PARENT-MEDIATED READING INTERVENTIONS WITH CHILDREN UP TO FOUR YEARS OLD: A SYSTEMATIC REVIEW

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Research demonstrates that literacy and academic achievement are predicated on the emergent literacy knowledge and skills children acquire from birth up to 4 years of age. Parents are children's first and most important language and literacy teachers, yet not all parents have the capacity to establish an adequate early literacy foundation. Efforts to address this situation have resulted in numerous programs aimed at fostering emergent literacy development. This systematic review evaluates evidence on the effectiveness of parent-mediated interventions that increase the time parents spend reading with young children up to 4 years old. Four studies met inclusion criteria, reporting outcomes for 664 children. Three provided data for meta-analysis of effects on reading duration. The standardized mean difference in reading duration was 1.61 (95% CI, 1.03, 2.19 fixed-effect), favoring intervention over control. Results indicate that interventions aimed at increasing the amount of time parents spend reading interactively with their children yield positive results. Findings also demonstrate that pediatric primary care providers are well positioned to deliver reading promotion programs to parents and preschoolers.

Keywords: Early intervention, emergent literacy, literacy promotion, parent-mediated, shared book reading, systematic review

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INTRODUCTION

Literacy acquisition has long been recognized as a socially and environmentally influenced process occurring developmentally along a continuum that begins from birth. Along this continuum, however, are equally recognizable evolutionary stages, each represented by a defined knowledge and skill set (e.g., Whitehurst & Lonigan, 1998). The first of these, emergent literacy, characterizes language-related behaviors and practices of children aged newborn-to-4 years and their early though growing awareness of how talk, reading, and writing function. Emergent, pre-reading skills are known to develop first, before children move to conventional reading practices (Gunning, 2002; Sukhram & Hsu, 2012; Topping et al., 2012). Pre-reading is thus characterized by understanding the directionality of print as occurring from top-to-bottom and left-to-right. Children at this stage develop their alphabetic and phonological awareness wherein they begin to connect letters with letter sounds, such as the /b/ sound required for the “b” letter that begins words like “bat” and “ball”. This connection accompanies a growing awareness that printed words are composed of letters, which evolves to more complex skills like word recognition and decoding (reading) at the word level. Decades of research have emphasized that a solid emergent literacy foundation is essential if children are to evolve successfully to the next developmental stage, early reading, as they progress to the more formal school learning environments in kindergarten and first grade and move to more conventional reading skills.

Research demonstrates that early reading success, as well as future reading success in concert with academic achievement, is predicated on adequate emergent literacy knowledge and skill acquisition. We know, for instance, that children lacking sufficient reading skills at the end of grade one have an 88% likelihood of remaining below grade level after 3 additional years of instruction (Juel, 1988; Melhuish et al., 2012), that they are more likely to drop out of high school, and are less likely to pursue studies beyond high school (Entwisle et al., 2005). Children not at grade-level literacy by third grade are likely to encounter difficulty with all curricular aspects, require long-term academic support, and continue to lag behind in literacy and curricular achievement (Diamond et al., 2013; Sylva et al., 2008). Prolonged reading difficulties tend to lead to poor self-esteem, reduced motivation, behavioral difficulties, psychosocial adjustment problems, and long-term occupational and economic status challenges (Coleman & Vaughan, 2000; Jackson et al., 1999; OECD, 2006).

Early learning opportunities clearly weigh heavily on children’s immediate and future success, particularly since they orient them...
toward success or failure in the transition to school (Elkind, 1991; OECD, 2006; Sukhram & Hsu, 2012). From birth, children are immersed in language through interactions with parents and family members who provide the context for early literacy learning (Hart & Risley, 1999; Heath, 1983; Snow et al., 1991; Topping et al., 2012), and, as such, parents are their children’s first and most important language and literacy teachers. Onus is therefore placed on parents given that the quality of the literacy environment created at home and the amount of literacy learning opportunities available, plays such an important role in the acquisition of foundational knowledge, skills, dispositions for learning to read (Bennett et al., 2002; Gjems, 2010; OECD, 2006; Melhuish et al., 2008; Swick, 2009), and reading and vocabulary skill development (Huisman, 2012; Sénéchal, 2006; Sukhram & Hsu, 2012; Theriot et al., 2003; Topping et al., 2012).

We also know, however, that initial home learning experiences vary significantly based on multiple factors such as household income, parent education levels, and parental literacy practices (Topping et al., 2012). Concern both for the significance of the preschool developmental period, and that not all homes have capacity to establish that all-important early literacy foundation, has over several decades led to a proliferation of programs aimed at fostering emergent literacy development (e.g. Mendelsohn et al., 2001; van Zanten et al., 2012). Publicly funded pre-kindergarten programs such as the United States’ Head Start, Australia’s Early Years Literacy Program, the UK’s Read to Succeed, and Canada’s Read to Me are heavily resourced, as are many community-based programs seeking to achieve the same early literacy outcomes. For the most part, these interventions aim to (a) increase the quantity of time spent on parent-child reading activities, (b) enhance the quality of those experiences by teaching parents strategies like inferential questioning and dialogic book reading, or (c) improve both the quality and quantity of parent-mediated interactive reading experiences with children (Kassow, 2006; Sénéchal, 2006; Sukhram & Hsu, 2012; Van Kleeck, 2008; Walker et al., 1994).

**CONTEXT AND AIM OF THIS REVIEW**

As researchers, a number of concerns arose for us given such heavy and ongoing investments in parent-mediated emergent literacy development programs. In reviewing the qualitative and quantitative studies and the systematic, meta-analytic, and thematic reviews of the literature on the question of parent-mediated reading interventions for children aged 4 years and under, it was evident that we have a substantial body of
qualitative research investigating the kinds of parent-child interactions intended to promote early literacy learning. At the same time there is a significant lack of reported experimental studies employing randomized controlled trial designs from which ‘undisputed evidence’ (Pelletier, 2008, pp. 59–61) showing how programs targeting improved literacy outcomes and clear directions for future research can be substantiated (Bus et al., 1995). While meta-analytic and thematic literature reviews have provided clearer evidence of effective parent-mediated reading strategies and conditions on emergent literacy acquisition, such reviews have tended to look at multiple intervention outcome measures for study populations up to 8 years of age (see, for example, Bus et al., 1995; Mol et al., 2008).

In continuing to informally review the research with an interest in findings from meta-analytic reviews like those led by Bus et al. (1995) and Mol et al. (2008), we were intrigued to learn that though several reviews had examined the effects of newborn literacy programs (e.g. Sénéchal, 2006), few appeared to focus exclusively on children aged 4 and under. This is a critical distinction in our view given children’s primary reliance on parents and primary care providers in acquiring that all-important emergent literacy foundation. We were also surprised by a seemingly few studies appearing to question whether parent-mediated reading programs targeting preschoolers were successful at promoting an increase in the amount of time parents and children read together. We therefore posited this issue of increased time that mothers and children aged 4 and under spent reading together as our primary systematic review outcome of interest. Secondarily, we also sought to discern whether more time spent reading together positively influenced expressive and receptive language capabilities.

We were surprised to learn from our findings that the question of increased time was addressed in only a few studies, and further, that most studies examining time were programs delivered in child well-being and pediatric care settings. Review evidence supporting early childhood primary care agencies in reinforcing parent-mediated literacy, is in our view, compelling, particularly given the Council of Early Childhood’s call for pediatric providers to position literacy promotion as an essential component of regular care provision (High et al., 2014). We report here our systematic review methodology and findings, and discuss the nature and design of the programs shown to foster an increase in the amount of time parents and children spend reading together. We end with urging those in healthcare fields to consider promoting comparable programs given the evident success of interventions delivered through these agencies.
METHODS

Search Strategy

As our review demonstrates, studies investigating parent-mediated reading interventions on the emergent literacy skill development of children under 4 years of age must be investigated from an interdisciplinary perspective. To that end, we employed Cochrane review methods (Higgins & Green, 2011) for ensuring a comprehensive search of the literature was undertaken. A possible 28 search strategies, for example “child”, “parent”, “literacy”, “intervention”, and several qualifications relating to child’s age, were used to electronically search 16 databases: CENTRAL, MEDLINE, EMBASE, ERIC, PsycINFO, CINAHL, Social Science Citation Index, Science Citation Index, Sociological Abstracts, ASSIA, BEI, AEI, OpenSIGLE, DARE, Web of Science, and Dissertation Abstracts International. Relevant websites like the Canadian Council on Learning, Canadian Language and Literacy Research Network, the Open Systems for Information on Grey Literature in Europe databases, and the Washington-based National Institute for Literacy were searched along with ancestry searches of retrieved papers. Study authors were contacted in instances where additional information or further publications, if available, could prove helpful. Searches were current to June 2014.

Inclusion and Exclusion Criteria

Studies selected for review had to meet several criteria related to three elements: study participant profiles, study design, and types of interventions. Participants had to be parents with children 48 months and under during and up to the end of the reading research intervention. Studies had to employ a control group to ensure measured intervention effects were distinguishable from reading maturation. Eligible studies therefore included those with allocation to experimental or control groups by random or quasi-random (e.g. birth date) assignment. Studies comparing clusters of individuals allocated to experimental and control groups such as geographical region were also eligible, as were non-random participant allocation studies where control and experimental populations were selected along similar characteristics like age, SES, and baseline reading or language performance. Studies comparing parent-mediated reading interventions to non-treatment or normative parenting interventions, which could include improved access to books or instruction on how to read effectively to children, were also included. No restrictions were placed on allocation to treatment or control groups
by parent, child, or parent-child dyad, and there were no language restrictions. Studies involving children with specifically defined disabilities like autism or other sensory deficits, cognitive impairments, and emotional disorders were not eligible.

Interventions were assessed against 5 review eligibility criteria: (1) they had to include the primary measurable outcome of change in the duration of reading between parents and children; (2) be parent-mediated with at least one parent responsible for its implementation with children; (3) be universally implemented or targeted by a social gradient (household income or parent education); (4) consist of one of three types of interventions—improved access to books; instruction, advice, or encouragement to parents on how to read interactively with children; or a combination of strategies aimed both at improving access to books and promoting reading interactions; and (5) measure outcomes using only valid, reliable, standardized measures for reading duration, and for measures of expressive and receptive vocabulary. Two secondary outcomes of expressive and receptive vocabulary were considered in our review, though their inclusion was not required for review consideration.

**Data Management and Analysis**

Two authors independently screened study titles and abstracts identified through searches to determine whether they met inclusion criteria. Full copies of studies that appeared to meet criteria were retrieved and assessed by two independent review authors. In cases of differing opinions about a study’s inclusion eligibility, conflicts were resolved through discussion by all reviewers. Two reviewers independently extracted data from included studies for entering into the RevMan5 information management system. Extracted data included sample characteristics, intervention characteristics, outcomes (including baseline and post-intervention scores) and statistical findings. Researchers assessed the quality of all studies meeting inclusion criteria and tabulated scores for each review. Quality judgments were based on the presence of random sequence generation, allocation concealment, blinding of outcome assessors, incomplete outcome data, selective outcome reporting, and assessment of any other bias (e.g., selection).

**Measures of Treatment Effect**

We measured the primary outcome, time spent reading, as the mean difference in minutes with 95% confidence intervals and the secondary outcomes of expressive and receptive vocabulary as mean differences on
standardized measures with 95% confidence intervals. The chi-squared test and associated confidence intervals for individual studies are presented in Figure 1 on a Forest plot to display heterogeneity visually. We interpreted a significance level of less than 0.10 as evidence of statistical heterogeneity. Additionally, we calculated the $I^2$ statistic in order to assess the impact of heterogeneity on meta-analysis. $I^2$ values of less than 30% indicated low heterogeneity. Values of 31% to 69% indicated moderate heterogeneity, and values greater than 70% indicated high heterogeneity (Higgins, 2011).

**Search Results**

Of the 27,025 abstracts and titles retrieved, 5,053 potential studies were identified. Two reviewers identified 624 articles from the original pool, and, following a second review, found and retrieved 339 items. The subsequent 161 particularly relevant studies selected were then analyzed using a pilot-tested five-domain data extraction protocol, as recommended by Cochrane (Higgins & Green, 2011). Retrieved titles and abstracts were reviewed twice and coded independently by each reviewer. Any disagreements or uncertainties were resolved by discussion and, where necessary, authors were contacted in the case of missing information. Detailed analysis of all studies generated just four investigations meeting inclusion criteria (Cronan et al., 1996; Golova et al., 1999; High et al., 1998, 2000) that yielded outcomes for 664 children. Further analysis employing Cochrane’s risk of bias assessment tool (Higgins & Green, 2011) determined that studies were
low risk or difficult to judge, and thus all studies remained in the analysis.

RESULTS

Figure 2 provides a summary of the methodological designs and interventions for the four included review studies. Studies are examined more fully below according to five thematic discussion areas to ensure program effects are sufficiently contextualized, and to ensure the approaches and interventions of each are adequately portrayed.

Study Designs and Participants

The three studies led by Cronan et al. (1996), Golova et al. (1999), and High et al. (2000) were all randomized controlled trials with High (1998) employing a quasi-randomized study design. A randomized controlled design was not possible for this study given that researchers employed a historical control group (families with children in the appropriate age range previously attending the clinic) and an intervention group of families attending the clinic at the time the study was implemented for conducting a cross-sectional comparison of the two groups. Of the four included studies, three measured the primary outcome of reading quantity or duration per week in days (Golova et al., 1999; High et al., 1998, 2000) with the remaining study reporting time spent reading per week in minutes (Cronan et al., 1996). Secondary outcomes included changes in expressive (Cronan et al., 1996; Golova et al., 1999; High et al., 2000) and receptive (Cronan et al., 1996; Golova et al., 1999; High et al., 2000) vocabulary.

Participants in all four included studies were parents with children between birth and 48 months, with all studies targeting low-income populations. Two studies (Golova et al., 1999; High et al., 1998) focused on children between 5 and 11 months, covering the timeframe during which children most frequently visit pediatric clinics (Golova et al., 1999), while the remaining two studies recruited children from 12-to-36 (Cronan et al., 1996) and 38 months of age (High et al., 2000).

Intervention Characteristics

All investigations were conducted in the United States with three study interventions delivered through community-based healthcare clinics (Golova et al., 1999; High et al., 1998, 2000). The fourth involved participants recruited through a community-based Head Start program
Parent-Mediated Reading Intervention

<table>
<thead>
<tr>
<th>Author</th>
<th>Study Title</th>
<th>Participants</th>
<th>Intervention</th>
<th>Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cronan T,</td>
<td>The Effects of a Community-Based Literacy Program on Young Children's Language and Conceptual Development.</td>
<td>225: 83 high intervention, 73 low intervention, 69 control</td>
<td>Project PRIMER High-Intervention (High-Int): Families received 18 instructional visits from the project team.</td>
<td>Reading quantity/duration per week: High-Int: 15.7 minutes (P &lt; 0.05, comparison to control) Control: 12.5 minutes</td>
</tr>
<tr>
<td>Cruz S,</td>
<td></td>
<td></td>
<td>Low-Intervention (Low-Int): Families received 3 instructional visits from the project team.</td>
<td>Expressive language (average percentile): High-Int: 52.5 (P &lt; 0.01, comparison to control) Control: 39.4</td>
</tr>
<tr>
<td>Arriaga R,</td>
<td></td>
<td></td>
<td>Control (Con): Families received assessments only, no instruction.</td>
<td>Language comprehension: High-Int: 29.0 (P &lt; 0.05, comparison to control) Control: 26.6</td>
</tr>
<tr>
<td>Sarkin, A.</td>
<td>(1996)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Golova N,</td>
<td>Literacy Promotion for Hispanic Families in a Primary Care Setting: A Randomized, Controlled Trial.</td>
<td>135: 65 intervention, 70 control</td>
<td>Literacy promoting intervention</td>
<td>Reading quantity/duration per week: Intervention (Int): High-Int: 29.8 days/week (SD = 2.3) Con: 20.3 days/week (SD = 2.4) (P &lt; 0.001)</td>
</tr>
<tr>
<td>Alario A,</td>
<td></td>
<td></td>
<td>Intervention (Int): Parents received material and guidance to promote literacy with their children (bilingual children's book, bilingual handout, literacy-related anticipatory guidance).</td>
<td>Receptive vocabulary: Int: 40.6 words Con: 30.8 words (P &lt; 0.01)</td>
</tr>
<tr>
<td>Vivier P,</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Rodriguez M,</td>
<td></td>
<td></td>
<td>Control (Con): No material or advice given.</td>
<td>Expressive vocabulary: Int: 18.8 words Con: 12.2 words (P &lt; 0.05)</td>
</tr>
<tr>
<td>High P,</td>
<td>Evaluation of a Clinic-Based Program to Promote Book Sharing and Bedtime Routines Among Low-Income Urban Families With Young Children.</td>
<td>151: 100 intervention, 51 historical control</td>
<td>Anticipatory guidance book sharing program</td>
<td>Nights/week parents shared books with child at bedtime: Int: 3.9 (SD = 2.6) (P = 0.002) Con: 2.5 (SD = 2.7) (P = 0.002)</td>
</tr>
<tr>
<td>Hopmann M,</td>
<td></td>
<td></td>
<td>Intervention (Int): Pediatric residents and nurse practitioners distributed books to families at well-child visits.</td>
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<td></td>
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<tr>
<td>High P,</td>
<td>Literacy Promotion in Primary Care Pediatrics: Can We Make a Difference?</td>
<td>153: 77 intervention, 76 control</td>
<td>Literacy promoting intervention</td>
<td>Change in days/week parent reads to child: Int: 1.89 (SE 0.3) (P &lt; 0.001) Con: 0.16 (SE 0.3) (P &lt; 0.001)</td>
</tr>
<tr>
<td>LaGasse L,</td>
<td></td>
<td></td>
<td>Intervention (Int): Parents of intervention group received material and guidance to promote literacy with their children.</td>
<td>Expressive vocabulary: Int: 22.1 (SE 3.1) (P &lt; 0.11) Con: 15.9 (SE 2.3) (P &lt; 0.11)</td>
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<tr>
<td>Becker S,</td>
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<tr>
<td>Ahlgren I,</td>
<td></td>
<td></td>
<td>Control (Con): No material or guidance given.</td>
<td>Receptive vocabulary: Int: 51.0 (SE 3.0) (P &lt; 0.004) Con: 39.3 (SE 2.7) (P = 0.004)</td>
</tr>
</tbody>
</table>

Figure 2. Details of studies included in systematic review.

(Cronan et al., 1996) aimed at delivering education, health, and parent involvement services to underprivileged children.

**Home-based**

Only one intervention (Cronan et al., 1996) was administered within the home setting where parents were taught dialogic reading strategies and...
techniques to increase their children’s conceptual development. Project personnel recruited families by first presenting the study’s purpose and approach to Head Start teachers and coordinators, who in turn talked with parents about study participation. Once recruiters had identified interested parents, they subsequently collected family demographic information for matching trained tutors and families based on ethnicity, geographical area, and language. Tutors were typically assigned three 1-year-olds, three 2-year-olds, and three 3-year olds. Children in each age group were randomly assigned to one of three conditions, a high intervention program delivered to parents and children together consisting of eighteen 30-minute tutor-led instructional home visits, a low intervention program consisting of three instructional visits, or a control group where no instructional visits were provided. The intervention consisted of tutors modeling interactive reading methods including the teaching of concepts (e.g. up-and-down, colors, shapes), encouraging parents to read to their children daily, and providing storybooks to families.

Clinic-based

Interventions in the remaining studies were designed to assess an anticipatory guidance book-sharing program (High et al., 1998) or a literacy-promoting intervention (Golova et al., 1999; High et al., 2000) delivered through either a hospital-based primary care pediatric practice (High et al., 1998) or community-based health care center (Golova et al., 1999; High et al., 2000). All three interventions followed a similar format. Pediatricians met with parents during routine well-child clinic visits where they provided parents with books to read with their children, an educational handout explaining the benefits of reading to young children along with suggested effective interactive reading strategies, and anticipatory guidance by highlighting some key points in the handout. High et al. (1998) distributed two books per family while both the Golova et al. (1999) and High et al. (2000) teams averaged three books per parent.

Since Golova et al. (1999) targeted Spanish-speaking families, researchers created bilingual books by applying labels with Spanish translations under the English text. The two-page handout accompanying the books was also bilingual and written at a fifth-grade level to facilitate comprehension of the materials. Both studies led by High et al. (1998, 2000) provided handouts in English using simple language at an accessible reading level. All education materials advised parents that even young children can enjoy and learn from book sharing, described how children at various ages can be expected to use a book, and explained how parents can encourage and enjoy time spent reading
together. The guide provided interactive reading strategies such as imitating, playing with, and enjoying children’s reactions while reading, and encouraging both verbal and nonverbal book responses. The High et al. (2000) handout suggested sharing books with children as part of a regular bedtime routine.

**Assessment Measures**

High et al. (1998), Golova et al. (1999), and High et al. (2000) used a structured face-to-face parent interview protocol to collect pre- and post-intervention data. The questionnaire was reportedly the same in all three studies, though the High et al., 1998 questionnaire consisted of 88 items compared with an 80-item measure for the other two studies. Only High et al., 1998 provided interview development information as derived from two existing measures, the standardized Sleep Habits Questionnaire, and a survey developed by Needlman et al. (1991) to assess the effects of a clinic-based literacy promotion intervention. Golova et al., 1999 and High et al., 2000 reference High et al., (1998) to indicate their interview’s use in prior research.

The interview, requiring 8–12 minutes to complete (High et al., 1998), collected demographic information, children’s play activities, bedtime practices, parental reading habits, and language proficiencies. Eighteen items were related specifically to literacy and interspersed with other non-literacy-related questions (Golova et al., 1999). Two open-ended questions were also included to collect information about children’s three favorite things to do other than eating and sleeping, and parents’ three favorite things to do with their children (High et al., 1998). The number of days per week parents read books with their child was the target question for the primary outcome variable. High et al. (2000) used a modified version of the MacArthur Communication and Development Inventory to assess children’s receptive and expressive vocabulary. Similarly, Golova et al. (1999) used a modified Spanish short form of the same measure to assess vocabulary. All interviews were conducted either in the clinic waiting room, an examining room, or by phone.

**Data Collection Points**

Three studies (Cronan et al., 1996; Golova et al., 1999; High et al., 2000) employed a pre-test and post-test design for data collection while High et al. (1998) employed a cross-sectional design and thus collected experimental and control group parent interview data just once when children were between 12 and 38 months. The 51 parents in the historical control or comparison group were interviewed between June and July.
1994 during regular clinic visits, prior to a clinic-wide anticipatory guidance book-sharing program implementation. The 100 intervention group parents were interviewed between May and September 1995, 1 month after parents received at least two books and educational materials at two clinic visits, with the final visit at least 1 month pre-interview. Parents were interviewed at the clinic if appointments occurred within the study period; all others were interviewed by phone.

The Golova et al. (1999) and High et al. (2000) research teams interviewed parents at the time of study enrolment and again following the intervention. Families in Golova et al. (1999) were enrolled between June and September 1996, by approaching eligible parents in the waiting room with a request for study participation aimed at examining children’s play activities, interests, language development, and sleep habits. Researchers interviewed parents 2–4 months after three consecutive well-child pediatrician visits. High et al. (2000) enrolled and interviewed eligible families between August 1996 and September 1997 following the same procedures as the Golova team. Researchers conducted control and intervention group follow-up interviews after an average 3.4 well-child visits. Both Golova et al. (1999) and High et al. (2000) conducted vocabulary assessments at follow-up.

In the Cronan-led study (Cronan et al., 1996), trained assessors interviewed parents before and after the intervention during two 1-hour home visits, and assessed children’s language level pre- and post-intervention. Researchers compared changes in parents’ self-reported behaviors and child tests scores between high-intensity, low-intensity, and control groups.

**Effects of Interventions**

**Primary Outcomes**

There were three studies included in the meta-analysis (Cronan et al., 1996; Golova et al., 1999; High et al., 2000). As reported in Table 1, the standardized mean difference in reading duration was 1.61 95% CI, 1.03, 2.19, favoring parent-mediated reading intervention over control. Although missing standard deviations in the High et al. (2000) study prevented inclusion in the meta-analysis, study results also favored the parent-mediated reading intervention group.

**Secondary Outcomes**

Insufficient data were available for meta-analysis; however, three studies reported improved expressive and receptive vocabulary in the
parent-mediated intervention group (Cronan et al., 1996, Golova et al., 1999; High et al., 2000) with one study not reporting on secondary outcomes (High et al., 1998).

**Studies’ Results**

The Cronan et al. (1996) study sought to determine whether a high-intensity and low-intensity intervention program would increase children’s productive and conceptual language skills compared to control group children. Parents in the high-intervention group receiving 18 30-minute tutor-led instructional visits over a 7-month period reported increased reading duration with children, $t(221) = 2.54, p = 0.012$, with little change for low intervention and control children. It appears that low-income children can make considerable gains in language skill development when parents are provided with intensive training in dialogic and conceptual instructional reading techniques.

The 1998 High-led study was also designed to evaluate an intervention in which pediatricians and nurse practitioners were trained to provide dialogic reading instructional guidance to parents, materials promoting book sharing, and two free books for parent-child reading. While the intervention group reported sharing books at bedtime more than the control group ($3.9 \pm 2.6$ nights per week versus $2.5 \pm 2.7$ nights per week; $p = 0.002$), small sample sizes, for the control group in particular ($N = 51$), limited confidence in the results. Data necessary to determine effects associated with intervention duration or intensity were not collected.

The Golova et al. (1999) study provided families in the intervention group with free children’s books, educational materials, opportunities for

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**Table 1. Results of the meta-analysis**

<table>
<thead>
<tr>
<th>Study or Subgroup</th>
<th>Experimental</th>
<th>Control</th>
<th>Mean Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>SD</td>
<td>Total</td>
<td>Mean</td>
</tr>
<tr>
<td>Cronan (1996)a</td>
<td>15.7</td>
<td>7.8</td>
<td>65</td>
</tr>
<tr>
<td>High (1998)</td>
<td>3.9</td>
<td>2.6</td>
<td>100</td>
</tr>
<tr>
<td>Golova (1999)b</td>
<td>3.6</td>
<td>2.3</td>
<td>65</td>
</tr>
<tr>
<td>Total (95% CI)</td>
<td>230</td>
<td></td>
<td>100</td>
</tr>
</tbody>
</table>

Heterogeneity Tau² = 0.00; Chi² = 1.85, df = 2 ($p = 0.40$); $I^2 = 0\%$.

Test for overall effect $Z = 5.45$ ($p < 0.00001$).

*aMeasures the length of time spent reading to child.

*bMeasures days per week spent reading with child.

SD = standard deviation.

95% CI = 95% confidence interval.
book-sharing, and guidance on how and when parents should read to their children (1999). Researchers found that 66% of intervention parents read to their child at least 3 days per week, compared to 24% of control parents.

High et al.’s (2000) study randomly assigned multicultural families with children aged 5–11 months to an intervention and control group, with intervention families receiving children’s books, educational materials, and advice about how and when parent-directed reading should occur. While missing standard deviations excluded the paper from the meta-analysis, results demonstrated that intervention families read more with their children compared with control families (4.3 days per week and 3.8 days per week, respectively; $p = <0.001$). The test for overall effect was significant ($z = 5.45$, $p < 0.00001$). Assessed using the Inverse Variance procedure, statistical heterogeneity was low ($\chi^2 = 1.85$, $p = 0.40$, and $I^2$ of 0%).

**DISCUSSION AND REVIEW IMPLICATIONS**

Review findings are encouraging yet potentially mixed in how the evidence might be interpreted. In conducting a broad literature analysis according to specific systematic review methods, four studies clearly demonstrate that interventions aimed at mediating an increase in the amount of time parents spend reading interactively with their children do yield positive and highly effective results. Three of these studies provide solid evidence that pediatric primary care providers can deliver reading-promoting interventions to parents and children 4 years and under with significant results. The two studies led by High et al. (1998, 2000) and the one led by Golova et al. (1999) were rigorously designed investigations demonstrating that clinic-based healthcare providers are well positioned to deliver simple and inexpensive yet highly effective emergent literacy reading interventions aimed at increasing time parents spend reading interactively with children 4 years of age and under. Standardized mean differences in reading duration favoring the parent-mediated reading intervention over control suggest that the provision of reading materials along with support materials and encouragement from pediatricians has the potential to be an effective intervention. Although the 1998 study led by High did not include the secondary outcomes of expressive and receptive vocabulary, the remaining included studies found receptive vocabulary improvement in the parent-mediated intervention group (Golova et al., 1999; High et al., 1998, 2000).

At the same time, however, it could be argued that findings are limited. Few studies were included in our review, all of which originated
in the United States. Furthermore, a single researcher acted as principal investigator in two of the four review studies (High et al., 1998, 2000), and co-author on a third (Golova et al., 1999). These three study designs were also similar in that they were all conducted in urban community-based pediatric health centers serving low-income multiethnic populations. Cronan’s et al.’s. (1996) study also targeted a low-income multiethnic population recruited from a community-based school readiness program. Interventions for the three studies occurring in health centers were also similar in their use of a combination of reading materials, guidance, and instructional reading strategies. As such, it could be argued that the above represents a limited applicability of the evidence either to other health and home care settings, or to other public and private sector settings and agencies delivering early childhood programs emphasizing parent-mediated reading.

Our findings agree with the significant qualitative and quantitative research base, which demonstrates the benefits of educating parents on proper reading techniques and provides useful models for practitioners charged with improving childhood literacy and school readiness (Huebner, 2000; Phillips et al., 2008; Rudd et al., 2008; Sénéchal, 2006). They also offer clear evidence that appropriately designed interventions can promote an increase in the amount of time parents spend reading with their preschoolers. Going forward, it would be beneficial if future studies examined intervention effects on the specific variable of change in reading duration for programs delivered to children aged 4 years and under. A key question for which we seek scientific understanding is the optimal amount of time required weekly to ensure emergent literacy learning is on track for achieving literacy and academic success. Given all of the investments in early childhood programs, knowing how much time is needed each week to make a critical difference is a fundamentally important question.

Finally, we urge those in the healthcare sector responsible for the well-being of young children, particularly those up to 4 years old, to include emergent literacy development as part of their overall treatment program. The research evidence is clear. The emergent stage of literacy acquisition and development is powerfully influential across the lifespan, but there are too many influencing factors preventing many parents from fostering adequate literacy levels for their children. Pediatric providers are well positioned to provide literacy-promoting programs that are easily implemented, low in cost, widely applicable to large populations, and ultimately significant in effectively achieving a healthy start for children’s scholastic experiences and outcomes, and general well-being.
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DECLARATION OF INTEREST

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