Child Care Health Consultation Improves Infant and Toddler Care

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ABSTRACT

Introduction: Many families enroll their infants and toddlers in early education and child care programs. The Pennsylvania Chapter of the American Academy of Pediatrics recruited 32 child care centers that care for infants and toddlers to be linked with a child care health consultant (CCHC).

Method: Project staff assigned the centers alternately to an immediate intervention or a 1-year delayed intervention (contrast) group. At entry into the project, and then 1 and 2 years later, an evaluator assessed center compliance with 13 standards for infants and toddler care selected from *Caring for Our Children: National Health and Safety Performance Standards* (3rd ed.). Project staff linked the Immediate Intervention centers with a CCHC in Year 1. In Year 2, in a crossover comparison, project staff linked Contrast centers with a CCHC.

Results: Working with a CCHC effectively improved compliance with some selected health and safety standards. J Pediatr Health Care. (2017) *31*, 684-694.

KEY WORDS

Child care, child care health consultation, health and safety, infants and toddlers

INTRODUCTION

Nationally, about 48% of children younger than 3 years of age are enrolled in organized child care facilities (Laughlin, 2013). Early educators (child care staff) care for these children for many hours and many days. The quality of their care has lifelong impact on their physical, developmental, and social–emotional well-being (Garcia, Heckman, Leaf, & Padros, 2016).

In 2013, the Early Childhood Education Linkage System (ECELS), a program of the Pennsylvania (PA) Chapter of the American Academy of Pediatrics (AAP)

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received a 3-year grant from the Maternal and Child Health Bureau (MCHB). The purpose of the grant was to "improve state infant/toddler [I/T] child care quality initiatives (Quality Rating and Improvement Systems [QRIS] and professional development)…" MCHB's grant required selection and promotion of 10 or more standards from a list provided by MCHB from *Caring for Our Children: National Health and Safety Performance Standards; Guidelines for Early Care and Education Programs*, 3rd ed. (*CFOC3*; AAP, American Public Health Association, & National Resource Center for Health and Safety in Child Care and Early Education, 2011).

Child care programs in PA's QRIS, called Keystone STARS, are ranked from the entry level at STAR 1 to STAR 4. To earn a rating, programs must comply with state regulations and meet the requirements listed for the designated STAR level on the PA Key Web site (www.pakeys.org). For a STAR 4 rating, a center that serves infants and toddlers must have scores at or above 5 (*good*) on the seven subscales of the Infant and Toddler Environment Rating Scale–Revised Edition (ITERS-R; Harms, Cryer, & Clifford, 2006). The Personal Care Routines subscale of the ITERS-R has some health and safety items. Scores in this subscale and on health and safety items in some of the other subscales are among the lowest scoring ITERS-R items in PA and elsewhere. This finding is reported by the PA Key Program Quality Assessment Team (2016) and by the authors of the ITERS-R (Harms and Cryer, personal communication, 2014).

Child care health consultants (CCHCs) use observation, education, collaborative decision making, coaching, and mentoring to achieve quality improvement in the QRIS (Zaslow, Tout, & Halle, 2012). CCHCs base their work on needs and feasible implementation. For more than a decade, published research has confirmed that child care health consultation is an effective approach to improving health and safety compliance with national child care standards (Alkon & Bernzweig, 2008; Alkon et al., 2008; Alkon, Bernzweig, Kim, Wolff, & Mackie, 2009; Alkon et al., 2014; Alkon et al., n.d.; Alkon, Sokal-Gutierrez, & Wolf, 2002; Banghart & Kraeder, 2012; Carabin et al., 1999; Crowley, 2006; Isbell et al., 2013; Moon & Oden, 2005; Organizational Research Services & Geo Education and Research, 2007; Pacific Research and Evaluation, 2007, 2008; Ramler, Nakatsukasa-Ono, Loe, & Harris, 2006; Roberts et al., 2000a, 2000b) Most of these studies did not specifically target care for infants and toddlers.

Published studies document the following specific improvements associated with involvement of a CCHC. Sanitation and hygiene reduced respiratory and gastrointestinal illness and days absent for illness among young children in group care (Carabin et al., 1999; Kotch et al., 2007; Roberts et al., 2000a, 2000b). Nationally recommended practices related to active play, nutrition, and food handling were adopted (Alkon et al., 2014). Policies and procedures accompanied by staff training reduced hazards and injuries (Kotch, 2002; Organizational Research Services & Geo Education and Research, 2007). Training about safe infant sleep positioning and the infant sleep environment reduced risk of sudden infant death syndrome (Moon & Oden, 2005). Better monitoring and tracking of immunization data in child care programs was associated with more children having up-to-date vaccine documentation (Alkon & Bernzweig, 2008).

The PA AAP established ECELS in 1989. ECELS maintains a CCHC Registry and regularly communicates with registered CCHCs to provide professional development, technical assistance, and tools to enable their implementation of the CCHC role. PA's CCHCs include private and public health service providers and health professionals who teach in academic settings. Funding for CCHC work is unpredictable, making recruitment, education, and retention of CCHCs challenging.

PA's child care regulations require that child care providers have documents showing that enrolled children are up to date with preventive health services recommended by the AAP, including "a review of the child's immunized status according to recommendations of the ACIP [Advisory Committee on Immunization Practices]" (PA Department of Human Services, 2008). This regulation is not enforced. Few providers use any reliable way to ensure that enrolled children are up to date. ECELS encourages child care centers to use a well-tested and routinely updated online software application called WellCareTracker™ (Weinburg, 2002) to check child health records for up-to-date routine preventive health services. It is described, demonstrated, and offered for subscription at www.wellcaretracker.org. Using WellCareTracker™ eases the burden for child care providers to comply with the regulation and remind families to obtain these services in a timely manner.

METHODS

Design

The PA AAP's MCHB-funded Infant-Toddler Quality Improvement Project (ITQIP) was conducted by ECELS using a randomly assigned clinical trial with a crossover comparison of centers assigned to an immediate intervention or delayed intervention (comparison) group. ECELS (a) assessed child care center practices related to I/T care for 13 selected *CFOC3* standards (AAP et al., 2011) and (b) assessed whether compliance with these practices improved when centers were linked with a CCHC.

Selection of the *CFOC3* standards addressed in ITQIP

With input from early care and education stakeholders, ECELS chose 13 *CFOC3* standards (AAP et al., 2011) from a list provided by MCHB (Box 1). The selection criteria were that the standard is (a) associated with the highest and most common risks of harm to I/T (AAP, American Public Health Association, & National Resource Center for Health and Safety in Child Care and Early Education, 2013), (b) measurable and amenable to improvement with technical assistance and professional development provided by a CCHC over a 12-month period, and (c) found by state inspectors to have a high level of noncompliance according to state data (PA Office of Child Development and Early Learning, 2010).

Evaluation plan

The evaluation plan is a classic randomly assigned crossover clinical trial. See Figure 1 for the evaluation plan logic model.

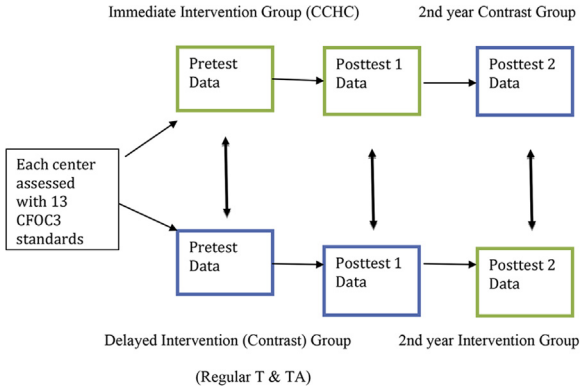
The ITQIP staff and consultants developed the evaluation tool described below. The ITQIP Project Coordinator (first author) and the evaluators collected data from participating centers at three points: when centers enrolled in the study (Pretest) and then 1 year (Posttest 1) and 2 years later (Posttest 2). One of the consultants (fourth author) compared the two groups on the pretest for equivalency and then on each of the two posttests. These data are discussed in the Results: Immediate Intervention Versus Delayed Intervention (Contrast) Group section. One year after the pretest data were collected, the participating centers were switched to a crossover comparison format. At this point, ITQIP ended the subsidy for the CCHCs who were working with the centers in the immediate intervention group and provided the subsidized CCHC linkage to the centers in the delayed intervention (contrast) group.

BOX 1. *CFOC3* standards chosen for ITQIP

1.4.5.2 Child Abuse and Neglect Education
3.4.4.1 Recognizing and Reporting Suspected Child Abuse, Neglect, and Exploitation
2.1.2.1 Personal Caregiver/Teacher Relationships for Infants and Toddlers
2.2.0.2 Limiting Infant/Toddler Time in Crib, High Chair, Car Seat, and other restraining equipment
3.1.3.1 Active Opportunities for Physical Activity
3.1.4.1 Safe Sleep Practices and SIDS Risk Reduction
3.2.1.4 Diaper Changing Procedure
3.2.2.1 Situations That Require Hand Hygiene
3.2.2.2 Handwashing Procedure
3.6.3.3 Training of Caregivers/Teachers to Administer Medication
3.5.0.1 Care Plan for Children with Special Health Care Needs
5.4.5.2 Cribs
7.2.0.1 Immunization Documentation

Note. CFOC3, *Caring for Our Children: National Health and Safety Performance Standards; Guidelines for Early Care and Education Programs (3rd ed.); ITQIP, Infant-Toddler Quality Improvement Project; SIDS, sudden infant death syndrome*.

FIGURE 1. Evaluation plan logic model. CCHC, child health care consultant; T, training; TA, technical assistance.



This figure appears in color online at www.jpedhc.org.

When a center enrolled in ITQIP, the ITQIP coordinator interviewed the center director by phone. She gathered demographic data, including the number of enrolled I/Ts, where and when I/T activities occurred in the center, and the number of children who met the MCHB definition of special health needs. She asked the director to submit up to five of any care plans the center had for these children, redacted for confidentiality. The MCHB definition of a child with special health care needs is noted in *CFOC3* standard 3.5.0.1 as "a child who has or is at increased risk for chronic physical, developmental, behavioral or emotional conditions and who requires health and related services of a type or amount beyond that required by children generally" (AAP et al., 2011).

The ITQIP coordinator selected the rooms for the evaluator to observe as those with the largest number of children in the age group. The evaluators recorded observations in one infant and one toddler room at each center.

The evaluator collected a random sample of immunization records for up to 10 infants and 10 toddlers with the names redacted for confidentiality. The ITQIP coordinator used WellCareTracker™ software to check these immunization records. The ITQIP coordinator evaluated the care plans that the director submitted for the presence of the appropriate components from the list of the 14 components specified in CFOC3 standard 3.5.0.1. (AAP et al., 2011) and a 15th component, the presence of the health care provider's signature, that is required by PA regulations (Box 2).

The ITQIP coordinator scored the evaluator's observations of diapering, hand hygiene, and medication administration. She promptly prepared a summary of all the findings for the center and sent the summary to the center director and the linked CCHC before the first CCHC site visit. The summary delineated areas of strengths and areas to improve based on the evaluation tool results. To facilitate use of the data by the center staff and CCHCs, the summary included the text of the evaluation tool item, the center's score on the item, and the reason why the center met or did not meet the standard. The CCHC contacted the center within 2 weeks after receiving the summary to set up the initial site visit.

Evaluation Tool

The ITQIP staff prepared the items on the evaluation tool from performance guidelines specified in the 13 selected *CFOC3* standards (AAP et al., 2011). ITQIP consultants (fourth and fifth authors) and the ECELS staff reviewed the tool for clarity and validity of content. After several rounds of revisions, the ITQIP coordinator and a prospective ITQIP evaluator field-tested the tool, further revised it, and then field-tested it again, this time testing for interrater reliability with two evaluators independently and simultaneously using the tool.

The ITQIP evaluation tool has four sections: (a) Demographic Information collected in the phone interview (35 items), (b) Observations (64 items), (c) Interview Questions (28 items), and (d) Documents (14 items). The score awarded to items on the evaluation tool was based on the criteria listed in Box 3. A score of 2 or 3 for an item was considered a strength, and a score of 0 or 1 for an item was considered an area to improve. This total score was the sum of the scores for each item. The total number of scorable items on the evaluation tool is 106, with a maximum score of 318. The documents assessed include training records, written policies, care plans for children with special needs, immunization data, and PA child abuse clearances.

ITQIP assigned each scorable item to one of the 10 topic areas addressed by the 13 *CFOC3* standards selected for the project (AAP et al., 2011). See Table 1.

Sampling design: Recruitment, random assignment, and retention of centers

ECELS recruited Keystone STAR 2 and STAR 3 centers by distributing a flyer about the project. Programs with higher STARS ratings qualify for higher payments for children whose care is state subsidized. The highest payments are for children enrolled in STAR 4 centers. The increased payment for a higher rating is a quality improvement incentive. Also, ECELS offered participating centers three free $10 credit–awarding reviews for ECELS self-learning modules. The flyer was included in the newsletters of a variety of organizations: four of the five regional state-supported sources of professional development (Regional Keys), the PA Child Care Association, the Pittsburgh Association for the Education of Young Children, and United Way. Because the northwestern region of the state has the fewest centers, recruitment from that region was not attempted.

As the centers joined ITQIP, the project coordinator assigned them alternately to one of two groups, either the immediate intervention group or the delayed intervention (contrast) group. ITQIP enrolled centers from all four targeted regions of the state.

BOX 2. Care plan components evaluated for children with special needs

1. A list of the child's diagnoses
2. Contact information for the child's health care provider and any subspecialists
3. Medications to be administered on a scheduled basis
4. Medications to be administered in an emergency with clearly stated signs and symptoms in lay language about when to give the medication
5. Procedures to be performed while in care
6. Allergies
7. Diet modification that the child requires
8. Activity modifications
9. Environmental modifications
10. Triggers that cause a reaction to avoid
11. Symptoms for caregivers/teachers to observe
12. Behavioral modifications beyond those needed for a typically developing child
13. Emergency response plans for a facility emergency and if the child has an emergency event
14. Special skills training and education required and provided for the staff
15. Health care provider signature (required by Pennsylvania regulation)

Note. *Fourteen components specified in the* Caring for Our Children: National Health and Safety Performance Standards; Guidelines for Early Care and Education Programs *(3rd ed.) standard 3.5.0.1.* (American Academy of Pediatrics et al., 2011) *and a 15th required by Pennsylvania child care regulation*.

BOX 3. Criteria for scores assigned to items on the evaluation tool

0 = Never meets item
1 = Partly (<50%) meets item
2 = Mostly (≥50%) meets item
3 = Fully (100%) meets the item
NA = Not Applicable
NOp = Not observed or no opportunity to obtain data
DK = Don't know (interviewee response)

TABLE 1. Topic areas and number of items to score per topic

Abbreviation	Topic areas	Number of items to score per topic[a]
CA	Preventing Child Abuse	13
PR	Personal Relationships	9
LA	Limited Physical Activity of Infants	3
AO	Active Opportunity for Physical Activity	22
SS	Safe Sleep Practices/SIDS Prevention	19
MA	Medication Administration	8
DC	Diaper Changing Procedure	16
HH	Hand Hygiene	8
IM	Immunization Documentation	3
SN	Care Plans for Children With Special Needs	5

Note. *SIDS, sudden infant death syndrome.*
[a]*See the narrative for an item-by-item explanation of those items with significance levels (*p *values) based on the* t *tests performed on each item.*

Centers enrolled in ITQIP agreed to

- allow a 4- to 5-hour site evaluation once a year for 3 years,
- work with a CCHC for a period of 1 year to improve I/T health and safety,
- accept random assignment to one of the two project groups,
- provide access to redacted immunization records and care plans for evaluation,
- pay $240.00 of the $500 honorarium ITQIP paid to their CCHC, and
- remain in ITQIP for 3 years.

Recruitment and roles of evaluators and CCHCs

Evaluators.

ITQIP recruited 17 evaluators from the list of CCHCs who had previously received CCHC training from ECELS and from the nurses in the Maternal Infant and Early Childhood Home Visiting Program. All evaluators were health professionals with pediatric experience related to observed items. Most had experience working with *CFOC3* standards (AAP et al., 2011). The evaluators learned how to use the evaluation tool by participating in a live Webinar or by using the recording of the Webinar. All evaluators received a copy of the evaluation tool and a training manual with instructions for completing the evaluation. Seven evaluators were also CCHCs in this project. None of the evaluators who were CCHCs in ITQIP were linked with centers they evaluated.

The evaluators gave their completed evaluation tools to the ITQIP coordinator to score and summarize. The coordinator reviewed each submitted evaluation tool and then discussed the documentation with the evaluator by phone to make sure the scoring was as intended.

Child Care Health Consultants.

ECELS recruited 14 registered nurses and one physician as CCHCs. The ITQIP coordinator (first author) has worked as a CCHC for more than 15 years. She and the project's director and primary investigator, a pediatrician (second author) educated, coached, mentored, and supported the work of the CCHCs. The CCHCs participated in a Webinar about the project scope and the use of the selected *CFOC3* standards (AAP et al., 2011). They received a training manual that included the 13 selected *CFOC3* standards (AAP et al., 2011) and resources to support best practice in each of the 10 topic areas. ITQIP provided additional resources and periodic *CFOC3* updates (AAP et al., 2011).

During the site visit, the CCHC compared her observations with those in the summary and solicited concerns about health and safety practices from the center's staff. Then the director, program staff, and CCHC chose three of the 10 topics as the primary focus of the center's improvement. The CCHC helped the center staff prepare an action plan to work on the three topic areas they chose.

> The CCHC helped the center staff prepare an action plan to work on the three topic areas they chose.

Action plans included filling gaps in knowledge, developing policies for staff and family handbooks, and improving staff practices. The CCHCs and center directors arranged all subsequent contacts and visits over the next 12 months.

Quarterly, the CCHCs sent the ITQIP coordinator documentation of their work and progress toward goals. The CCHCs submitted the center's initial action plan and a final action plan at the end of the year that showed what the center accomplished. ITQIP paid $250 to the CCHCs upon receipt of the center's initial action plan and date of the first CCHC visit. ITQIP paid the CCHCs an additional $250 after they submitted the final action plan from their 12-month linkage. Throughout the project, the ITQIP coordinator reviewed quarterly encounter forms that the CCHCs submitted to describe their work with the centers. This enabled the ITQIP coordinator to suggest ways to promote progress on action plans, including use of relevant health and safety resources.

RESULTS

Descriptive Report

ITQIP linked CCHCs with 32 centers. Of these, 16 centers were in the immediate CCHC-linked group, and 16 were in the delayed CCHC-linked group. In all,

59 directors, 348 I/T teachers and 1,490 infants and toddlers were directly involved in ITQIP. Three centers from each group dropped out, leaving 13 centers in each group at the completion of the project (Table 2).

Over the 1-year period of CCHC linkage, 12 of the 32 programs had turnovers of two to four directors. This change in center leadership made the CCHCs' work to improve I/T care very difficult. For the immediate intervention group, three of the original 16 centers withdrew from the project. One center in the delayed intervention (contrast) group closed during the project period; two others withdrew from ITQIP. Some centers dropped out because they were so overwhelmed with maintaining ratios in classrooms and staffing issues that they believed they could not focus on their action plans.

This report compares pretest, Posttest 1 and Posttest 2 scores for the 13 immediate intervention sites and 13 delayed intervention (contrast) sites that remained enrolled in ITQIP for the full 3 years.

ITQIP did not require a specific time spent in the CCHC role for each linkage. The CCHCs in the immediate intervention group provided an average of 14 hours of consultation per site (range = 2.25–28.75 hours). The CCHCs in the delayed intervention (contrast) group provided an average of 12.5 hours of consultation per site (range = 2–32 hours). The CCHCs completed quarterly encounter forms to report the total hours of services to their linked center, including a checklist of onsite, phone, and e-mail services. The most common CCHC interactions with centers included providing health education for the director and staff, onsite consultation at the facility, technical assistance by phone or e-mail, providing print or audiovisual materials, helping the facility comply with state regulations, and developing health policies and procedures.

Topics chosen by the centers in the immediate intervention group and the delayed intervention (contrast) group and the number of centers that chose each topic are shown in Table 3.

Quantitative Comparison of Evaluation Tool Scores on the Pretest Versus the Two Posttests

The scores used in the quantitative comparisons are the sum of all scores on the Evaluation Tool, not only those for the topics that the center chose for special focus (Table 4).

Immediate intervention group

On the pretest, the range in scores was 175 to 267, with an average score of 212 out of a possible 318 points (66%). On Posttest 1, the range in scores was 213 to 297, with an average score of 254 out of a possible 318 points (79%). This change from the pretest to Posttest 1 was statistically significant ($t = -4.62$, $p < .0001$). Postest2 did not show any significant change from the average score on Posttest 1, showing that the initial results from the intervention were sustained in the next year (254 to 254).

Delayed intervention (contrast) group

On the pretest, the range in scores was 164 to 271, with an average score of 218 out of a possible 318 points (68%). On Posttest1, the range in scores was 149 to 257, with an average score of 221 out of a possible 318 points (69%). These changes from the pretest to Posttest 1 were not significant. Posttest2 showed significant change in the average score from Posttest 1 (221 points) to Posttest 2 (243 points; $t = -1.80$, $p < .08$) a year after this delayed intervention (contrast) group had received their CCHC linkage.

Immediate Intervention Versus Delayed Intervention (Contrast) Groups

The comparison of the average scores between the Immediate Intervention (212) and Delayed Intervention (Contrast, 218) groups on the pretest was not significant, showing that the groups were equivalent. The difference between the average scores of the immediate intervention (254) and delayed intervention (contrast, 221) groups on Posttest1 was statistically significant ($t = -3.46$, $p < .002$), showing the effectiveness of the CCHC intervention for the immediate intervention group. Posttest 2 showed no significant difference between the change in the average postintervention scores for the immediate intervention group 12 months after their CCHC-subsidized linkage and the delayed intervention (contrast) group (254 vs. 243) at the end of their 12 months of CCHC-subsidized linkage. See Figure 2 for the crossover comparison results.

TABLE 2. Location and retention of recruited centers

Region of Pennsylvania	Immediate intervention group			Delayed intervention group		
	Centers recruited	Centers dropped out	Centers completed	Centers recruited	Centers dropped out	Centers completed
Southwest Region (Pittsburgh metropolitan area)	1	0	1	3	1	2
South Central Region (Harrisburg metropolitan area)	4	1	3	2	1	1
Northeast Region (Allentown/Bethlehem/Scranton)	3	0	3	4	0	4
Southeast Region (Philadelphia metropolitan area)	8	2	6	7	1	6
Total	16	3	13	16	3	13

TABLE 3. *CFOC3* topics chosen by centers by intervention group

CFOC3 topics	Number of centers in immediate intervention group that chose each topic	Number of centers in delayed intervention (contrast) group that chose each topic
Safe Sleep Practice	11	11
Medication Administration	10	6
Child Abuse Prevention	6	1
Care Plans for Children with Special Needs	5	8
Diaper Changing Procedure	4	4
Limited Physical Activity of Infants	2	1
Hand Hygiene	2	5
Immunization	1	0
Personal Relationships	0	1
Active Opportunity for Physical Activity	0	4

Note. CFOC3, *Caring for Our Children: National Health and Safety Performance Standards; Guidelines for Early Care and Education Programs (3rd ed.).*

The crossover comparison results (Figure 2) show the relationship between the immediate intervention and the delayed intervention (contrast) groups in a crossover design. It clearly shows how effective the intervention (pretest to Posttest 1) was for the immediate intervention group and that the effects persisted after 1 year without a subsidized CCHC linkage (Posttest 1 to Posttest 2). It also shows that the intervention was effective when the delayed intervention (contrast) group was switched to receive the CCHC intervention with targeted training, technical assistance, and collaborative consultation a year after their pretest assessment (Posttest 1 to Posttest 2).

For the Immediate Intervention Group After 1 Year of Linkage With a CCHC

Among the items in each topic area (Table 1), the following items showed statistically significant improvement (pretest to Posttest 1).

Medication administration

The director had documentation that the staff who are authorized to give medications have received medication administration training within the year from a health professional ($p < .001$).

Safe sleep

The number of written safe sleep policies containing the required elements increased ($p < .05$). Teachers ($p < .01$) and parents ($p < .05$) reviewed the safe sleep policies and were educated about safe sleep practices ($p < .05$).

Child abuse

Child abuse policies contained the required elements ($p < .05$). Both infant and toddler teachers were educated about child abuse and how, as mandated reporters, they are required to personally report incidents they suspect might involve child maltreatment ($p < .001$). The number of centers having required clearance documents on file for teachers increased ($p < .05$).

Active opportunities for physical activity

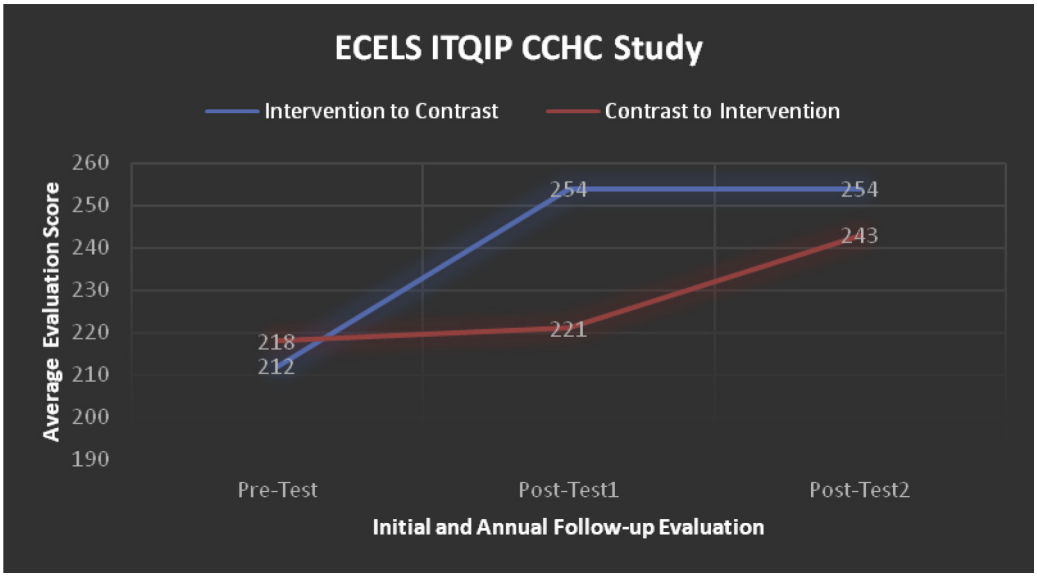
Infants (birth through 12 months of age) were taken outside two to three times per day, as tolerated ($p < .05$). Toddlers (12 months through 3 years)

TABLE 4. Quantitative results of the evaluation from the pretest to two posttests

	Intervention group				Delayed intervention (contrast) group			
	Range	Average	%	Possible total	Range	Average	%	Possible total
Pretest	175–267	212[a]	66	318	164–271	218	68	318
Posttest 1	213–297	254[a,c]	79	318	149–257	221[b,c]	69	318
Posttest 2	137–286	254	79	318	170–283	243[b]	76	318

Note. CCHC, child care health consultant.
[a]*Statistically significant change (*t = −4.62, p ≤ .0001*) from pretest to Posttest 1 for the immediate intervention group after the intervention of a 1-year linkage with a CCHC.*
[b]*Statistically significant change (*t = −1.80, p ≤ .08*) from Posttest 1 to Posttest 2 for the delayed intervention group after the intervention of 1 year of CCHC linkage.*
[c]*Statistically significant change (*t = −3.46; p < .002*) for Posttest 1 between the immediate intervention group and the delayed intervention (contrast) group.*

FIGURE 2. Crossover comparison results. CCHC, child care health consultant; ECELS, Early Childhood Education Linkage System; ITQIP, Infant-Toddler Quality Improvement Project.



went outside except in weather that poses a significant health risk ($p < .05$).

Diaper changing

Before the beginning of the diaper change, changing table paper was placed over the diapering surface, followed by the gathering of supplies needed for the diaper change from the containers in which they are stored and use of gloves ($p < .05$).

Hand hygiene

Observed times when toddlers ($p < .01$) and the toddler teachers/caregivers ($p < .05$) should have washed their hands showed statistically significant improvement after CCHC linkage.

For the Delayed Intervention (Contrast) Group After 1 Year of Linkage With a CCHC

Among the items in each topic area (Table 1), the following items showed statistically significant improvement (Posttest 1 to Posttest 2).

Safe sleep

Safe sleep policies that contained all the elements that should be in a safe sleep policy per *CFOC3* standard 3.1.4.1. ($p < .05$; AAP et al., 2011). The facility had documentation that parents reviewed the center's safe sleep policy and were educated about safe sleep practices ($p < .05$). There was no soft or loose bedding or other objects in a crib when an infant was in the crib ($p < .05$). Caregivers and teachers checked on sleeping infants often enough (about every 5 minutes) to be sure that the infant was still breathing ($p < .05$).

Medication administration

The name of a child to receive medication was verified before the medication was administered to that child ($p < .05$).

Diaper changing

Bottom clothing was removed, including shoes and socks, if feet were unlikely to be kept from contacting soiled skin or surfaces. If clothing was soiled, it was removed and placed in a plastic bag ($p < .05$).

Special needs

The number of care plans submitted that included the required elements in a care plan for children with special needs per the *CFOC3* standard 3.5.0.1 increased ($p < .05$; AAP et al., 2011).

Additional Findings of Interest

Immunization documentation

Only one center chose to work on documentation of up-to-date immunization status as an action plan focus. Overall, the immunization data for the two groups showed low compliance with *CFOC3* standard 7.2.0.1 (AAP et al., 2011) and PA's immunization regulations (PA Department of Human Services, 2008). On the pretest, in the immediate intervention centers, 22% of the immunization records for infants and 43% of the immunization records for toddlers were up to date.

Little change occurred for this group on Posttest 1 (36% for infants, 43% for toddlers.) On the pretest for the delayed intervention (contrast) centers, 25% of the immunization records for infants and 40% of the immunizations records for toddlers were up to date. On Posttest 1 the delayed intervention (contrast) centers improved from 25% to 38% for infants but dropped from 40% to 27% of the records for toddlers showing up-to-date vaccines.

Care plans for children with special needs

The data for the two groups showed low compliance with *CFOC3* standard 3.5.0.1 (AAP et al., 2011) that lists the components for care plans. Combining the immediate intervention and delayed intervention (contrast) center findings for this topic, the pretest showed that 66 I/Ts were identified with special health care needs in the 32 centers initially enrolled in ITQIP. Only 15 (23%) of I/Ts with identified special health care needs had any care plan signed by a health care professional. Only 1 of 66 I/Ts with special health care needs had a care plan signed by a health care professional that had all necessary components for optimal daily and/or emergency care. Posttest 2 showed that 39 I/Ts were identified with a special health care need in the remaining 26 centers. For children identified by the centers as having a special health care need, 62% did not have a care plan. Fifteen (38%) of those with identified special health care needs had a care plan signed by a health professional. Four of the 15 care plans had all the required elements. Examples of children who had special needs and had no care plan signed by a health care provider included children with gastroesophageal reflux taking Ranitidine, febrile seizures, asthma, multiple epinephrine autoinjectors onsite, autism, nonfebrile seizures, and torticollis and plagiocephaly, which required that the child wear a helmet each day.

DISCUSSION AND CONCLUSIONS

Quality early education and child care have been shown to be associated with lifelong benefits (Garcia et al., 2016). Young children are especially vulnerable to infectious diseases and injuries because of their age-appropriate behavior and abilities, their immature immune systems, and their lack of understanding of risk. Maintaining safe and healthful environments and practices involves removal of hazards and provision of policies and procedures, as well as compliance with quality standards by everyone in the group.

Numerous studies have shown the effectiveness of child care health consultation. This study focused on I/T care. The immediate intervention group showed significant improvement in policy development for safe sleep and child abuse and in education about safe sleep practices, preventing child abuse, and medication administration training. Some improvement in diaper changing and hand hygiene procedures occurred. The delayed intervention (contract) group showed significant improvement in safe sleep procedures, policies and education, medication administration procedure, diaper changing procedures, and care plans for children with special needs with appropriate information and signed by a health care provider.

The immediate intervention group showed significant improvement in policy development for safe sleep and child abuse and in education about safe sleep practices, preventing child abuse, and medication administration training.

The data collected by ITQIP show that many children with special needs lacked appropriate care plans. After finding little improvement in the immediate intervention group for centers having care plans with needed elements, ITQIP chose this topic as the focus of an MCHB-required continuous quality improvement initiative. ITQIP provided an audioconference for the CCHCs and gave them resources for teaching what should be in a care plan. CCHCs reported that they were most successful at helping the centers have complete, useful care plans for children with disease-specific conditions.

The areas chosen to target varied from center to center. Immunization was chosen by only one center. At the time of the study, neither regulation inspectors nor quality rating assessors were checking whether the center had documentation that the enrolled children were up to date with their vaccines. With little incentive or sanctions, documentation of up-to-date immunization status was poor.

Improvements occurred in some practices specified in selected *CFOC3* standards. Many of the directors said they appreciated the help they received from the CCHCs that ITQIP linked with their centers. The director of one center, part of a corporation with centers in 12 states, advocated for improving sleep policies for all the centers in her company. This advocacy could lead to widespread improvement.

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The centers that participated in this project were STAR 2 and STAR 3 programs that responded to an invitation to participate in ITQIP to improve. They were willing to contribute a modest copayment to work with a CCHC and wanted to raise their STAR rating and consequent higher payments for subsidized enrollees.

This selection bias is likely to have influenced the observed improvements.

A limitation of the study is the small sample size due to limited funding for the project. Also, although the study assessed practices for 13 *CFOC3* standards (AAP et al., 2011), the centers addressed only three topic areas. Little improvement was seen in topics that were not chosen or chosen less frequently. Change in leadership at the centers with varying levels of interest in working on the action plans made improvement difficult.

Another limitation of the study is the variability in child care operation from one facility to another and from year to year. Evaluators were unlikely to have been evaluating the same children from pretest through Posttest 2. Different teachers/caregivers and children may occupy designated rooms in a facility. ITQIP did not require that the CCHCs spend a specific amount of time with their centers. The time and type of service provided by CCHCs varied widely. Although CCHCs reported the total time and types of services they provided, they were not asked to report the time spent in each type of service (onsite visits, phone calls, or e-mails).

CCHCs support health and safety practices and environments that prevent harm and promote health and development of children, as well as overall wellbeing for families and early education staff. Currently, only 17 U.S. states have a statutory requirement for early childhood education programs to have child care health consultation (Honigfeld, Pascoe, Macary, & Crowley, 2017). Of these, two states require CCHC involvement only if the facility cares for sick children (Honigfeld et al., 2017).

None of the centers in this project continued their relationship with their CCHC after the year of subsidized linkage. Some directors stated that although they found the CCHC very helpful and informative, the cost of the CCHC was prohibitive. Some said they would continue the CCHC on a fee basis if they could budget for it in the future. Other studies have shown that linkage of centers with CCHC improves health and safety compliance. ITQIP showed this is true for I/T programs, too.

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