabulated the first and second ratings. The study team examined the cross-tabulations and counted the number of programs with decreased ratings (defined as receiving a lower rating at the second time point), with a rating that remained the same (defined as staying at the same rating for programs that began with a rating of 2, 3, or 4 [the state does not allow programs to continue participating in Iowa QRS if they began with a rating of 1 and are not re-rated at a higher rating]), or with an increased rating (defined as receiving a higher rating at the second time point; the study team would also have included programs that began with a rating of 5 and were re-rated at 5 in this group, although no programs exhibited that characteristic in the administrative data). The study team then used the frequency of programs in each of these categories (decreased rating, rating remained the same, increased rating) to produce charts and tables. The study team also examined increases among programs at each rating level at the first time point.

The study team used a multiple regression framework to address research question 6:

- What is the relationship between quality improvement supports and activities and increases in QRS ratings and domain scores?

Before running regression models, the study team created a binary variable indicating whether the program increased its rating or not using the analysis results from research question 5. The study team created similar binary variables indicating which programs increased domain scores across the two time points among the subset of rated programs with domain scores (those with a rating of 3, 4, and 5).

Given the binary nature of the outcomes (variables indicating changes in the Iowa QRS ratings and domain scores are coded 1 for an increase and 0 for no increase), the study team used logistic regression analysis models to regress increases in Iowa QRS ratings or domain scores on quality improvement supports and activities, controlling for the baseline Iowa QRS ratings and program characteristics, and also staff quality improvement supports and barriers to quality improvement in some models. The study team ran separate series of logistic regression models with different dependent and independent variables, as shown in table C11 (the model numbers correspond with those in the results tables in appendix E). The models examine five dependent variables related to Iowa QRS rating outcomes, as defined in the section above on measures used in the study:

- The Iowa QRS rating increased from the first to the second rating.
- The health and safety domain score increased from the first to the second rating.
- The professional development domain score increased from the first to the second rating.
- The environment domain score increased from the first to the second rating.
- The family and community partnerships domain score increased from the first to the second rating.

The main independent variables in the analyses for research question 6 included 10 quality improvement supports and activities analysis variables (table C12). Variables were first entered into separate models and then entered into a single model.

Table C11. Dependent and independent variables in logistic regression models for programs participating in the Iowa Quality Rating System, by model number

Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10
Dependent variables: Iowa Quality Rating System (Iowa QRS) outcomes										
Iowa QRS rating increase	✓	✓								
Health and safety domain score			✓	✓						
Professional development domain score					✓	✓				
Environment domain score							✓	✓		
Family and community partnerships domain score									✓	✓
Independent variables: quality improvement supports and activities										
Management topics	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Fifteen or more training hours	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Grants	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Continuing education	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Coaching monthly or more	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Self-assessment topics	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Classroom practices topics	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Nonfinancial incentives	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Training with follow-up	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Child development topics	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Independent variables: program characteristics										
Iowa QRS rating at baseline	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Center-based program	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Public preschool or Head Start funding	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Receives child care subsidies	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Region	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Independent variables: staff supports, barriers, and planning										
Quality improvement plan		✓		✓		✓		✓		✓
Count of supports	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Barriers scale	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Source: Authors' analysis of data from a survey administered in fall 2014 by the Iowa Department of Human Services, in partnership with regional Child Care Resource and Referral agencies.

All models included covariates for program characteristics, including the following:

- Baseline Iowa QRS rating.
- Program is a center.
- Program receives funding from Head Start or state preschool.
- Program receives child care subsidies.
- Region, which is separated into four dummy variables representing four of the five regions.

Some models also controlled for staff supports and barriers to quality improvement and quality improvement planning variables, as follows:

- Program has a quality improvement plan.
- Barriers to quality improvement scale variable.
- Staff supports for quality improvement activities count variable.

Table C12. Key indicators used in regression analysis on the relationship between quality improvement indicators and rating increases among programs participating in the Iowa Quality Rating System

Indicator	Definition
Management topics	Managers or home providers received training or coaching on management.
Fifteen or more training hours	Key staff received an average of 15 or more training hours in the previous year.
Grants	As a financial incentive, the program received a grant or grants for Iowa Quality Rating System participation or rating level or for specific quality improvements.
Continuing education	Teachers or home providers were pursuing a degree or credential.
Coaching monthly or more	Staff in the program received coaching monthly or more frequently.
Self-assessment topics	Managers or home providers received training or coaching on self-assessment.
Classroom practices topics	Teachers or home providers received training or coaching on classroom practices.
Nonfinancial incentives	The program received free or discounted equipment or materials.
Training with follow-up	Staff in the program received training with follow-up.
Child development topics	Teachers or home providers received training or coaching on child development.

Source: Authors' analysis of survey data from Iowa Department of Human Services.

For research question 6, the study team ran separate sets of models for each dependent variable, following the same four steps for each set of models. First, the study team ran 10 separate models entering each quality improvement support or activity into the model alone, controlling for program characteristics (the results of the separate models are not included in the appendix E tables to streamline the presentation of the results). Second, the study team ran models with all 10 quality improvement supports and activities in the same model, controlling for program characteristics. Third, the study team ran the model from the second step, adding in the supports and barriers variables as controls. Fourth, the study team ran separate models with interaction terms for the baseline Iowa QRS rating and center-based program type for all activities with statistically significant coefficients in the full model to determine whether the relationships with the Iowa QRS rating or domain score increases varied by these program characteristics (none of the interaction terms were statistically significant; so the results are not included in the appendix E tables).

In the models with domain score dependent variables, the sample size is considerably smaller than the samples in the models with Iowa QRS rating increase dependent variables (109 programs in the models with domain score increases as the dependent variable and 146 programs in the models with Iowa QRS rating increases as the dependent variable) because only programs with a rating of 3 or higher receive domain scores. As a sensitivity test, the study team ran the models with Iowa QRS rating increases as the dependent variable with the subsample of programs associated with domain scores (the differences in the model results were not substantive in nature; so the sensitivity analysis results are not included in the appendix E tables). The models with increases in the family and community partnerships variable did not fit the data well (on the basis of statistically significant Hosmer-Lemeshow chi-square statistics indicating poor goodness of fit and low model specificity; so those analysis results are not included in the appendix E tables).

The regression analysis results in table E12 in appendix E are presented as odds ratios. An odds ratio greater than 1.0 and statistically significant means that programs completing this type of quality improvement activity show a greater likelihood of increasing the rating

relative to programs not completing this type of quality improvement activity. In contrast, an odds ratio less than 1.0 and statistically significant means that programs completing this type of quality improvement activity show less likelihood of increasing the rating relative to programs not completing this type of quality improvement activity. One challenge in interpreting odds ratios is that the magnitude of odds ratios below 1.0 is not comparable with the magnitude of odds ratios above 1.0 because odds ratios above 1.0 gain magnitude as the numbers increase, whereas odds ratios below 1.0 lose magnitude as the numbers decrease and approach zero. This presents a particular challenge in communicating the meaning of the odds ratio results. The study team addressed this challenge in the main body of the report by inverting the odds ratios below zero (dividing 1.0 by the odds ratio of increasing the rating) to produce the odds ratio of not increasing the rating. (Note that this is the same odds ratio that would be produced by running the logistic regression model with a reverse coded binary variable in which 1 represents not increasing and 0 represents increasing.) In the main body of the report, figure 11 in the main text combines the odds ratios of increasing the rating for quality improvement activities that had an odds ratio above 1.0 in the main model (model 1 in table E12 in appendix E) with the odds ratios of not increasing the rating only for the quality improvement activities that had an odds ratio below 1.0 in the main model.

Appendix D. Quality improvement survey items

This appendix provides information about the survey items in Iowa's survey of early childhood education providers.

Table D1. Items in Iowa's quality improvement survey of early childhood education providers, fall 2014

Question	Response type (and response options, if applicable)	Question asked of centers	Types of staff asked about for centers ^a	Question asked of homes without assistants	Types of staff asked about for homes without assistants ^b	Question asked of homes with assistants	Types of staff asked about for homes with assistants ^c
1. Are you a center or child development home provider?	Binary						
2. What is the name of your program?	String	✓		✓		✓	
3. How many staff work for your program in each of the staff categories?	Count	✓	Manager Teacher Assistant	✓	Provider	✓	Provider Assistant
4. In the last 12 months, how many of each staff type were working toward any credential or degree, such as a Child Development Associate (CDA) credential, an early childhood certificate, or an associate's, bachelor's, or master's degree?	Count	✓	Manager Teacher Assistant	✓	Provider	✓	Provider Assistant
5. In the last 12 months, did you or any of your staff receive a Teacher Education and Compensation Helps (T.E.A.C.H.) scholarship?	Binary	✓		✓		✓	
6. Which of the following funding sources does your center receive?	Check all that apply (multiple subitems)	✓		✓		✓	
6A. Tuition paid by families	Binary	✓		✓		✓	
6B. Co-payments or fees paid by families	Binary	✓		✓		✓	
6C. Early Head Start or Head Start	Binary	✓		✓		✓	
6D. Statewide Voluntary Preschool program	Binary	✓		✓		✓	
6E. Shared Visions preschool funding	Binary	✓		✓		✓	
6F. Other funding for preschool through the Iowa Department of Education, such as Title I	Binary	✓		✓		✓	
6G. Child Care Assistance (CCA) (children receiving subsidies attend your program)	Binary	✓		✓		✓	
6H. Early Childhood Iowa (ECI) funding	Binary	✓		✓		✓	
6I. Area Education Agency (AEA) early childhood funding	Binary	✓		✓		✓	
6J. Federal Food Program (Child and Adult Care Food Program [CACFP])	Binary	✓		✓		✓	
6K. Early Childhood Special Education (including Individuals with Disabilities Act [IDEA] Parts B and C)	Binary	✓		✓		✓	
6L. Other Iowa Department of Human Services funding	Binary	✓		✓		✓	

(continued)

Table D1. Items in Iowa’s quality improvement survey of early childhood education providers, fall 2014
(continued)

Question	Response type (and response options, if applicable)	Question asked of centers	Types of staff asked about for centers ^a	Question asked of homes without assistants	Types of staff asked about for homes without assistants ^b	Question asked of homes with assistants	Types of staff asked about for homes with assistants ^c
6M. Other (please specify)	Binary	✓		✓		✓	
7. In the last 12 months, did your program receive any of the following as a result of participating in Iowa QRS?	Check all that apply (multiple subitems)	✓		✓		✓	
7A. Bonus payments for achieving a specific Iowa QRS rating	Binary	✓		✓		✓	
7B. Free or discounted equipment or furniture (e.g., cribs, fences)	Binary	✓		✓		✓	
7C. Free or discounted instructional materials (e.g., books, games)	Binary	✓		✓		✓	
7D. Grants to help pay for specific quality improvements	Binary	✓		✓		✓	
7E. Grants or funding opportunities that require Iowa QRS participation or a minimum rating	Binary	✓		✓		✓	
7F. Other (please specify)	Binary	✓		✓		✓	
8. Do you offer an orientation for new teaching staff?	Binary	✓				✓	
9. How many hours of orientation do you provide to new staff?	Count	✓				✓	
10. Do you use the new staff orientation videos and resources developed by Iowa State University Extension?	Binary	✓				✓	
11. Do you offer any of the following types of mentoring for new staff?	Check all that apply (multiple subitems)	✓				✓	
11A. Formal meeting with an experienced teacher	Binary	✓				✓	
11B. Formal meeting with a professional mentor who does not work for your program	Binary	✓				✓	
11C. Informal mentoring as needed by colleagues	Binary	✓				✓	
11D. Other (please specify)	Binary	✓				✓	
12. Have you or any of your staff received coaching or consultation in the last 12 months?	Binary	✓		✓		✓	
13. In the last 12 months, how many staff received the following types of coaching or consulting?	Count	✓	Manager Teacher Assistant	✓	Provider	✓	Provider Assistant

(continued)

Table D1. Items in Iowa’s quality improvement survey of early childhood education providers, fall 2014
(continued)

Question	Response type (and response options, if applicable)	Question asked of centers	Types of staff asked about for centers ^a	Question asked of homes without assistants	Types of staff asked about for homes without assistants ^b	Question asked of homes with assistants	Types of staff asked about for homes with assistants ^c
14. On average, how often did coaches or consultants interact with staff?	Ordered categorical: 1 = once a year or less 2 = about twice a year 3 = every couple of months 4 = about once a month 5 = about twice a month 6 = about once a week 7 = more than once a week	✓		✓		✓	
15. What types of coaching or consultation did staff in your program receive?	Check all that apply (multiple subitems)	✓		✓		✓	
15A. In-person coaching or consultation	Binary	✓		✓		✓	
15B. Online (e.g., video-based or Web-based modules of coaching) coaching or consultation	Binary	✓		✓		✓	
15C. Informal (e.g., informal coaching that may include telephone calls, emails, or text messages between you and a coach).	Binary	✓		✓		✓	
16. Have you or any of your staff attended trainings or workshops in the last 12 months?	Binary	✓		✓		✓	
17. In the last 12 months, what was the total number of hours of training or workshops completed by staff in your program?	Count	✓	Manager Teacher Assistant	✓	Provider	✓	Provider Assistant
18. What types of training or workshops did staff in your program receive?	Check all that apply (multiple subitems)	✓		✓		✓	
18A. In-person training	Binary	✓		✓		✓	
18B. In-person training with some follow-up	Binary	✓		✓		✓	
18C. Online training or webinars	Binary	✓		✓		✓	
18D. Online training or webinars with some follow-up	Binary	✓		✓		✓	
19. Which of the following topics were covered by professional development (including trainings, workshops, coaching, or consultation) received by any staff of each type?	Check all that apply (multiple subitems)	✓	Manager Teacher Assistant	✓	Provider	✓	Provider Assistant

(continued)

Table D1. Items in Iowa’s quality improvement survey of early childhood education providers, fall 2014
(continued)

Question	Response type (and response options, if applicable)	Question asked of centers	Types of staff asked about for centers ^a	Question asked of homes without assistants	Types of staff asked about for homes without assistants ^b	Question asked of homes with assistants	Types of staff asked about for homes with assistants ^c
19A. Health and safety practices (e.g., infant/child first aid and CPR, child abuse reporting, disease control, nutrition and food preparation, playground and equipment safety)	Binary	✓	Manager Teacher Assistant	✓	Provider	✓	Provider Assistant
19B. Child development (e.g., general child development or stages of learning)	Binary	✓	Manager Teacher Assistant	✓	Provider	✓	Provider Assistant
19C. Classroom practices (e.g., instructional techniques and activities)	Binary	✓	Manager Teacher Assistant	✓	Provider	✓	Provider Assistant
19D. Program self-assessment	Binary	✓	Manager Teacher Assistant	✓	Provider	✓	Provider Assistant
19E. Program management and business practices	Binary	✓	Manager Teacher Assistant	✓	Provider	✓	Provider Assistant
19F. Family engagement or cultural competence	Binary	✓	Manager Teacher Assistant	✓	Provider	✓	Provider Assistant
19G. QRS participation (e.g., preparing for Iowa’s Quality Rating System [Iowa QRS] participation)	Binary	✓	Manager Teacher Assistant	✓	Provider	✓	Provider Assistant
19H. Other topic (please specify)	Binary	✓	Manager Teacher Assistant	✓	Provider	✓	Provider Assistant
20. How much do the following factors affect your program’s level of participation in professional development and other quality improvement activities?	Check all that apply (multiple subitems)	✓		✓		✓	
20A. Cost	1 (no effect), 2 (small effect), 3 (medium effect), 4 (large effect)	✓		✓		✓	
20B. Distance and travel time	1 (no effect), 2 (small effect), 3 (medium effect), 4 (large effect)	✓		✓		✓	
20C. Staff availability to take part in professional development	1 (no effect), 2 (small effect), 3 (medium effect), 4 (large effect)	✓		✓		✓	
20D. Classroom coverage	1 (no effect), 2 (small effect), 3 (medium effect), 4 (large effect)	✓		✓		✓	

(continued)

Table D1. Items in Iowa’s quality improvement survey of early childhood education providers, fall 2014
(continued)

Question	Response type (and response options, if applicable)	Question asked of centers	Types of staff asked about for centers ^a	Question asked of homes without assistants	Types of staff asked about for homes without assistants ^b	Question asked of homes with assistants	Types of staff asked about for homes with assistants ^c
20E. Availability of scholarships	1 (no effect), 2 (small effect), 3 (medium effect), 4 (large effect)	✓		✓		✓	
20F. Staff turnover	1 (no effect), 2 (small effect), 3 (medium effect), 4 (large effect)	✓		✓		✓	
20G. Support from management	1 (no effect), 2 (small effect), 3 (medium effect), 4 (large effect)	✓		✓		✓	
20H. Availability of professional development on needed topics	1 (no effect), 2 (small effect), 3 (medium effect), 4 (large effect)	✓		✓		✓	
20I. Timing and scheduling of trainings or workshops	1 (no effect), 2 (small effect), 3 (medium effect), 4 (large effect)	✓		✓		✓	
20J. Other (please describe below)	1 (no effect), 2 (small effect), 3 (medium effect), 4 (large effect)	✓		✓		✓	
21. In the last 12 months, have you or any of your staff received any of the following supports for professional development or higher education?	Check all that apply (multiple subitems)	✓		✓		✓	
21A. Release time during regular work hours	Binary	✓		✓		✓	
21B. Flexible schedules	Binary	✓		✓		✓	
21C. Financial support for education or training costs	Binary	✓		✓		✓	
21D. Books and materials	Binary	✓		✓		✓	
21E. Transportation reimbursement	Binary	✓		✓		✓	
21F. Cash awards or bonus payments to staff for course or degree completion	Binary	✓		✓		✓	
21G. A raise or salary adjustment based on completion of degree or credential	Binary	✓		✓		✓	
21H. Other (please specify)	Binary	✓		✓		✓	
22. Which of the following sources of information do you use to determine your professional development needs?	Check all that apply (multiple subitems)	✓		✓		✓	
22A. Information from Iowa’s Quality Rating System (Iowa QRS) rating process	Binary	✓		✓		✓	
22B. Quality improvement plans	Binary	✓		✓		✓	

(continued)

Table D1. Items in Iowa’s quality improvement survey of early childhood education providers, fall 2014
(continued)

Question	Response type (and response options, if applicable)	Question asked of centers	Types of staff asked about for centers ^a	Question asked of homes without assistants	Types of staff asked about for homes without assistants ^b	Question asked of homes with assistants	Types of staff asked about for homes with assistants ^c
22C. Results of monitoring visits from funding or accreditation agencies	Binary	✓		✓		✓	
22D. Recommendations from consultants, coaches, specialists, or other technical assistance providers	Binary	✓		✓		✓	
22E. Classroom observation data	Binary	✓		✓		✓	
22F. Child outcomes data	Binary	✓		✓		✓	
22G. Staff surveys	Binary	✓		✓		✓	
22H. Staff performance review results	Binary	✓		✓		✓	
22I. Specific staff requests or informal conversations with staff	Binary	✓		✓		✓	
22J. Parent surveys	Binary	✓		✓		✓	
22K. Parent committee input	Binary	✓		✓		✓	
22L. Informal conversations with families	Binary	✓		✓		✓	
22M. Availability of trainings/training schedule	Binary			✓		✓	
22N. Working with a mentor to map out professional development	Binary			✓		✓	
22O. Other (please specify)	Binary	✓		✓		✓	
23. Does your program have a written quality improvement plan that includes quality improvement goals and planned activities to meet those goals?	Binary	✓		✓		✓	
24. Do you feel that your program’s current Iowa QRS rating reflects the true quality of the care provided? Why or why not?	String	✓		✓		✓	
25. Do you have any suggestions for the state on how to increase access to quality improvement supports for your program?	String	✓		✓		✓	
26. Is there anything else you would like to share about the Iowa QRS?	String	✓		✓		✓	
27. What is your role at the center?	Check all that apply (multiple subitems)	✓					
27A. Director	Binary	✓					
27B. Assistant Director	Binary	✓					
27C. Supervisor	Binary	✓					
27D. Coordinator	Binary	✓					
27E. Specialist	Binary	✓					
27F. Other Manager	Binary	✓					
27G. Teacher	Binary	✓					
27H. Assistant Teacher	Binary	✓					
27I. Other (please specify)	Binary	✓					

(continued)

Table D1. Items in Iowa’s quality improvement survey of early childhood education providers, fall 2014
(continued)

Question	Response type (and response options, if applicable)	Question asked of centers	Types of staff asked about for centers ^a	Question asked of homes without assistants	Types of staff asked about for homes without assistants ^b	Question asked of homes with assistants	Types of staff asked about for homes with assistants ^c
28. How many years of teaching experience do you have?	Check all that apply (multiple subitems)	✓		✓		✓	
28A. Years	Count	✓		✓		✓	
28B. Months	Count	✓		✓		✓	
29. What is your gender?	Binary	✓		✓		✓	
30. What is your race?	Check all that apply (multiple subitems)	✓		✓		✓	
30A. White	Binary	✓		✓		✓	
30B. Black or African-American	Binary	✓		✓		✓	
30C. American Indian or Alaskan Native	Binary	✓		✓		✓	
30D. Asian	Binary	✓		✓		✓	
30E. Native Hawaiian or other Pacific Islander	Binary	✓		✓		✓	
30F. Some other race (please specify)	Binary	✓		✓		✓	
31. Are you of Hispanic or Latino origin?	Binary	✓		✓		✓	
32. Is your program a licensed center?	Binary	✓					
33. What is your program’s license or registration ID?	Alphanumeric	✓		✓		✓	

CPR is cardiopulmonary resuscitation. ID is identifier. QRS is Quality Rating System.

- a. This column indicates the categories of staff in centers for which the respondent was asked to supply information.
- b. This column indicates the categories of staff in homes without assistants for which the respondent was asked to supply information.
- c. This column indicates the categories of staff in homes with assistants for which the respondent was asked to supply information.

Source: Survey co-developed by Regional Educational Laboratory Midwest and the Iowa Quality Rating System Oversight Committee (see Faria, Hawkinson, & Metzger, in press, for the complete formatted version of the survey).

Appendix E. Detailed results tables

This appendix includes tables with the detailed results of the analyses presented in the main body of the report.

Table E1. Responses to fall 2014 survey on topics related to training and coaching received in past 12 months, by program characteristic

Program characteristic	Training activities in past 12 months														
	Any staff in program received training			Average training hours for key staff ^a meets 15-hour benchmark			Any staff in program received training with follow-up			Any staff in program received in-person training			Any staff in program received web-based training		
	Frequency	Percent	<i>n</i>	Frequency	Percent	<i>n</i>	Frequency	Percent	<i>n</i>	Frequency	Percent	<i>n</i>	Frequency	Percent	<i>n</i>
All programs	372	97.38	382	165	47.28	349	78	20.91	373	356	95.44	373	183	49.06	373
Program type															
Centers	178	98.89	180	46	27.06	170	51	28.81	177	171	96.61	177	106	59.89	177
Homes	194	96.04	202	119	66.48	179	27	13.78	196	185	94.39	196	77	39.29	196
Significant relationship?	No ($\chi^2 = 3.03$, $p = .082$)		382	Yes ($\chi^2 = 54.36$, $p = .000$)		349	Yes ($\chi^2 = 12.72$, $p = .000$)		373	No ($\chi^2 = 1.05$, $p = .304$)		373	Yes ($\chi^2 = 15.80$, $p = .000$)		373
Iowa Quality Rating System rating, September 2014															
1	8	88.89	9	4	57.14	7	2	25.00	8	7	87.50	8	3	37.50	8
2	119	97.54	122	47	42.73	110	22	18.49	119	115	96.64	119	61	51.26	119
3	78	98.73	79	33	44.59	74	14	17.72	79	76	96.20	79	30	37.97	79
4	139	96.53	144	66	50.00	132	34	24.29	140	132	94.29	140	74	52.86	140
5	28	100.00	28	15	57.69	26	6	22.22	27	26	96.30	27	15	55.56	27
Significant relationship?	No ($\chi^2 = 4.29$, $p = .368$)		382	No ($\chi^2 = 2.92$, $p = .571$)		349	No ($\chi^2 = 1.98$, $p = .739$)		373	No ($\chi^2 = 2.13$, $p = .711$)		373	No ($\chi^2 = 5.81$, $p = .214$)		373
Program characteristic	Coaching activities in past 12 months														
	Staff in program received coaching			Staff receive coaching once a month or more			Staff receive in-person coaching			Staff receive coaching over email, telephone, or text			Staff receive video- or web-based coaching		
	Frequency	Percent	<i>n</i>	Frequency	Percent	<i>n</i>	Frequency	Percent	<i>n</i>	Frequency	Percent	<i>n</i>	Frequency	Percent	<i>n</i>
All programs	249	64.68	385	57	15.12	377	220	57.29	384	129	33.59	384	27	7.03	384
Program type															
Centers	117	64.64	181	35	19.44	180	110	61.11	180	49	27.22	180	16	8.89	180
Homes	132	64.71	204	22	11.17	197	110	53.92	204	80	39.22	204	11	5.39	204
Significant relationship?	No ($\chi^2 = 0.0002$, $p = .989$)		385	Yes ($\chi^2 = 5.02$, $p = .025$)		377	No ($\chi^2 = 2.02$, $p = .155$)		384	Yes ($\chi^2 = 6.17$, $p = .013$)		384	No ($\chi^2 = 1.79$, $p = .181$)		384
Iowa Quality Rating System rating, September 2014															
1	4	44.44	9	1	12.50	8	3	33.33	9	2	22.22	9	0	0.00	9
2	69	56.56	122	12	9.92	121	60	49.18	122	40	32.79	122	7	5.74	122
3	53	67.09	79	9	11.39	79	49	62.03	79	21	26.58	79	8	10.13	79
4	100	68.49	146	25	17.61	142	88	60.27	146	55	37.67	146	9	6.16	146
5	23	79.31	29	10	37.04	27	20	71.43	28	11	39.29	28	3	10.71	28
Significant relationship?	No ($\chi^2 = 8.98$, $p = .062$)		385	Yes ($\chi^2 = 14.24$, $p = .007$)		377	No ($\chi^2 = 8.93$, $p = .063$)		384	No ($\chi^2 = 3.79$, $p = .435$)		384	No ($\chi^2 = 2.90$, $p = .575$)		384

Note: For each activity the table indicates the number of programs (frequency) and percentage of programs (percent) that selected the activity and the total number of programs that responded to the question (*n*); the significance test (χ^2) indicates whether there are statistically significant differences in use of the activity by the program characteristic in that section of the table. *p* values are rounded to three decimal places.

a. Key staff includes managers and teachers in centers and providers in homes.

Source: Authors' analysis of data from a survey administered in fall 2014 by the Iowa Department of Human Services, in partnership with regional Child Care Resource and Referral agencies.

Table E2. Responses to fall 2014 survey topics related to continuing education, orientation, and mentoring, by program characteristic

Program characteristic	Continuing education activities in past 12 months						New staff orientation activities in past 12 months					
	Any staff in continuing education			Teachers (in centers) or providers (in homes) in continuing education			Program provided new staff orientation			Program used Iowa State University Extension orientation materials		
	Frequency	Percent	n	Frequency	Percent	n	Frequency	Percent	n	Frequency	Percent	n
All programs	140	36.08	388	108	27.84	388	187	78.24	239	101	53.72	188
Program type												
Centers	100	55.25	181	68	37.57	181	168	92.82	181	101	59.76	169
Homes with assistants	40	19.32	207	40	19.32	207	19	32.76	58	0	0.00	19
Significant relationship?	Yes ($\chi^2 = 54.04$, $p = .000$)		388	Yes ($\chi^2 = 16.00$, $p = .000$)		388	Yes ($\chi^2 = 93.07$, $p = .000$)		239	Yes ($\chi^2 = 24.54$, $p = .000$)		188
Iowa Quality Rating System rating, September 2014												
1	4	40.00	10	2	20.00	10	2	33.33	6	0	0.00	2
2	28	22.58	124	24	19.35	124	41	69.49	59	15	35.71	42
3	33	41.77	79	28	35.44	79	39	76.47	51	31	79.49	39
4	56	38.36	146	38	26.03	146	80	83.33	96	41	51.25	80
5	19	65.52	29	16	55.17	29	25	92.59	27	14	56.00	25
Significant relationship?	Yes ($\chi^2 = 22.19$, $p = .000$)		388	Yes ($\chi^2 = 18.05$, $p = .001$)		388	Yes ($\chi^2 = 14.58$, $p = .006$)		239	Yes ($\chi^2 = 18.46$, $p = .001$)		188
Mentoring activities in past 12 months												
Program characteristic	Program provides mentoring			Formal mentoring by colleagues			Formal mentoring by a professional			Informal mentoring		
	Frequency	Percent	n	Frequency	Percent	n	Frequency	Percent	n	Frequency	Percent	n
All programs	183	76.76	241	113	47.28	239	30	12.55	239	148	61.41	239
Program type												
Centers	167	92.27	181	106	58.56	181	28	15.47	181	137	75.69	181
Homes with assistants	18	30.00	60	7	12.07	58	2	3.45	58	11	18.33	58
Significant relationship?	Yes ($\chi^2 = 97.94$, $p = .000$)		241	Yes ($\chi^2 = 38.09$, $p = .000$)		239	Yes ($\chi^2 = 5.78$, $p = .016$)		239	Yes ($\chi^2 = 62.56$, $p = .000$)		239
Iowa Quality Rating System rating, September 2014												
1	3	50.00	6	2	33.33	6	2	33.33	6	1	16.67	6
2	41	69.49	59	23	38.98	59	12	20.34	59	32	54.24	59
3	38	74.51	51	30	58.82	51	12	23.53	51	31	60.78	51
4	80	81.63	98	46	46.94	98	4	4.08	98	63	64.29	98
5	23	85.19	27	12	44.44	27	0	0.00	27	21	77.78	27
Significant relationship?	No ($\chi^2 = 6.68$, $p = .154$)		241	No ($\chi^2 = 4.91$, $p = .297$)		241	Yes ($\chi^2 = 21.65$, $p = .000$)		241	Yes ($\chi^2 = 9.75$, $p = .045$)		241

Note: Questions about new staff orientation and mentoring were asked only of centers and homes with assistants, so the survey responses exclude 149 homes without any assistants. For each activity the table indicates the number of programs (frequency) and percentage of programs (percent) that selected the activity and the total number of programs that responded to the question (n); the significance test (χ^2) indicates whether there are statistically significant differences in use of the activity by the program characteristic in that section of the table. *p* values are rounded to three decimal places.

Source: Authors' analysis of data from a survey administered in fall 2014 by the Iowa Department of Human Services, in partnership with regional Child Care Resource and Referral agencies.

Table E3. Responses to fall 2014 survey on topics covered in professional development for staff, by program characteristic

Program characteristic	Health and safety practices			Child development			Classroom practices			Program self-assessment		
	Frequency	Percent	<i>n</i>	Frequency	Percent	<i>n</i>	Frequency	Percent	<i>n</i>	Frequency	Percent	<i>n</i>
All programs	346	91.76	376	318	84.57	376	285	75.80	376	206	54.79	376
Program type												
Centers	168	94.92	177	154	87.01	177	156	88.14	177	121	68.36	177
Homes	177	88.94	199	164	82.41	199	129	64.82	199	85	42.71	199
Significant relationship?	Yes ($\chi^2 = 4.41$, $p = .036$)			No ($\chi^2 = 1.52$, $p = .218$)			Yes ($\chi^2 = 27.75$, $p = .000$)			Yes ($\chi^2 = 24.88$, $p = .000$)		
Iowa Quality Rating System rating, September 2014												
1	6	85.71	7	5	71.43	7	5	71.43	7	3	42.86	7
2	109	91.60	119	103	86.55	119	83	69.75	119	66	55.46	119
3	75	94.94	79	70	88.61	79	57	72.15	79	46	58.23	79
4	128	89.51	143	116	81.12	143	113	79.02	143	69	48.25	143
5	27	96.43	28	24	85.71	28	27	96.43	28	22	78.57	28
Significant relationship?	No ($\chi^2 = 3.16$, $p = .531$)			No ($\chi^2 = 3.61$, $p = .462$)			Yes ($\chi^2 = 10.33$, $p = .035$)			Yes ($\chi^2 = 9.66$, $p = .047$)		
Program characteristic	Program management			Family engagement			Quality Rating System participation			Other topics		
	Frequency	Percent	<i>n</i>	Frequency	Percent	<i>n</i>	Frequency	Percent	<i>n</i>	Frequency	Percent	<i>n</i>
All programs	203	53.99	376	178	47.34	376	246	65.43	376	12	3.19	376
Program type												
Centers	114	64.41	177	89	50.28	177	127	71.75	177	12	6.78	177
Homes	89	44.72	199	89	44.72	199	119	59.80	199	0	0.00	199
Significant relationship?	Yes ($\chi^2 = 14.61$, $p = .000$)			No ($\chi^2 = 1.16$, $p = .281$)			Yes ($\chi^2 = 5.92$, $p = .015$)			Yes ($\chi^2 = 13.94$, $p = .000$)		
Iowa Quality Rating System rating, September 2014												
1	3	42.86	7	3	42.86	7	3	42.86	7	0	0.00	7
2	60	50.42	119	52	43.70	119	73	61.34	119	1	0.84	119
3	44	55.70	79	30	37.97	79	58	73.42	79	1	1.27	79
4	75	52.45	143	73	51.05	143	92	64.34	143	9	6.29	143
5	21	75.00	28	20	71.43	28	20	71.43	28	1	3.57	28
Significant relationship?	No ($\chi^2 = 6.16$, $p = .187$)			Yes ($\chi^2 = 10.78$, $p = .029$)			No ($\chi^2 = 5.20$, $p = .267$)			No ($\chi^2 = 7.78$, $p = .100$)		

Note: For each topic of professional development the table indicates the number of programs (frequency) and percentage of programs (percent) that received it and the total number of programs that responded to the question (*n*); the significance test (χ^2) indicates whether there are statistically significant differences in professional development on the topic by the program characteristic in that section of the table. *p* values are rounded to three decimal places.

Source: Authors' analysis of data from a survey administered in fall 2014 by the Iowa Department of Human Services, in partnership with regional Child Care Resource and Referral agencies.

Table E4. Responses to fall 2014 survey topics related to professional development received by staff, by program and staff type

Professional development topic	Centers						Homes			
	Managers (<i>n</i> = 169)		Teachers (<i>n</i> = 175)		Assistant teachers (<i>n</i> = 152)		Providers (<i>n</i> = 199)		Assistants (<i>n</i> = 58)	
	Frequency	Percent	Frequency	Percent	Frequency	Percent	Frequency	Percent	Frequency	Percent
Health and safety practices	144	85.21	154	88.00	127	83.55	177	88.94	22	37.93
Child development	122	72.19	141	80.57	113	74.34	164	82.41	11	18.97
Classroom practices	104	61.54	146	83.43	94	61.84	128	64.32	6	10.34
Program self-assessment	102	60.36	68	38.86	38	25.00	85	42.71	2	3.45
Management	105	62.13	38	21.71	14	9.21	84	42.21	3	5.17
Family engagement	76	44.97	67	38.29	38	25.00	89	44.72	3	5.17
Iowa Quality Rating System participation	111	65.68	66	37.71	30	19.74	119	59.80	3	5.17
Other	8	4.73	9	5.14	6	3.95	0	0.00	0	0.00

Note: The table indicates the number of programs (frequency) and percentage of programs (percent) that had each staff type receive professional development on the indicated topic and the total number of programs that responded to the question (*n*). The number of programs that responded in each staff category, indicated by *n*, varies because some programs do not have all listed staff types.

Source: Authors' analysis of data from a survey administered in fall 2014 by the Iowa Department of Human Services, in partnership with regional Child Care Resource and Referral agencies.

Table E5. Responses to fall 2014 survey topics related to incentives received by programs in past 12 months, by program characteristic

Program characteristic	Program received any type of incentive			Received free or discounted equipment or materials			Received grants for Quality Rating System or quality improvement			Received monetary award based on Quality Rating System rating		
	Frequency	Percent	<i>n</i>	Frequency	Percent	<i>n</i>	Frequency	Percent	<i>n</i>	Frequency	Percent	<i>n</i>
All programs	287	74.16	387	62	16.02	387	149	38.50	387	215	55.56	387
Program type												
Centers	143	79.01	181	31	17.13	181	64	35.36	181	115	63.54	181
Homes	144	69.90	206	31	15.05	206	85	41.26	206	100	48.54	206
Significant relationship?	No ($\chi^2 = 4.17$, $p = .041$)		387	No ($\chi^2 = 0.31$, $p = .578$)		387	No ($\chi^2 = 1.42$, $p = .234$)		387	Yes ($\chi^2 = 8.77$, $p = .003$)		387
Iowa Quality Rating System rating, September 2014												
1	4	44.44	9	3	33.33	9	3	33.33	9	0	0.00	9
2	83	66.94	124	31	25.00	124	50	40.32	124	61	49.19	124
3	65	82.28	79	12	15.19	79	25	31.65	79	50	63.29	79
4	111	76.03	146	13	8.90	146	58	39.73	146	82	56.16	146
5	24	82.76	29	3	10.34	29	13	44.83	29	22	75.86	29
Significant relationship?	Yes ($\chi^2 = 11.63$, $p = .020$)		387	Yes ($\chi^2 = 15.67$, $p = .004$)		387	No ($\chi^2 = 2.43$, $p = .658$)		387	Yes ($\chi^2 = 20.06$, $p = .000$)		387

Note: For each type of incentive the table indicates the number of programs (frequency) and percentage of programs (percent) that selected the incentive and the total number of programs that responded to the question (*n*); the significance test (χ^2) indicates whether there are statistically significant differences in use of the incentive by the program characteristic in that section of the table. *p* values are rounded to three decimal places.

Source: Authors' analysis of data from a survey administered in fall 2014 by the Iowa Department of Human Services, in partnership with regional Child Care Resource and Referral agencies.

Table E6. Response to fall 2014 survey topics related to quality improvement support received by staff, by program characteristic

Program characteristic	Financial support for education or training costs			Release time during regular work hours			Flexible schedules			Books and materials		
	Frequency	Percent	<i>n</i>	Frequency	Percent	<i>n</i>	Frequency	Percent	<i>n</i>	Frequency	Percent	<i>n</i>
All programs	106	28.42	373	95	25.47	373	81	21.72	373	60	16.09	373
Program type												
Centers	89	50.86	175	85	48.57	175	73	41.71	175	35	20.00	175
Homes	17	8.59	198	10	5.05	198	8	4.04	198	25	12.63	198
Significant relationship?	Yes ($\chi^2 = 81.60$, $p = .000$)		373	Yes ($\chi^2 = 92.69$, $p = .000$)		373	Yes ($\chi^2 = 77.56$, $p = .000$)		373	No ($\chi^2 = 3.74$, $p = .053$)		373
Iowa Quality Rating System rating, September 2014												
1	1	14.29	7	1	14.29	7	0	0.00	7	1	14.29	7
2	25	21.37	117	23	19.66	117	23	19.66	117	20	17.09	117
3	30	37.97	79	19	24.05	79	21	26.58	79	8	10.13	79
4	41	28.67	143	43	30.07	143	28	19.58	143	25	17.48	143
5	9	33.33	27	9	33.33	27	9	33.33	27	6	22.22	27
Significant relationship?	No ($\chi^2 = 7.45$, $p = .115$)		373	No ($\chi^2 = 5.10$, $p = .227$)		373	No ($\chi^2 = 5.86$, $p = .210$)		373	No ($\chi^2 = 3.14$, $p = .534$)		373
Program characteristic	Transportation reimbursement			Teacher Education and Compensation Helps (T.E.A.C.H.) scholarship			Cash awards to staff for course or degree completion			Raise based on completion of degree or credential		
	Frequency	Percent	<i>n</i>	Frequency	Percent	<i>n</i>	Frequency	Percent	<i>n</i>	Frequency	Percent	<i>n</i>
All programs	50	13.40	373	33	8.57	385	27	7.24	373	27	7.24	373
Program type												
Centers	45	25.71	175	17	9.39	181	12	6.86	175	25	14.29	175
Homes	5	2.53	198	16	7.84	204	15	7.58	198	2	1.01	198
Significant relationship?	Yes ($\chi^2 = 43.03$, $p = .000$)		373	No ($\chi^2 = 0.29$, $p = .588$)		373	No ($\chi^2 = 0.07$, $p = .789$)		373	Yes ($\chi^2 = 24.38$, $p = .000$)		373
Iowa Quality Rating System rating, September 2014												
1	0	0.00	7	0	0.00	10	0	0.00	7	0	0.00	7
2	15	12.82	117	4	3.25	123	11	9.40	117	4	3.42	117
3	9	11.39	79	5	6.33	79	3	3.80	79	6	7.59	79
4	21	14.69	143	16	11.11	144	11	7.69	143	14	9.79	143
5	5	18.52	27	8	27.59	29	2	7.41	27	3	11.11	27
Significant relationship?	No ($\chi^2 = 2.20$, $p = .698$)		373	Yes ($\chi^2 = 20.45$, $p = .000$)		373	No ($\chi^2 = 2.80$, $p = .592$)		373	No ($\chi^2 = 5.09$, $p = .278$)		373

Note: For each type of quality improvement support the table indicates the number of programs (frequency) and percentage of programs (percent) that received it and the total number of programs that responded to the question (*n*); the significance test (χ^2) indicates whether there are statistically significant differences in quality improvement supports by the program characteristic in that section of the table. *p* values are rounded to three decimal places.

Source: Authors' analysis of data from a survey administered in fall 2014 by the Iowa Department of Human Services, in partnership with regional Child Care Resource and Referral agencies.

Table E7. Response to fall 2014 survey question on support and barrier factors that affect participation in professional development and other improvement activities, by program characteristic

Program characteristic	All supports			All barriers		
	Average level of supports	Percent	<i>n</i>	Average level of barriers	Percent	<i>n</i>
All programs	1.29	1.72	370	2.54	0.62	361
Program type						
Centers	2.18	1.87	175	2.80	0.56	175
Homes	0.50	1.08	195	2.29	0.56	186
Significant relationship?	Yes (<i>F</i> = 114.09, <i>p</i> = .000)			Yes (<i>F</i> = 73.86, <i>p</i> = .000)		
Iowa Quality Rating System rating, September 2014						
1	0.43	0.79	7	2.29	0.56	7
2	1.08	1.73	116	2.46	0.65	113
3	1.28	1.48	79	2.50	0.61	79
4	1.41	1.80	141	2.62	0.57	134
5	1.89	1.95	27	2.60	0.65	28
Significant relationship?	No (<i>F</i> = 1.89, <i>p</i> = .111)			No (<i>F</i> = 1.54, <i>p</i> = .190)		

Note: For each type of quality improvement support the table indicates the number of programs (frequency) and percentage of programs (percent) that received it and the total number of programs that responded to the question (*n*); the significance test (χ^2) indicates whether there are statistically significant differences in quality improvement supports by the program characteristic in that section of the table. *p* values are rounded to three decimal places.

Source: Authors' analysis of data from a survey administered in fall 2014 by the Iowa Department of Human Services, in partnership with regional Child Care Resource and Referral agencies.

Table E8. Responses to fall 2014 survey on topics related to sources of information used to determine professional development needs, by program characteristic

Program characteristic	Information from QRS rating process			Recommendations from consultants or coaches			Quality improvement plan			Parent surveys		
	Frequency	Percent	<i>n</i>	Frequency	Percent	<i>n</i>	Frequency	Percent	<i>n</i>	Frequency	Percent	<i>n</i>
All programs	280	75.07	373	195	52.28	373	181	48.53	373	137	36.73	373
Program type												
Centers	138	78.86	175	102	58.29	175	99	56.57	175	80	45.71	175
Homes	142	71.72	198	93	46.97	198	82	41.41	198	57	28.79	198
Significant relationship?	No ($\chi^2 = 2.53$, $p = .112$)		373	Yes ($\chi^2 = 4.77$, $p = .029$)		373	Yes ($\chi^2 = 8.54$, $p = .003$)		373	Yes ($\chi^2 = 11.45$, $p = .001$)		373
Iowa Quality Rating System rating, September 2014												
1	4	57.14	7	4	57.14	7	0	0.00	7	0	0.00	7
2	77	65.81	117	60	51.28	117	49	41.88	117	31	26.50	117
3	68	86.08	79	39	49.37	79	34	43.04	79	41	51.90	79
4	108	75.52	143	70	48.95	143	77	53.85	143	50	34.97	143
5	23	85.19	27	22	81.48	27	21	77.78	27	15	55.56	27
Significant relationship?	Yes ($\chi^2 = 13.16$, $p = .010$)		373	Yes ($\chi^2 = 10.25$, $p = .036$)		373	Yes ($\chi^2 = 20.49$, $p = .000$)		373	Yes ($\chi^2 = 21.47$, $p = .000$)		373
Program characteristic	Informal conversations with families			Classroom observation data			Results of monitoring visits from funding or accreditation agencies			Child outcomes data		
	Frequency	Percent	<i>n</i>	Frequency	Percent	<i>n</i>	Frequency	Percent	<i>n</i>	Frequency	Percent	<i>n</i>
All programs	130	34.85	373	124	33.24	373	82	21.98	373	44	0.12	373
Program type												
Centers	45	25.71	175	91	52.00	175	51	29.14	175	30	17.14	175
Homes	85	42.93	198	33	16.67	198	31	15.66	198	14	7.07	198
Significant relationship?	Yes ($\chi^2 = 12.12$, $p = .000$)		373	Yes ($\chi^2 = 52.26$, $p = .000$)		373	Yes ($\chi^2 = 9.85$, $p = .002$)		373	Yes ($\chi^2 = 9.06$, $p = .003$)		373
Iowa Quality Rating System rating, September 2014												
1	0	0.00	7	1	14.29	7	2	28.57	7	1	14.29	7
2	43	36.75	117	33	28.21	117	21	17.95	117	8	6.84	117
3	23	29.11	79	22	27.85	79	15	18.99	79	10	12.66	79
4	53	37.06	143	52	36.36	143	35	24.48	143	19	13.29	143
5	11	40.74	27	16	59.26	27	9	33.33	27	6	22.22	27
Significant relationship?	No ($\chi^2 = 5.80$, $p = .215$)		373	Yes ($\chi^2 = 12.37$, $p = .015$)		373	No ($\chi^2 = 4.25$, $p = .374$)		373	No ($\chi^2 = 5.99$, $p = .200$)		373

(continued)

Table E8. Responses to fall 2014 survey on topics related to sources of information used to determine professional development needs, by program characteristic (continued)

Program characteristic	Parent committee input			Specific staff requests or informal conversations			Staff performance review results ^a			Staff surveys ^a		
	Frequency	Percent	<i>n</i>	Frequency	Percent	<i>n</i>	Frequency	Percent	<i>n</i>	Frequency	Percent	<i>n</i>
All programs	27	7.24	373	93	39.91	233	85	36.48	233	76	32.62	233
Program type												
Centers	23	13.14	175	90	51.43	175	85	48.57	175	76	43.43	175
Homes	4	2.02	198	3	5.17	58	0	0.00	58	0	0.00	58
Significant relationship?	Yes ($\chi^2 = 17.12$, $p = .000$)		373	Yes ($\chi^2 = 38.86$, $p = .000$)		233	Yes ($\chi^2 = 44.35$, $p = .000$)		233	Yes ($\chi^2 = 37.38$, $p = .000$)		233
Iowa Quality Rating System rating, September 2014												
1	0	0.00	7	1	25.00	4	0	0.00	4	0	0.00	4
2	13	11.11	117	22	38.60	57	25	43.86	57	17	29.82	57
3	4	5.06	79	13	25.49	51	22	43.14	51	21	41.18	51
4	8	5.59	143	46	47.92	96	31	32.29	96	31	32.29	96
5	2	7.41	27	11	44.00	25	7	28.00	25	7	28.00	25
Significant relationship?	No ($\chi^2 = 4.29$, $p = .368$)		373	No ($\chi^2 = 7.57$, $p = .108$)		233	No ($\chi^2 = 6.11$, $p = .191$)		233	No ($\chi^2 = 4.08$, $p = .395$)		233

Note: For each source of information the table indicates the number of programs (frequency) and percentage of programs (percent) that used it and the total number of programs that responded to the question (*n*); the significance test (χ^2) indicates whether or not there are statistically significant differences in information sources by the program characteristic in that section of the table. Due to an error in survey administration, data are not available for survey items on availability/schedule of trainings or working with a mentor. *p* values are rounded to three decimal places.

a. These categories apply to centers and homes with assistants only.

Source: Authors' analysis of data from a survey administered in fall 2014 by the Iowa Department of Human Services, in partnership with regional Child Care Resource and Referral agencies.

Table E9. Changes in Iowa Quality Rating System ratings from the first to the second rating time point for programs with at least two ratings, by first rating level, 2011–15

Second rating	First Iowa Quality Rating System rating										n
	Started at 1		Started at 2		Started at 3		Started at 4		Started at 5		
	Frequency	Percent	Frequency	Percent	Frequency	Percent	Frequency	Percent	Frequency	Percent	
Second Quality Rating System rating											
1	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0
2	3	75.00	37	43.02	0	0.00	3	5.77	0	0.00	43
3	0	0.00	40	46.51	8	27.59	0	0.00	0	0.00	48
4	1	25.00	9	10.47	21	72.41	45	86.54	1	100	77
5	0	0.00	0	0.00	0	0.00	4	7.69	0	0.00	4
Total	4		86		29		52		1		172
Type of change at second rating											
Lower rating	na	na	0	0.00	0	0.00	3	5.77	1	100	4
Same rating	0	0.00	37	43.02	8	27.59	45	86.54	0	0.00	90
Increased rating	4	100.00	49	56.98	21	72.41	4	7.69	na	na	78
Total	4		86		29		52		1		172

na is not applicable.

Note: The table indicates the number of programs (frequency) and percentage of programs (percent) in each category, and the total number of programs that responded to the question (n).

Source: Authors' analysis of data from a survey administered in fall 2014 by the Iowa Department of Human Services, in partnership with regional Child Care Resource and Referral agencies.

Table E10. Characteristics of programs that did and those that did not increase their Iowa Quality Rating System ratings and domain scores, 2011–15

Program characteristic	Overall Iowa Quality Rating System rating			Iowa Quality Rating System domain scores											
	Did not increase (percent)	Did increase (percent)	Total (number)	Health and safety score			Environment score			Family and community partnerships score			Professional development score		
				Did not increase (percent)	Did increase (percent)	Total (number)	Did not increase (percent)	Did increase (percent)	Total (number)	Did not increase (percent)	Did increase (percent)	Total (number)	Did not increase (percent)	Did increase (percent)	Total (number)
All programs	54.11	45.89	146	33.03	66.97	109	45.87	54.13	109	26.61	73.39	109	34.86	65.14	109
Program type															
Centers	55.22	44.78	67	34.55	65.45	55	40.00	60.00	55	23.64	76.36	55	40.00	60.00	55
Homes	53.16	46.84	79	31.48	66.97	54	51.85	48.15	54	29.63	70.37	54	29.63	70.37	54
Significant relationship?	No ($\chi^2 = 0.06$, $p = .803$)			No ($\chi^2 = 0.12$, $p = .734$)			No ($\chi^2 = 1.54$, $p = .214$)			No ($\chi^2 = 0.50$, $p = .479$)			No ($\chi^2 = 1.29$, $p = .256$)		
Public preschool funding															
Public preschool funds	43.24	56.76	37	40.00	60.00	35	25.71	74.29	35	22.86	73.39	35	31.43	68.57	35
No public preschool funds	57.80	42.20	109	29.73	70.27	74	55.41	44.59	74	28.38	71.62	74	36.49	63.51	74
Significant relationship?	No ($\chi^2 = 2.36$, $p = .125$)			No ($\chi^2 = 1.13$, $p = .287$)			Yes ($\chi^2 = 8.44$, $p = .004$)			No ($\chi^2 = 0.37$, $p = .542$)			No ($\chi^2 = 0.27$, $p = .605$)		
Receipt of child care subsidies															
Receives subsidies	46.58	53.42	73	43.40	76.79	53	42.86	57.14	56	21.43	78.57	56	25.00	75.00	56
Does not receive subsidies	61.64	38.36	73	23.21	56.60	56	49.06	50.94	53	32.08	67.92	53	45.28	54.72	53
Significant relationship?	No ($\chi^2 = 3.34$, $p = .068$)			Yes ($\chi^2 = 5.01$, $p = .025$)			No ($\chi^2 = 0.42$, $p = .516$)			No ($\chi^2 = 1.58$, $p = .209$)			Yes ($\chi^2 = 4.93$, $p = .026$)		
Iowa Quality Rating System rating at first rating time point															
1	0.00	100.00	2	na	na	na	na	na	na	na	na	na	na	na	na
2	43.84	56.16	73	0	100.00	41	0.00	100.00	41	0.00	100.00	41	0.00	100.00	41
3	28.57	71.43	28	42.86	57.14	28	67.86	32.14	28	39.29	60.71	28	35.71	64.29	28
4	90.48	9.52	42	58.97	41.03	39	79.49	20.51	39	43.59	56.41	39	69.23	30.77	39
5	100.00	0.00	1	100.00	0	1	0	100.00	1	100.00	0	1	100.00	0	1
Significant relationship?	Yes ($\chi^2 = 36.03$, $p = .000$)			Yes ($\chi^2 = 35.34$, $p = .000$)			Yes ($\chi^2 = 58.79$, $p = .000$)			Yes ($\chi^2 = 25.69$, $p = .000$)			Yes ($\chi^2 = 44.11$, $p = .000$)		

(continued)

Table E10. Characteristics of programs that did and those that did not increase their Iowa Quality Rating System ratings and domain scores, 2011–15 (continued)

Program characteristic	Iowa Quality Rating System domain scores														
	Overall Iowa Quality Rating System rating			Health and safety score			Environment score			Family and community partnerships score			Professional development score		
	Did not increase (percent)	Did increase (percent)	Total (number)	Did not increase (percent)	Did increase (percent)	Total (number)	Did not increase (percent)	Did increase (percent)	Total (number)	Did not increase (percent)	Did increase (percent)	Total (number)	Did not increase (percent)	Did increase (percent)	Total (number)
Region															
1	43.48	56.52	46	31.43	68.57	35	28.57	71.43	35	17.14	82.86	29	31.43	68.57	35
2	65.79	34.21	38	34.48	65.52	39	65.52	34.48	29	34.48	65.52	19	41.38	58.62	29
3	66.67	33.33	18	45.45	54.55	11	45.45	54.55	11	18.18	81.82	9	27.27	72.73	11
4	57.14	42.86	21	31.25	68.75	16	50.00	50.00	16	31.25	68.75	11	43.75	56.25	16
5	43.48	56.52	23	27.78	72.22	18	44.44	55.56	18	33.33	66.75	12	27.78	72.22	18
Significant relationship?	No ($\chi^2 = 6.44$, $p = .168$)			No ($\chi^2 = 1.08$, $p = .897$)			No ($\chi^2 = 8.85$, $p = .065$)			No ($\chi^2 = 3.52$, $p = .475$)			No ($\chi^2 = 1.96$, $p = .744$)		

na is not applicable.

Note: The table indicates the percentage of programs that did and did not increase their Iowa QRS ratings or domain scores among programs with each characteristic and the total number of programs in the sample with each characteristic (n); the significance test (χ^2) indicates whether or not there are statistically significant differences in increasing the Iowa QRS rating or domain score by the program characteristic in that section of the table. p values are rounded to three decimal places.

Source: Authors' analysis of data from a survey administered in fall 2014 by the Iowa Department of Human Services, in partnership with regional Child Care Resource and Referral agencies.

Table E11. Quality improvement supports and activities reported on the fall 2014 survey by programs that did and those that did not increase their ratings and domain scores, 2011–15

Program characteristic	Iowa Quality Rating System domain scores														
	Overall Iowa Quality Rating System rating			Health and safety score			Environment score			Family and community partnerships score			Professional development score		
	Did not increase (percent)	Did increase (percent)	Total (number)	Did not increase (percent)	Did increase (percent)	Total (number)	Did not increase (percent)	Did increase (percent)	Total (number)	Did not increase (percent)	Did increase (percent)	Total (number)	Did not increase (percent)	Did increase (percent)	Total (number)
Fifteen or more training hours															
Yes	52.86	47.14	70	35.71	64.29	56	51.79	48.21	56	23.21	76.79	56	33.93	66.07	56
No	55.26	44.74	76	30.19	69.81	53	39.62	60.38	53	30.19	69.81	53	35.85	64.15	53
Significant relationship?	No ($\chi^2 = 0.08$, $p = .771$)			No ($\chi^2 = 0.376$, $p = .540$)			No ($\chi^2 = 1.62$, $p = .203$)			No ($\chi^2 = 0.68$, $p = .410$)			No ($\chi^2 = 0.04$, $p = .833$)		
Training with follow-up															
Yes	70.59	29.41	34	41.67	66.97	24	45.83	54.17	24	25.00	75.00	24	54.17	45.83	24
No	49.11	50.89	112	30.59	69.41	85	45.88	54.12	85	27.05	72.94	85	29.41	70.59	85
Significant relationship?	Yes ($\chi^2 = 4.85$, $p = .028$)			No ($\chi^2 = 1.04$, $p = .308$)			No ($\chi^2 = 0.00$, $p = .997$)			No ($\chi^2 = 0.04$, $p = .840$)			Yes ($\chi^2 = 5.05$, $p = .025$)		
Coaching monthly or more															
Yes	63.16	45.89	19	52.94	47.06	17	58.82	41.18	17	29.41	70.59	17	58.82	41.18	17
No	52.76	47.24	127	29.35	70.65	92	43.48	56.52	92	26.09	73.91	92	30.43	69.57	92
Significant relationship?	No ($\chi^2 = 0.72$, $p = .396$)			No ($\chi^2 = 3.61$, $p = .057$)			No ($\chi^2 = 1.36$, $p = .243$)			No ($\chi^2 = 0.08$, $p = .776$)			Yes ($\chi^2 = 5.09$, $p = .024$)		
Child development professional development															
Yes	56.15	43.85	130	33.68	66.32	95	49.47	50.53	95	27.37	72.63	95	34.74	65.26	95
No	37.50	62.50	16	28.57	71.43	14	21.43	78.57	14	21.43	78.57	14	35.71	64.29	14
Significant relationship?	No ($\chi^2 = 2.00$, $p = .158$)			No ($\chi^2 = 0.14$, $p = .704$)			Yes ($\chi^2 = 3.87$, $p = .049$)			No ($\chi^2 = 0.22$, $p = .639$)			No ($\chi^2 = 0.01$, $p = .943$)		
Classroom practices professional development															
Yes	52.68	47.32	112	32.95	67.05	88	45.45	54.55	88	27.27	72.73	88	36.36	63.64	88
No	58.82	41.18	34	33.33	66.67	21	47.62	52.38	21	23.81	76.19	21	28.57	71.43	21
Significant relationship?	No ($\chi^2 = 0.40$, $p = .529$)			No ($\chi^2 = 0.00$, $p = .974$)			No ($\chi^2 = 0.03$, $p = .858$)			No ($\chi^2 = 0.10$, $p = .747$)			No ($\chi^2 = 0.45$, $p = .501$)		
Self-assessment professional development															
Yes	45.95	54.05	74	25.00	75.00	56	39.29	60.71	56	16.07	83.93	56	30.36	69.64	56
No	62.50	37.50	72	41.51	58.49	53	52.83	47.17	53	37.74	62.26	53	39.62	60.38	53
Significant relationship?	Yes ($\chi^2 = 4.03$, $p = .045$)			No ($\chi^2 = 3.36$, $p = .067$)			No ($\chi^2 = 2.01$, $p = .156$)			Yes ($\chi^2 = 6.55$, $p = .011$)			No ($\chi^2 = 1.03$, $p = .310$)		

(continued)

Table E11. Quality improvement supports and activities reported on the fall 2014 survey by programs that did and those that did not increase their ratings and domain scores, 2011–15 (continued)

Program characteristic	Iowa Quality Rating System domain scores														
	Overall Iowa Quality Rating System rating			Health and safety score			Environment score			Family and community partnerships score			Professional development score		
	Did not increase (percent)	Did increase (percent)	Total (number)	Did not increase (percent)	Did increase (percent)	Total (number)	Did not increase (percent)	Did increase (percent)	Total (number)	Did not increase (percent)	Did increase (percent)	Total (number)	Did not increase (percent)	Did increase (percent)	Total (number)
Management professional development															
Yes	46.58	53.42	73	27.12	72.88	59	44.07	55.93	59	25.42	74.58	59	28.81	71.19	59
No	61.64	38.36	73	40.00	60.00	50	48.00	52.00	50	28.00	72.00	50	42.00	58.00	50
Significant relationship?	No ($\chi^2 = 3.34$, $p = .068$)			No ($\chi^2 = 2.03$, $p = .154$)			No ($\chi^2 = 0.17$, $p = .681$)			No ($\chi^2 = 0.09$, $p = .726$)			No ($\chi^2 = 2.07$, $p = .150$)		
Continuing education															
Yes	54.11	45.89	39	26.47	73.53	34	44.12	55.88	34	17.65	82.35	34	26.47	73.53	34
No	59.81	40.19	107	36.00	64.00	75	46.67	53.33	75	30.67	69.33	75	38.67	61.33	75
Significant relationship?	Yes ($\chi^2 = 5.25$, $p = .022$)			No ($\chi^2 = 0.96$, $p = .327$)			No ($\chi^2 = 0.06$, $p = .805$)			No ($\chi^2 = 2.03$, $p = .154$)			No ($\chi^2 = 1.53$, $p = .216$)		
Nonfinancial incentives															
Yes	64.00	36.00	25	23.08	76.92	13	53.85	46.15	13	23.08	76.92	13	38.46	61.54	13
No	52.07	47.96	121	34.38	65.63	96	44.79	55.21	96	27.08	72.92	96	34.38	65.63	96
Significant relationship?	No ($\chi^2 = 1.19$, $p = .276$)			No ($\chi^2 = 0.66$, $p = .416$)			No ($\chi^2 = 0.38$, $p = .539$)			No ($\chi^2 = 0.09$, $p = .759$)			No ($\chi^2 = 0.08$, $p = .772$)		
Grants															
Yes	48.98	51.02	49	23.68	76.32	38	52.63	47.37	38	21.05	78.95	38	28.95	71.05	38
No	56.70	43.30	97	38.03	61.97	71	42.25	57.75	71	29.58	70.42	71	38.03	61.97	71
Significant relationship?	No ($\chi^2 = 0.78$, $p = .377$)			No ($\chi^2 = 2.30$, $p = .129$)			No ($\chi^2 = 1.07$, $p = .300$)			No ($\chi^2 = 0.92$, $p = .337$)			No ($\chi^2 = 0.90$, $p = .343$)		

Note: The table indicates the percentage of programs that did and did not increase their Iowa QRS ratings or domain scores among programs with each characteristic and the total number of programs in the sample with each characteristic (n); the significance test (χ^2) indicates whether or not there are statistically significant differences in increasing the Iowa QRS rating or domain score by the program characteristic in that section of the table. p values are rounded to three decimal places.

Source: Authors' analysis of data from a survey administered in fall 2014 by the Iowa Department of Human Services, in partnership with regional Child Care Resource and Referral agencies.

Table E12. Results of logistic regressions of increase in ratings or domain scores on program quality improvement supports and activities, 2011–15

Variable	Odds ratios for Iowa Quality Rating System rating increase		Odds ratios for domain score increases								
	Model 1	Model 2	Health and safety		Environment		Family and community partnerships		Professional development		
			Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10	
Independent variables: Quality improvement supports and activities											
Management topics	3.01*	4.47*	3.41	4.68	3.18	1.27	3.41	0.86	1.04	3.05	3.28
Fifteen or more training hours	2.90*	2.80	1.29	1.67	0.57	0.44	6.00*	6.52*	5.83*	3.98	
Grants	2.90	2.62	2.43	2.47	0.50	0.38	1.40	1.11	1.53	1.21	
Continuing education	2.24	2.10	0.55	0.25	0.31	0.40	1.96	3.46	2.32	0.52	
Coaching monthly or more	1.49	1.01	0.58	0.43	0.62	0.19	0.79	0.59	0.31	0.04*	
Self-assessment topics	1.44	1.21	1.36	0.84	2.11	4.05	3.55	3.03	0.99	0.65	
Classroom practices topics	0.99	0.58	1.56	2.63	3.01	2.71	0.55	0.82	0.29	0.20	
Nonfinancial incentives	0.82	0.78	0.92	0.68	0.41	0.43	1.69	1.70	1.18	2.27	
Training with follow-up	0.63	0.57	1.01	0.82	8.29	43.06*	1.77	2.44	0.55	0.83	
Child development topics	0.12**	0.10**	0.38	0.33	0.06*	0.04*	0.26	0.25	0.75	1.22	
Independent variables: Program characteristics											
Quality Rating System rating at baseline	0.23***	0.15***	0.11***	0.10***	0.03***	0.01***	0.16***	0.18**	0.07***	0.03***	
Center	0.94	0.89	2.56	4.15	3.69	1.33	4.75	7.43*	1.04	0.30	
Public preschool or Head Start funding	3.75	3.81	0.34	0.15	8.53	30.12*	1.91	1.33	4.82	4.87	
Receives child care subsidies	1.13	0.98	1.27	1.48	0.21	0.16	1.23	1.10	3.36	1.96	
Independent variables: Staff supports, barriers, and planning											
Quality improvement plan		2.59		0.70		0.95		0.51		2.75	
Count of supports		1.05		1.19		1.02		0.86		1.84*	
Barriers scale		1.95		0.30		10.96*		0.76*		12.43*	
Model statistics											
<i>n</i>	146	137	109	103	109	103	109	103	109	103	
Likelihood ratio χ^2 (model)	59.18***	59.01***	54.16***	55.30***	92.74	97.12***	41.54**	41.06*	69.83***	77.09***	
Hosmer-Lemeshow χ^2 (goodness of fit)	5.70	8.42	9.97	7.36	5.61	6.74	8.11	6.75	5.67	6.83	
Sensitivity	74.63	73.44	84.93	88.73	89.83	91.07	88.75	88.16	91.55	92.54	
Specificity	83.54	79.45	61.11	71.88	88.00	91.49	51.72	59.26	78.95	86.11	
Percentage of cases correctly classified	79.45	76.64	77.06	83.50	88.99	91.26	78.90	80.58	87.16	90.29	

* $p < .05$; ** $p < .01$; *** $p < .001$.

Note: All models also control for region, which was not a significant predictor of rating increase in any model. Coefficients for each independent variable are presented as odds ratios. Significant odds ratios less than 1 indicate a reduced likelihood of a rating increase, and odds ratios greater than 1 indicate an increased likelihood of a rating increase.

Source: Authors' analysis of data from a survey administered in fall 2014 by the Iowa Department of Human Services, in partnership with regional Child Care Resource and Referral agencies.

Notes

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1. This report includes two similar abbreviations. QRIS refers to quality rating and improvement systems across states, and QRS is the abbreviated name for the QRIS in Iowa, the Iowa Quality Rating System.
2. Members of the Iowa Quality Rating System Oversight Committee include representatives from the Iowa Department of Human Services, Iowa Department of Education, Iowa Department of Public Health, Child Care Resource and Referral agencies, Iowa State University Extension, Early Childhood Iowa, as well as center-, home-, and school-based programs.
3. The National Institute for Early Education Research identifies a minimum of 15 hours of training annually for teachers as a quality benchmark (Barnett, Carolan, Squires, Brown, & Horowitz 2014). This study adapted the benchmark to an average of 15 hours of training during the previous year for key staff, including managers and teachers in centers and providers in homes. Average hours of training is the sum of training hours among key staff, divided by the number of key staff.
4. In registered homes, providers are required to complete 12 hours of training per year; assistants are not required to take a set number of hours of training. Among licensed centers, annual required hours of training range from 5 to 9 based on staff type. The state currently requires that the minimum required training hours be completed in person rather than online; any training beyond the required hours can be completed online.
5. Bonus payments are part of QRS participation and are based on maintaining or improving ratings achieved by a program; programs are rated every two years, so not all programs would be eligible for a bonus in any given year.
6. Quality improvement plans are an optional part of the Iowa QRS rating process. They confer points toward the environment domain score. Programs complete a form identifying their quality improvement goals and the specific steps they are taking to achieve the goals.
7. Programs with a rating of 5 at both rating time points are not included in the category of rating increase because their ratings cannot possibly increase above 5. (Only one program in the sample started with a rating of 5, but it did not stay at that rating at the second time point.) Programs that start with a rating of 1 and are not able to reach a rating of 2 by the next rating cycle may not continue in the Iowa QRS; so no programs that started with a rating of 1 and remained there at the subsequent rating point are shown in figure 10.
8. Domain score increases are more common in Iowa QRS than are rating increases because it is easier to receive additional points on a domain score than to cross to a higher rating. Ratings of 3–5 are determined by achieving a range of points summed across all domains, as well as a separate ERS observation score for a rating of 5 only (see appendix B for additional detail).

9. The ordinal coefficient alpha (Zumbo, Gadermann, & Zeisser, 2007) is similar to Cronbach's alpha but is based on the tetrachoric correlation matrix in the case of binary items (such as the support variables) or on the polychoric correlation matrix in the case of ordinal items (such as the barrier variables). Cronbach's alpha is not used with binary or ordinal items because it is based on Pearson's r correlation matrix, which assumes items are normally distributed.

References

- Adams, D., Bierbrauer, J., Edie, D., Riley, D., & Roach, M. (2003). *T.E.A.C.H. early childhood Wisconsin evaluation report: August 1999–June 2003*. Madison, WI: Wisconsin Child Care Research Partnership, University of Wisconsin-Extension.
- Aikens, N., & Akers, L. (2011). *Background review of existing literature on coaching: Final report*. Washington DC: Mathematica Policy Research. Retrieved October 18, 2015, from: http://www.first5la.org/files/07110_502.2CoachingLitRev_FINAL_07072011.pdf.
- Barnett, W. S., Carolan, M. E., Squires, J. H., Brown, K. C., & Horowitz, M. (2014). *The state of preschool 2014: State preschool yearbook*. Rutgers, NJ: National Institute for Early Education Research. Retrieved October 18, 2015, from: http://nieer.org/sites/nieer/files/Yearbook2014_full2_0.pdf.
- Boller, K., Paulsell, D., Del Grosso, P., Blair, R., Lundquist, E., Kassow, D. Z., et al. (2015). Impacts of a child care quality rating and improvement system on child care quality. *Early Childhood Research Quarterly*, 30(1), 306–315.
- Bryant, D., Wesley, P., Burchinall, P., Sideris, J., Taylor, K., Fenson, C., et al. (2009). *The QUINCE-PFI study: An evaluation of a promising model for child care provider training: Final report*. Chapel Hill, NC: Frank Porter Graham Child Development Institute. Retrieved October 18, 2015, from <http://www.researchconnections.org/childcare/resources/18531/pdf>.
- Build Initiative & Child Trends. (2015). A catalog and comparison of quality rating and improvement systems (QRIS). Washington, DC: U.S. Department of Health and Human Services, Administration for Children and Families, Office of Planning, Research and Evaluation. Retrieved October 30, 2015, from <http://qriscompendium.org/>.
- Cassidy, D. J., Buell, M. J., Pugh-Hoese, S., & Russell, S. (1995). The effect of education on child care teachers' beliefs and classroom quality: Year one evaluation of the TEACH early childhood associate degree scholarship program. *Early Childhood Research Quarterly*, 10(2), 171–183.
- Early, D. M., Bryant, D. M., Pianta, R. C., Clifford, R. M., Burchinal, M. R., Ritchie, S., et al. (2006). Are teachers' education, major, and credentials related to classroom quality and children's academic gains in pre-kindergarten? *Early Childhood Research Quarterly*, 21(1), 174–195.
- Faria, A.-M., Hawkinson, L., & Metzger, I. (in press). *The "I" in QRIS Survey: Collecting data on quality improvement activities for early childhood education programs* (REL 2017–221). Washington, DC: U.S. Department of Education, Institute of Education Sciences, National Center for Education Evaluation and Regional Assistance, Regional Educational Laboratory Central. Retrieved from <http://ies.ed.gov/ncee/edlabs>.
- Fukkink, R. G., & Lont, A. (2007). Does training matter? A meta-analysis and review of caregiver training studies. *Early Childhood Research Quarterly*, 22(3), 294–311.

- Garrison-Mogren, R., Bullis, M., & Falls, J. (2007). *Post-school outcomes: Response rates and non-response bias*. Eugene, OR: Westat. Retrieved October 30, 2015, from http://www.psocenter.org/content_page_assets/content_page_15/westat_pso_response_rates_bias.pdf.
- Gormley, W. T., & Lucas, J. K. (2000). *Money, accreditation, and child care center quality*. Working Paper Series. New York, NY: Foundation for Child Development.
- Hamre, B. K., Pianta, R. C., Burchinal, M., Field, S., LoCasale-Crouch, J., Downer, J. T., et al. (2012). A course on effective teacher-child interactions: Effects on teacher beliefs, knowledge, and observed practice. *American Educational Research Journal*, *49*(1), 88–123.
- Hamre, B. K., Pianta, R. C., Mashburn, A. J., & Downer, J. T. (2012). Promoting young children's social competence through the Preschool PATHS curriculum and MyTeachingPartner professional development resources. *Early Education and Development*, *23*(6), 809–832.
- Hawkinson, L. E., Quick, H. E., Muenchow, S., Anthony, J., Weinberg, E., Holod, A., et al. (2015). *Independent evaluation of California's Race to the Top: Early Learning Challenge quality rating and improvement system half-term report*. Washington, DC: American Institutes for Research.
- Hestenes, L. L., Kintner-Duffy, V. L., Wang, Y., La Paro, K. M., Mims, S., Crosby, D. A., et al. (2015). Comparisons among quality measures in child care settings: Understanding the use of multiple measures in North Carolina's QRIS and their links to social-emotional development in preschool children. *Early Childhood Research Quarterly*, *30*(1), 199–214.
- Holod, A., Faria, A.-M., Weinberg, E., & Howard, E. (2015). *Moving up the ladder: How do states deliver quality improvement supports within their quality rating and improvement systems?* Washington, DC: American Institutes for Research. Retrieved October 30, 2015, from <http://www.air.org/sites/default/files/downloads/report/Quality-Rating-and-Improvement-Systems-QRIS-Early-Childhood-Sept-2015rev.pdf>.
- Howes, C., Burchinal, M., Pianta, R., Bryant, D., Early, D., Clifford, R., et al. (2008). Ready to learn? Children's pre-academic achievement in pre-kindergarten programs. *Early Childhood Research Quarterly*, *23*(1), 27–50.
- Iowa Department of Human Services. (2015). *Child Care Client Portal*. Des Moines, IA: Author. Retrieved October 30, 2015, from <http://ccmis.dhs.state.ia.us/ClientPortal/ProviderLocator.aspx>.
- Isner, T., Tout, K., Zaslow, M., Soli, M., Quinn, K., Rothenberg, L., et al. (2011). *Coaching in early care and education programs and quality rating and improvement systems (QRIS): Identifying promising features*. Washington, DC: Child Trends. Retrieved October 30, 2015, from <http://www.childtrends.org/wp-content/uploads/2013/05/2011-35CoachingQualityImprovement.pdf>.

- Karoly, L. A. (2014). *Validation studies for early learning and care quality rating and improvement systems: A review of the literature*. Santa Monica, CA: RAND. Retrieved October 30, 2015, from http://www.rand.org/content/dam/rand/pubs/working_papers/WR1000/WR1051/RAND_WR1051.pdf.
- Karoly, L. A., Zellman, G. L., & Perlman, M. (2013). Understanding variation in classroom quality within early childhood centers: Evidence from Colorado's quality rating and improvement system. *Early Childhood Research Quarterly*, 28(4), 645–657.
- Landry, S. H., Anthony, J. L., Swank, P. R., & Monseque-Bailey, P. (2009). Effectiveness of comprehensive professional development for teachers of at-risk preschoolers. *Journal of Educational Psychology*, 101(2), 448–465.
- Landry, S. H., Swank, P. R., Anthony, J. L., & Assel, M. A. (2011). An experimental study evaluating professional development activities within a state funded pre-kindergarten program. *Reading and Writing*, 24(8), 971–1010.
- Le, V., Schaack, D. D., & Setodji, C. M. (2015). Identifying baseline and ceiling thresholds within the Qualistar Early Learning Quality Rating and Improvement System. *Early Childhood Research Quarterly*, 30(B), 215–226.
- Mitchell, A. (2012). *Financial incentives in quality rating and improvement systems: Approaches and effects*. Washington, DC: QRIS National Learning Network.
- Muenchow, S., Holod, A., Quick, H. E., Hawkinson, L. E., González, R. L., Abram, K., et al. (2013). *Local quality improvement efforts and outcomes descriptive study: Final report*. Sacramento, CA: California Department of Education.
- Neuman, S. B., & Cunningham, L. (2009). The impact of professional development and coaching on early language and literacy instructional practices. *American Educational Research Journal*, 46(2), 532–566.
- Pianta, R. C., DeCoster, J., Cabell, S. Q., Burchinal, M., Hamre, B., Downer, J., et al. (2014). Dose-response relations between preschool teachers' exposure to components of professional development and increases in quality of their interactions with children. *Early Childhood Research Quarterly*, 29(4), 499–508.
- Piasta, S. B., Justice, L. M., Cabell, S. Q., Wiggins, A. K., Turnbull, K. P., & Curenton, S. M. (2012). Impact of professional development on preschool teachers' conversational responsivity and children's linguistic productivity and complexity. *Early Childhood Research Quarterly*, 27(3), 387–400.
- QRIS National Learning Network. (2015). *QRIS state contacts & map: Revised February 2015*. Washington, DC: Author. Retrieved October 18, 2015, from <http://www.qrisnetwork.org/qris-state-contacts-map>.
- Raikes, H. H., Torquati, J. C., Hegland, S., Raikes, H. A., Scott, J., Messner, L., et al. (2006). Studying the culture of quality early education and care: A cumulative approach to measuring characteristics of the workforce and relations to quality in four Midwestern

- states. In M. Zaslow & I. Martinez-Beck (Eds.), *Critical issues in early childhood professional development* (pp. 111–136). Baltimore, MD: Brookes.
- Sabol, T. J., & Pianta, R. R. (2015). Validating Virginia's quality rating and improvement system among state-funded pre-kindergarten programs. *Early Childhood Research Quarterly*, 30(1), 183–198.
- Schaack, D. D., Tarrant, K., Boller, K., & Tout, K. (2012). Quality Rating and Improvement Systems: Frameworks for early care and education systems change. In S. L. Kagan & K. Kauerz (Eds.), *Early childhood systems: Transforming early learning* (pp. 71–86). New York, NY: Teachers College Press.
- Smith, S., Robbins, T., Schneider, W., Kreader, J. L., & Ong, C. (2012). *Coaching and quality assistance in quality rating and improvement systems: Approaches used by TA providers to improve quality in early care and education programs and home-based settings*. New York, NY: National Center for Children in Poverty, Columbia University. Retrieved October 18, 2015, from http://www.nccp.org/publications/pub_1047.html.
- Smith, S., Schneider, W., & Kreader, J. L. (2010). *Features of professional development and on-site assistance in child care quality rating improvement systems: A survey of state-wide systems*. New York, NY: National Center for Children in Poverty, Columbia University. Retrieved October 18, 2015, from http://nccp.org/publications/pdf/text_970.pdf.
- Tout, K., Epstein, D., Soli, M., & Lowe, C. (2015). A blueprint for early care and education quality improvement initiatives. Bethesda, MD: Child Trends. <http://eric.ed.gov/?id=ED558576>
- Tout, K., Starr, R., Isner, T., Cleveland, J., Albertson-Junkans, L., Soli, M., et al. (2011). *Evaluation of Parent Aware: Minnesota's quality rating and improvement system pilot*. Minneapolis, MN: Minnesota Early Learning Foundation Research Consortium. Retrieved October 30, 2015, from https://s3.amazonaws.com/Omnera/VerV/s3finder/38/pdf/Parent_Aware_Year_4_Final_Evaluation_Technical_Report_Dec_2011.pdf.
- Tout, K., Zaslow, M., & Berry, D. (2006). Quality and qualifications: Links between professional development and quality in early care and education settings. In M. Zaslow & I. Martinez-Beck (Eds.), *Critical issues in early childhood professional development* (pp. 77–110). Baltimore, MD: Brookes.
- U.S. Census Bureau. (2015). *State & county Quickfacts: Iowa*. Washington, DC: Author. Retrieved October 30, 2015, from <http://quickfacts.census.gov>.
- U.S. Department of Education, National Center for Education Statistics. (2015). Common Core of Data. Public Elementary/Secondary School Universe Survey (2013–14 v.1a). Retrieved October 30, 2015, from <http://nces.ed.gov/ccd/pubagency.asp>.
- Vu, J. A., Jeon, H. J., & Howes, C. (2008). Formal education, credential, or both: Early childhood program classroom practices. *Early Education and Development*, 19(3), 479–504.

- Warner-Richter, M., Lowe, C., Tout, K., Epstein, D., & Li, W. (2016). *Improving quality for child care centers in greater Philadelphia: An evaluation of Success By 6 Final Report*. Bethesda, MD: Child Trends. Retrieved October 30, 2015, from <http://www.childtrends.org/wp-content/uploads/2016/02/2016-07SuccessBySixReport.pdf>.
- Wasik, B. A., & Hindman, A. H. (2011). Improving vocabulary and pre-literacy skills of at-risk preschoolers through teacher professional development. *Journal of Educational Psychology, 103*(2), 455–469.
- Weinstock, P., Bos, J., Tseng, F., Rosenthal, E., Ortiz, L., Dowsett, C., et al. (2012). *Evaluation of Program for Infant/Toddler Care (PITC): An on-site training of caregivers* (NCEE No. 2012-4003). National Center for Education Evaluation Working Paper. Washington, DC: U.S. Department of Education. Retrieved October 30, 2015, from http://ies.ed.gov/ncee/edlabs/regions/west/pdf/REL_20124003.pdf.
- Yazejian, N., & Iruka, I. U. (2015). Associations among tiered quality rating and improvement system supports and quality improvement. *Early Childhood Research Quarterly, 30*(B), 255–265.
- Yoshikawa, H., & Zaslow, M. (2013). *Too much evidence to ignore: New findings on the impact of quality preschool at scale*. Washington, DC: National Institute for Early Education Research.
- Zaslow, M., Tout, K., Halle, T., Whittaker, J. V., & Lavelle, B. (2010). *Toward the identification of features of effective professional development for early childhood educators: Literature review*. Washington, DC: U.S. Department of Education, Office of Planning, Evaluation and Policy Development.
- Zumbo, B. D., Gadermann, A. M., & Zeisser, C. (2007). Ordinal versions of coefficients alpha and theta for Likert rating scales. *Journal of Modern Applied Statistical Methods, 6*(1), 21–29.

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