



# Reach Out and Read Implementation: A Scoping Review

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## ABSTRACT

**BACKGROUND:** Reach Out and Read (ROR) is an evidence-based literacy promotion intervention that leverages the near-universal access to children of primary care practices to promote optimal child development. While several studies document ROR's effectiveness, its implementation remains understudied.

**OBJECTIVE:** This scoping review examines the existing literature to better understand ROR implementation.

**DATA SOURCES:** PubMed, ERIC, Web of Science, Academic Search Premier, ProQuest Education Database, and CINAHL.

**STUDY SELECTION:** We included peer-reviewed English-language papers focusing on ROR in an ambulatory setting in North America.

**DATA EXTRACTION:** Extracted variables were informed by the Template for Intervention Description and Replication checklist and included publication year, title, author(s), clinic location, study design, study aim, ROR implementation, modifications, implementation assessment, barriers, facilitators, and outcomes.

**RESULTS:** Seventy-one papers were included, of which 43 were research articles. We identified substantial variation in ROR

implementation including differences in components delivered. A considerable number of research articles did not assess ROR implementation. The most common barriers to ROR implementation were at the system level (ie, financing and inadequate time). Modifications and enhancements to ROR are emerging; most address barriers at the clinician and family level.

**LIMITATIONS:** This review was limited to published English language papers focusing on ROR.

**CONCLUSIONS:** ROR implementation varies across studies, and many did not assess implementation. Consistent reporting and assessment of ROR implementation could create opportunities to better understand the mechanisms underlying ROR's effects and inform other early childhood interventions that seek to promote optimal development at the population level.

**KEYWORDS:** early childhood; literacy promotion; Reach Out and Read; scoping review

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## WHAT THIS SCOPING REVIEW Adds

This scoping review identifies variation in Reach Out and Read (ROR) implementation and how implementation is assessed. These findings highlight opportunities for more consistent description and assessment of the ROR model, which in turn may help amplify its impact.

## HOW TO USE THIS SCOPING REVIEW

To inform more robust evaluations of ROR and early childhood interventions

To conduct research with clear reporting of the description of intervention components

To inform policy solutions and advocacy efforts to address barriers to ROR implementation

EIGHTY PERCENT OF third-graders who live in poverty do not read at grade level.<sup>1</sup> Third-grade reading proficiency strongly predicts high school graduation, career readiness, and other markers of wellbeing.<sup>2</sup> The COVID-19 pandemic, with its far-reaching impacts on wellbeing, has intensified gaps in reading proficiency for children from low-income backgrounds<sup>3</sup> and amplified the need for early childhood interventions that can help address these inequities. Given their near-universal and regular contact with young children, primary care professionals have a unique opportunity to encourage language-rich routines like shared reading during early childhood that can support optimal development<sup>4–7</sup> and mitigate income-based gaps in school readiness and reading achievement.<sup>1,8,9</sup> In fact, the American Academy of Pediatrics identifies literacy promotion as “an essential component of pediatric primary care” and recommends that pediatricians encourage parents to read aloud to children from birth.<sup>10</sup>

Reach Out and Read (ROR) is an evidence-based primary care literacy promotion intervention that has been implemented at scale in the United States. All participating clinicians are required to complete the national center training. The ROR model as described in the national center training includes: 1) anticipatory guidance and modeling, 2) a new book, and 3) a literacy-rich environment.<sup>11</sup> Historically, ROR began at 6 months; it now begins at birth, but a children’s book is not an essential component before the 6-month visit. ROR serves over 4 million children across the United States annually, with about half of these children coming from low-income families.<sup>12</sup> ROR increases shared reading frequency, augments interest in reading, and improves child language outcomes.<sup>13–15</sup> Additionally, more recent work suggests ROR’s impact extends beyond reading, improving well-child visit attendance and parent-clinician relationships.<sup>16,17</sup> Collectively, this work evinces ROR’s unique role as a model literacy promotion intervention with the potential to promote optimal development and mitigate inequities in school readiness at the population level. However, to reach this potential, there is a critical need for research on the implementation of ROR and early childhood interventions more broadly, to advance beyond simply demonstrating mean differences in outcomes among exposed and unexposed groups.<sup>18</sup> Careful descriptions of intervention models and attention to how they are implemented could help move the field toward linking early childhood interventions like ROR to theories of change and illuminating the mechanisms that underlie impact.

Complex health interventions like ROR are defined as having multiple interacting components.<sup>19</sup> The complexity exists not simply because of reliance on multiple component parts but also because each of these parts may vary in the extent and ways different clinicians implement them across different contexts.<sup>20</sup> Given the widespread adoption of ROR, the importance of investigating its implementation is critical given that clinicians might understand and implement the intervention in different ways. In fact, qualitative work by King et al documented

differences in ROR implementation at different sites, with clinic culture identified as an important factor.<sup>21</sup> Further, some clinicians hold the misperception that ROR is a book giveaway program or that literacy promotion simply involves telling parents about the importance of reading aloud, which could diminish ROR’s effects.<sup>22</sup>

While several studies, including multiple reviews, document ROR’s effectiveness, there has been less attention on ROR implementation. To address this gap, we conducted a scoping review to better understand ROR implementation in ambulatory health care settings with children through 5 years of age and their families and to identify existing gaps in knowledge. We focused on 1) how ROR and its components were implemented, 2) how implementation was assessed, 3) barriers and facilitators to implementation, and 4) existing modifications and enhancements to the model, if applicable, since such work is emerging but has not been systematically characterized. Given ROR’s standing as a model literacy promotion intervention with extensive uptake and national reach, these findings may also inform future research on other early childhood interventions that aim to promote optimal development and reduce inequities at the population level.

## METHODS

We modified the Template for Intervention Description and Replication (TIDieR) and used it as organizing framework for this scoping review. TIDieR was developed by an international group of experts and stakeholders to enhance the completeness of reporting on interventions and has been widely used.<sup>23</sup> For this study, we combined “tailoring” and “modifications” into a single item “Modifications” and modified “planned” and “actual” implementation into “Assessment of ROR Implementation” and “Outcomes/Implementation.” We selected other elements of the framework based on their relevance to ROR implementation. We utilized the Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Review guidelines to report methods and results.<sup>24</sup>

## ELIGIBILITY CRITERIA

To ensure a comprehensive review, we included any peer-reviewed manuscript regardless of the study design. We also included reviews as well as commentaries to examine how thought leaders in the field described ROR. We included studies that: focused on ROR, implemented ROR in an ambulatory health care setting, took place in North America, and were published in English. We excluded articles when ROR was not the primary focus of the study along with newspaper articles, press releases, abstracts, and poster presentations. Papers were not excluded based on publication date.

## INFORMATION SOURCES

Articles were extracted from the following online databases: PubMed, ERIC, Web of Science, Academic

Search Premier, ProQuest Education Database, and CINAHL. Each database was searched on June 13, 2021.

## SEARCH

We developed a search strategy with the help of a medical research librarian for the PubMed database first. The developed strategy was adapted to all the online databases listed above. For the PubMed search, the following search terms were utilized: "Reach Out and Read"; ("Pediatrics\*" OR "Pediatricians" OR "pediatric office" OR "pediatric clinic" OR "primary health care" OR "primary care\*") OR ("Latino\*" OR "Spanish" OR "Hispanic" OR "Hispanic American\*" OR "multilingual" OR "multilingualism" OR "bilingual\*" OR "language\*") OR ("community\*" OR "family\*" OR "families" or "communities") OR ("reading" OR "book\*" OR "health literacy" OR "literacy" OR "read\*") AND ("reach out and read"); and ("early intervention\*" OR "intervention\*" OR "language development" OR "education\*" or "language\*") OR ("child\*" OR "children" OR "child development" or "adolescence\*") OR ("literacy promotion\*" OR "literacy method\*") OR ("low-income\*" OR "low income\*" OR "poverty\*" OR "income\*") AND ("reach out and read").

Supplemental Table 1 lists the complete search strategies used for the remaining databases. We did not register our protocol. We identified 3331 total papers and imported them into EndNote. After duplicates were removed, automatically and then manually, 812 papers remained. Upon reviewing references of the 812 remaining papers, 18 additional papers were identified, and 830 papers remained in total.

## SELECTION OF SOURCES OF EVIDENCE

The screening was completed in a 2-step process to determine article eligibility. In the first round, 2 reviewers, N.U. and M.R., independently reviewed the nonduplicate titles and abstracts for the 812 papers and 18 additional papers against the eligibility criteria. In the case of a title for which an abstract was not available, the article was included for subsequent review of the full article. Any disagreement between the reviewers was resolved through discussion and if needed was decided by a third independent reviewer (M.J., J.H., or K.D.). Upon completion of the first round of screening, 140 articles remained for which full-text articles were obtained. In the second round of review, the full-text articles were independently reviewed by 2 reviewers (N.U., M.R.). Papers were included if they met the criteria discussed above and any disputes were resolved through discussion. In the case a resolution could not be reached, a third independent reviewer was consulted (M.J., J.H., or K.D.). Upon reviewing the full texts for eligibility, 71 articles met criteria for inclusion in this review (Fig. 1).

## DATA CHARTING PROCESS

We developed a data extraction form informed by the study objectives and TIDieR as described above<sup>24</sup>

(Table 1). The extraction form included detailed definitions and examples. The extractors were trained and then pilot tested the form prior to its use. One third of the total articles were reviewed by 2 reviewers concurrently (N.U., M.R.) and then discussed to establish a reliability in data extraction. Once consistency was established the remaining two thirds of the articles were reviewed independently by each reviewer (N.U., M.R.) and then checked by the reviewer who did not initially extract the data (N.U., M.R.). We excluded studies at this stage that did not meet the eligibility criteria ( $n = 14$ ). The reviewers met regularly to ensure consistency and resolve any conflicts. Upon completion of the review, the remaining authors of this study (M.J., J.H., K.D.) each reviewed one third of the articles for accuracy. All articles were reviewed by at least 3 authors. The study team then met to discuss the final data in the extraction table and finalize the article type and design classification for research articles. No additional data were sought from the investigators of the included studies.

## DATA ITEMS

Data abstracted from each research paper included: publication year, title, author(s), clinic location, study design (adapted from the Grimes and Schulz<sup>62</sup>) criteria with the addition of categories for qualitative studies and health care improvement (defined as any systematic effort intended to raise the quality, safety, and value of health care services<sup>63</sup>), study aim (why), how ROR was implemented (materials & procedures), modifications, assessment of ROR implementation, barriers, facilitators, and outcomes (implementation and impact). For review and commentary articles, we captured publication year, title, author(s), and ROR model described.

## SYNTHESIS OF RESULTS

We categorized all abstracted data in 2 tables: 1) research articles and 2) commentaries and review articles (Tables 1 and 2, respectively). We conducted descriptive analyses on variables of interest and summarized data in narrative form organized by our research questions: ROR implementation and assessment of implementation, barriers and facilitators, and emerging modifications and enhancements.

## RESULTS

Of the 71 included articles, 2 were published from the period of 1991–1996 (2/71, 3%), 14 were published from 1997 to 2002 (14/71, 20%), 12 were published from 2003 to 2008 (12/71, 17%), 14 were published from 2009 to 2014 (14/71, 20%), and 29 were published from 2015 to 2021 (29/71, 41%) (Fig. 2). Forty-three articles were classified as research articles (43/71, 61%), which are the primary focus of this review to allow for a careful examination of ROR implementation (Table 1). The remaining 28 articles were reviews and commentaries (Table 2).

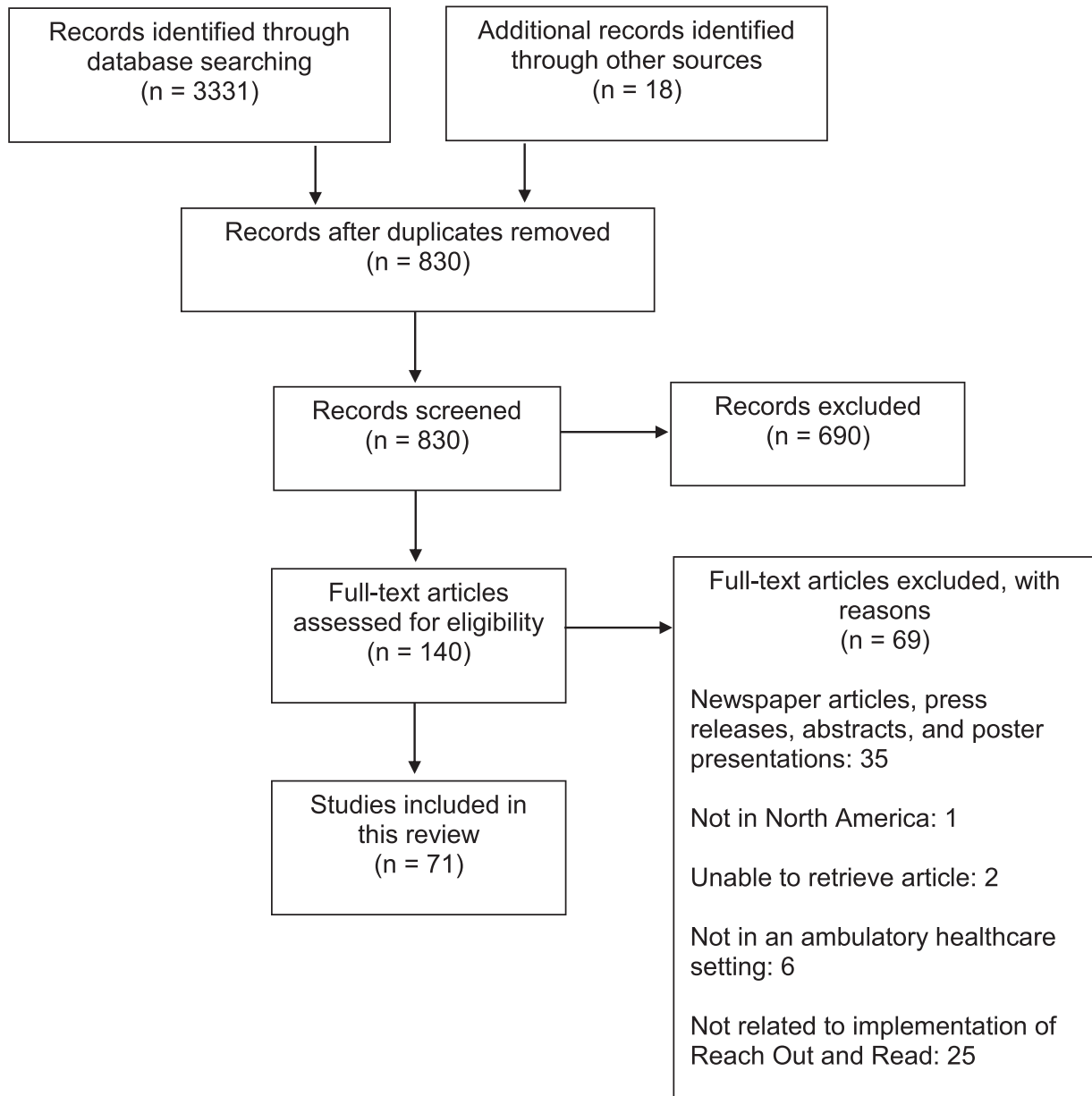


Figure 1. Flow diagram.

The 43 research articles employed diverse study designs. Among these articles, 35 used study designs consistent with the categories described by Grimes and Schulz: randomized controlled trial (RCT) (5/43, 12%), non-RCT (6/43, 14%), descriptive (10/43, 23%), cohort (2/43, 5%), and cross-sectional (12/43, 28%). The other articles used qualitative (5/43, 12%) or health care improvement designs (3/43, 7%). While one research article examined clinic-level data (1/43, 2%),<sup>48</sup> the remaining 42 research articles studied parents/caregivers and/or health care professionals.

#### ROR IMPLEMENTATION AND ASSESSMENT

The research articles varied both in how ROR was implemented and how implementation was assessed. Among the 35 research articles that examined ROR using RCT, non-RCT, descriptive, cohort, and cross-sectional

designs, 27 (27/35, 77%) articles described ROR implementation (Table 1). Of these 27 articles, all 27 (100%) reported a clinician providing anticipatory guidance, 26 (26/27, 96%) reported distributing children's books, and 15 (15/27, 56%) reported having a literacy-rich waiting room (eg, presence of volunteers or children's books). Fifteen articles (15/27, 56%) reported having all 3 of these components. Of note, one article<sup>49</sup> (1/27) focused only on anticipatory guidance. Only 8 (8/27, 30%) articles mentioned modeling reading. Twenty-five articles (25/35, 71%) assessed to what extent ROR components were implemented. The most common approach to assessing implementation was caregiver report.

All 3 health care improvement projects aimed to improve anticipatory guidance and book distribution and one of the projects also aimed to improve documentation of these activities. The qualitative studies focused on

**Table 1.** Reach Out and Read (ROR) Research Articles

Year	Title	Author(s)	Clinic Location	Study Design	Study Aim (Why)	How ROR Was Implemented (Materials & Procedures)	Modifications	Assessment of ROR Implementation	Barriers	Facilitators	Outcomes	
											Implementation	Impact
1991	Clinic-based intervention to promote literacy. A pilot study <sup>25</sup>	Needlman, R., Fried, L. E., Morley, D.S., et al.	Not reported	Descriptive	To assess parental response to a clinic-based literacy program designed to encourage early book use among parents of children at risk	1. Volunteers reading aloud in waiting room 2. Counseling by pediatrician about literacy development 3. Book distribution of ethnically and developmentally appropriate books for 6 months to 6 years	Not reported	Caregiver report	Not reported	Not reported	- 38% reported seeing volunteer reader in waiting room, 27% talked with pediatrician about literacy guidance, and 46% had been given book(s) by pediatrician - 6% reported exposure to all 3 components of the program	- Receiving a book was associated with reporting literacy orientation (odds ratio [OR], 4.05; $P = .028$ ; 95% confidence interval [CI], 1.12–14.6) - Among parents receiving Aid to Families with Dependent Children, 64% receiving books reported literacy orientation compared with 19% of those not given books ( $P = .011$ )
1998	Evaluation of a clinic-based program to promote book sharing and bedtime routines among low-income urban families with young children <sup>26</sup>	High, P., Hopmann, M., LaGasse, L., et al.	Urban	Cross-sectional	To evaluate a program of anticipatory guidance in which pediatric residents and nurse practitioners in a continuity practice gave parents books for their young children along with developmentally appropriate educational materials describing why and how to share the books and promoting reading as part of a bedtime routine	1. Children given developmentally appropriate book 2. Providers talked to parents about how to read with their child and gave parents a pamphlet with information	Clinic gave out educational materials with books (included age-appropriate advice about shared reading)	Caregiver report	Not reported	Not reported	Parents in group 2 reported receiving more anticipatory guidance on how to share books with their child than parents in group 1 ( $P < .001$ )	- 8% of control parents and 21% of intervention parents said one of their child's 3 favorite activities included reading ( $P = .04$ ) - 22% of control parents and 42% of intervention parents said one of their 3 favorite activities with their child was book sharing ( $P = .01$ ) - 20% of the control parents and 35% of intervention parents said that they share books 6 or 7 times a week at bedtime ( $P = .05$ ) - 33% of the parents in control (group 1) and 69% of the parents in intervention (group 2) ( $P < .001$ ) demonstrated positive child-centered literacy orientation (CCLO) - CCLO is more likely to be present in intervention families (OR = 4.7) - Book sharing as part of a bedtime routine was more frequent in intervention (mean $\pm$ SD, 3.9 $\pm$ 2.6 nights per week) than in control (mean $\pm$ SD, 2.5 $\pm$ 2.7 nights per week; $P = .002$ )
1999	Literacy promotion for Hispanic families in a primary care setting: a randomized, controlled trial <sup>27</sup>	Golova, N., Alario, A.J., Vivier, P.M., Rodriguez, M., and High, P.C.	Urban	Nonrandomized controlled trial	To evaluate the effectiveness of a simple, inexpensive, and culturally appropriate literacy-promoting intervention delivered by community-based pediatric primary care providers	1. Pediatricians gave child an age-appropriate bilingual board book 2. Pediatricians gave parent literacy-related anticipatory guidance	Single page guidance handouts given to parents with the book. It included benefits of reading to young children, written at 5th-grade reading level with one side English and one side Spanish	Caregiver report	Not reported	- Books were colorful and attractive - Both the books and the handouts were bilingual - Intervention was repetitive, taking place on 3 separate and consecutive occasions - Intervention delivered when the child was very young and thus parents may be more receptive to advice	14% of parents in the intervention group reported that their pediatrician had not discussed reading books with their child at their last visit	- Intervention parents were more likely to read books with their child at least 3 days/week (intervention 66% vs control parents 24%) - Intervention parents were more likely to report that reading books was one of their 3 most favorite things to do with their child (intervention 43% vs controls 13%) - Intervention families also had a greater number of children's books and total books at home - Odds of parents reading to their child at least 3 days/week were 10 times greater in intervention families (OR 10.1, 95% CI, 4.0–25.6) compared with control families

(Continued)



Table 1. (Continued)

Year	Title	Author(s)	Clinic Location	Study Design	Study Aim (Why)	How ROR Was Implemented (Materials & Procedures)	Modifications	Assessment of ROR Implementation	Barriers	Facilitators	Implementation	Outcomes Impact
2000	Literacy promotion in primary care pediatricians: can we make a difference? <sup>16</sup>	Jones, V.F., Franco, S.M., Metcalf, S.C., Popp, R., Staggs, S., and Thomas, A.E.	Urban	Nonrandomized controlled trial	To evaluate the effects of a literacy-promoting intervention delivered by pediatric providers as part of well-child care on parent attitudes and behaviors and on child language	1. Pediatricians gave child an age-appropriate board book 2. Pediatricians gave parent literacy-related anticipatory guidance	Single page guidance handouts given to parents with the book. It included benefits of reading to young children, written at 3rd-grade reading level with one side English and one side Spanish	Caregiver report	Not reported	- Books were selected to appeal to parents and children with colorful pictures, and simple language - Sturdy board books with interactive components for parent-child interaction - Education materials written at a third grade reading level and bulletted, making it clear and easy to read - Pediatricians' guidance reinforced handouts - Intervention was repetitive, taking place on 3 separate and consecutive occasions	- 59 intervention arm parents (77%) reported their pediatrician had discussed reading books with their child at their most recent clinic visit compared to 28 parents in the control group (37%) - Both receptive and expressive vocabulary scores were higher in older ROR toddlers (18-25 months old; n = 88), but there was no significant difference in younger ROR toddlers (13-17 months old; n = 62)	- 40% increase in Child-Centered Literacy Orientation among intervention families compared with 16% among controls - Intervention families read 4.3 days with their children per week vs 3.8 for non-ROR families
2000	The value of book distribution in a clinic-based literacy intervention program <sup>17</sup>	Jones, V.F., Franco, S.M., Metcalf, S.C., Popp, R., Staggs, S., and Thomas, A.E.	Not reported	Nonrandomized controlled trial	To determine whether anticipatory guidance at well-child visits (WCV) that included discussion of early literacy development and the provision of books by the examining physician changed family literacy orientation and improved the communication between the physician and the parent compared to anticipatory guidance alone	1. Anticipatory guidance from physician for 2 years during WCV at the end of guidance session (treatment group only) 2. Sporadically, families in waiting room observed volunteers modeling book reading/sharing 3. Health care provider (HCP) training on the promotion of early literacy development throughout the study period 3. Book cabinet with low-cost books families could buy	Caregiver report	- Lack of standardization in presentation of literacy guidance	- Providing book right after delivering guidance reinforced the concept of book sharing - In 94% of the sessions, the clinician discussed book sharing - Demonstration of reading by physician reinforced how to partake in shared reading	- 1263 anticipatory guidance sessions provided - 94% of the sessions, the clinician discussed book sharing - Physician's rating of parental receptiveness was also higher in the treatment group than control (only book distribution) ( $P < .05$ ) - Physician's rating of parental receptiveness was also higher in the treatment group than control group ( $P < .05$ ) - 2 years after enrollment, mother-child pairs who received guidance and a book were 2x more likely to report enjoyment in reading together than controls who received guidance but no book	- Parental ratings on physician helpfulness were higher in the treatment group (anticipatory guidance and book distribution) than control (only book distribution) ( $P < .05$ ) - Physician's rating of parental receptiveness was also higher in the treatment group than control group ( $P < .05$ ) - 2 years after enrollment, mother-child pairs who received guidance and a book were 2x more likely to report enjoyment in reading together than controls who received guidance but no book	

(Continued)

Table 1. (Continued)

Year	Title	Author(s)	Clinic Location	Study Design	Study Aim (Why)	How ROR Was Implemented (Materials & Procedures)	Modifications	Assessment of ROR Implementation	Barriers	Facilitators	Implementation	Outcomes Impact
2000	Prescribing books for immigrant children - a pilot study to promote emergent literacy among the children of Hispanic immigrants <sup>30</sup>	Sanders, L. M., Gershon, T. D., Huffman, L. C., and Mendoza, F. S.	Not reported	Descriptive	To describe factors associated with the home book-sharing routines of first-generation immigrant families (predominantly from Mexico) and the effect of a bilingual ROR program on Hispanic immigrant families	1. Pediatric residents educated about "dialogic reading" through 1-hour didactic session and 30 minutes interactive session with introduction of the program positive verbal message about dialogic reading to family at each WCV from 2 months to 5 years 2. Pediatric residents gave a book to each at each WCV from 2 months to 5 years 3. Volunteers demonstrate reading and book sharing with groups of children in the waiting room	1. Residents give parents a signed prescription to read 10 minutes every day with their child 2. ROR delivered to children from 2 months old	Caregiver report	- Barriers to acculturation including fear of legal and economic discrimination for Mexican immigrant families - Includes limitations to access to public libraries, early childhood education, and other public programs that promote early literacy - Baseline rates of parent child book sharing - Language and literacy barriers to opportunities for children of immigrant families	- 54% of parents reported their children received books from physician and 46% reported that children received no books from the pediatrician - Of those receiving books, 72% received 1, 23% received 2, and 5% received 3 books	- Parents exposed to even one encounter of receiving a book from the physician were more likely to report higher frequency of sharing books at home with their child compared with parents not exposed to the program - Book sharing was reported more frequently among parents whose children had received books (OR: 3.62 (95% CI, 1.40–9.37; $P < .05$ ) - Book sharing was associated with parents reading frequently to themselves (OR = 9.52; 95% CI, 2.09–43.27; $P < .05$ ) and national origin outside Mexico (OR = 5.54; 95% CI, 1.59–19.27; $P < .05$ )	
2001	The impact of a clinic-based literacy intervention on language development in inner-city preschool children <sup>31</sup>	Mendelsohn, A. L., Mogilner, L. N., Dreyer, B. P., Forman, J. A. et al.	Not reported	Cross-sectional	To determine the effect of ROR on the language development of preschool children	1. In waiting room: volunteer staff members modeled reading with kids and discussed importance of reading with parents 2. Pediatricians discussed importance and fun of reading with parents 3. Pediatricians gave developmentally appropriate books to families at each AAP recommended WCV	1. In waiting room: volunteer staff members modeled reading with kids and discussed importance of reading with parents 2. Pediatricians discussed importance and fun of reading with parents 3. Pediatricians gave developmentally appropriate books to families at each AAP recommended WCV	Caregiver report	Not reported	Not reported	- Intervention families received a mean of 4.0 books ( $t = 7.2$ ; $P < .001$ ) - Intervention families said doctor discussed reading with them 3.0 times ( $t = 2.3$ ; $P = .03$ ) - Mean total literacy promotion events was 13.1 ( $t = 8.3$ ; $P < .001$ )	Families exposed to ROR for a longer period participated in shared reading more often, and children in these families had higher receptive/expressive language scores
2002	Exposure to Reach Out and Read and vocabulary outcomes in inner-city preschoolers <sup>13</sup>	Sharif, I., Rieber, S., Ozuah, P. O. and Rieber, S	Not reported	Cross-sectional	To examine the association between ROR and vocabulary outcomes and standardized measures of home reading activities	1. Providers counseled parents about reading to children 2. Providers delivered age-appropriate book at head health maintenance visit 3. Sporadic volunteer readers at site	Not reported	Not reported	Not reported	N/A	- Exposed children scored higher on receptive vocabulary (Standard scores: 81.5 vs 74.3; $P = .005$ ) - no difference in expressive vocabulary - They also scored higher on both the Home Literacy Orientation scale (4.3 vs 3.3; $P = .002$ ) and the STIMQ-READ (12.6 vs 1.0; $P = .056$ )	

(Continued)

**Table 1. (Continued)**

Year	Title	Author(s)	Clinic Location	Study Design	Study Aim (Why)	How ROR Was Implemented (Materials & Procedures)	Modifications	Assessment of ROR Implementation	Barriers	Facilitators	Implementation	Outcomes Impact
2002	An English-language clinic-based literacy program is effective for a multilingual population <sup>5</sup>	Silverstein, M., Iverson, L., and Lozano, P.	Urban	Cross-sectional	To determine how language and culture modify the effect of a Reach Out and Read-based intervention for a multilingual/multicultural population	1. Waiting room volunteers modeling age-appropriate reading in English 2. During health supervision visits, families were given age-appropriate literacy counseling by their primary provider as part of anticipatory guidance 3. At the end of the visit, the child was given an unused, age-appropriate book in English	Not reported	Not reported	Not reported	Not reported	N/A	- Intervention respondents were more likely to report reading as a favorite activity for the child (10% vs 25%) and parent (18% vs 40%), to read to their child before bed at least weekly (45% vs 71%), and to possess over 10 children's books at home (49% vs 63%) - Among English-speaking families, weekly bedtime reading increased (63%—93%, $P = .003$ ), reading as child's favorite activity increased (7% vs 30%, $P = .02$ ), and reading as the parent's favorite activity to do with child increased (33% vs 58%, $P = .05$ ) - Among non-English-speaking families weekly bedtime reading increased (36% vs 56%, $P = .04$ ), reading as the parent's favorite activity increased (11% vs 27%, $P = .03$ ), and the number of families to possess >10 children's books in the home increased (31% vs 49%, $P = .05$ )
2003	The impact of early literacy guidance on language skills of 3-year-olds <sup>14</sup>	Theriot, J. A.; Franco, S. M.; Sisson, B. A.; Metcalf, S. C.; Kennedy, M. A., and Bada, H. S.	Not reported	Descriptive	To determine the effects of early literacy anticipatory guidance that included distribution of age-appropriate books during WCV that began at 2 months of age	1. Anticipatory guidance about early literacy given at WCV from 2 months old 2. At the end of visit, physician hands an age-appropriate book to the parent and gave suggestions for how, when, and where to share the book with their children 3. Parents observe interactive reading through volunteers in the waiting room	1. Books wrapped with paper with information on age-appropriate literacy development 2. Anticipatory guidance delivered from WCV at 2-month-old	Clinician documentation	Not reported	- Book wrap on each book with age-appropriate shared reading techniques and common behaviors based on the child's age to enhance consistency in guidance given as well as the parent's motivation to read to their child and the quality of their literacy interaction	- Each child received an average of 5 books and an average of 6 anticipatory guidance experiences - Higher scores in EOWPVT-R were predicted by race, the number of visits, and books given x number of books purchased ( $P = .0009$ ) - All families reported reading together	- Intervention respondents were more likely to report reading as a favorite activity for the child (10% vs 25%) and parent (18% vs 40%), to read to their child before bed at least weekly (45% vs 71%), and to possess over 10 children's books at home (49% vs 63%) - Among English-speaking families, weekly bedtime reading increased (63%—93%, $P = .003$ ), reading as child's favorite activity increased (7% vs 30%, $P = .02$ ), and reading as the parent's favorite activity to do with child increased (33% vs 58%, $P = .05$ ) - Among non-English-speaking families weekly bedtime reading increased (36% vs 56%, $P = .04$ ), reading as the parent's favorite activity increased (11% vs 27%, $P = .03$ ), and the number of families to possess >10 children's books in the home increased (31% vs 49%, $P = .05$ )
2004	More evidence for Reach Out and Read: a home-based study <sup>22</sup>	Weitzman, C. C., Roy, L., Wallis, T., and Tomlin, R.	Not reported	Cross-sectional	To determine the relationship between the frequency of ROR encounters that a family receives during WCV and a child's home literacy profile	Not reported	Not reported	1. Resident documentation 2. Caregiver report 3. Direct observation of ROR books in the home by researcher	Not reported	Not reported	- Ranges of 0–6 ROR encounters, with most children receiving 3 encounters - Authors reported discrepancies between parent sources of reporting	- Increased ROR encounters contributed portion of the variance explaining a child's home literacy profile (5%), with this model accounting for a total of 19% of the variance (3 variables – parent education ( $P < .05$ ), HOME score ( $P < .05$ ), and number of ROR encounters ( $P = .005$ ) – each predicted a significant portion of the variance)

(Continued)



Table 1. (Continued)

Year	Title	Author(s)	Clinic Location	Study Design	Study Aim (Why)	How ROR Was Implemented (Materials & Procedures)	Modifications	Assessment of ROR Implementation	Barriers	Facilitators	Implementation	Outcomes Impact
2004	The effect of a literacy training program on family medicine residents <sup>33</sup>	Rosenthal, M. S., Werner, M. J., and Dubin, N. H.	Not reported	Descriptive	To determine whether introducing ROR and intervention improves family medicine residents' literacy knowledge, attitudes, and practices	1. Volunteers in the clinic waiting rooms reading to children 2. Residents and attending physicians receive training in ROR about adult and child literacy. Deliver anticipatory guidance to parents 3. Developmentally appropriate book distribution	Bookmarks throughout the clinic with the name and address of a free, local adult literacy organization 2. Including adult literacy guidance in ROR implementation 3. Residents trained in both child and adult literacy and encouraged to give book-marks to parents	Resident report	- Barriers to literacy assessment and counseling in children for resident: time and knowledge	Not reported	Greater proportion of residents reported usually or always asking about literacy milestones (30.2% vs 79.2%, $P < .001$ ) and parent-child reading (65.2% vs 97.8%, $P < .001$ ) during WCV	- Literacy knowledge mean scores for clinicians trained increased from 74.5% to 83.1% ( $P < .001$ ) - Residents reported a greater sense of comfort in counseling about childhood and adult literacy ( $P < .001$ )
2005	Effectiveness of a primary care intervention to support reading aloud: a multicenter evaluation <sup>34</sup>	Needham, R., Toker, K. H., Dreyer, B. P., Klass, P. and Mendelsohn, A. L.	Urban, Suburban, Rural	Cross-sectional	To determine whether implementation of ROR is associated with increased reading aloud in a national sample	1. All sites provided new, free picture books at health supervision visits from 6 months up to the sixth birthday 2. Individualized guidance from the clinicians 3. Availability of waiting room readers varied	Some sites distributed 1. Site leader report of 16 books to siblings 2. Caregiver report (16 of 19 study sites)	Not reported	Not reported	Not reported	Site leader report: - All the sites provided physician counseling and distribution of children's books - 6 sites reported at least sometimes running out of books Caregiver report: - 70.1% of parents reported receiving books at any previous visit	ROR exposure associated with reading aloud as a favorite activity (AOR 1.6, $P < .001$ ), reading as an activity to help child be successful in 1st grade, reading aloud at bedtime (AOR 1.5, $P < .001$ ), ever reading aloud, reading aloud 3 or more days a week (AOR 1.8, $P < .001$ ), and ownership of 10 or more books (AOR 1.6, $P < .001$ )
2008	The good habit of reading (El Buen Habito de la Lectura): parental reactions to an enhanced Reach Out and Read program in a clinic for the underserved <sup>35</sup>	Byington, C. L., Hobson, W. L., Olson, L., Torres-Nielsen, G., Winter, K., Ortiz, K. A., Buchi, K. F.	Not reported	Qualitative	To study parental reactions to a ROR program enhanced with a children's library in an urban clinic serving low-income immigrant families	Not applicable	1. Library was source of library card and other literacy resources 2. For Spanish-speaking families intervention delivered in Spanish first with bilingual books offered later 3. A library accessible to everyone in the clinic that is open every day and contains 3000–5000 children's books	Not reported	Not reported	- Availability of Spanish-language and bilingual reading materials and story time may have contributed to the families' perception that physicians respected their culture - Positive feelings engendered by the ROR program may influence families' willingness to accept advice on other subjects, strengthening the patient-clinician interaction	N/A	N/A

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Table 1. (Continued)

Year	Title	Author(s)	Clinic Location	Study Design	Study Aim (Why)	How ROR Was Implemented (Materials & Procedures)		Assessment of ROR Implementation	Barriers	Facilitators	Outcomes	
						Modifications	Not reported				Implementation	Impact
2008	Training pediatric residents in early literacy, attitudes, and practice <sup>6</sup>	Dabrow, S., Hazard, A., McFadden-Garden, T., Celano, M. and Melhado, T.	Not reported	Cohort	To determine whether training in emergent literacy-building techniques increases self-reported literacy-related knowledge, attitudes, and intervention with patients	Not reported	Resident report	<ul style="list-style-type: none"> <li>- Barriers for literacy assessment and anticipatory guidance: limited time knowledge</li> <li>- Reasons for not providing a book: forgetting, depleted supply of books, and other pressing clinical issues</li> </ul>	<ul style="list-style-type: none"> <li>- Residents who observed supervising physicians assess and discuss literacy with families had more literacy-facilitative attitudes</li> </ul>	<ul style="list-style-type: none"> <li>- Relative to 18 comparison subjects, 48 residents in the intervention group exhibited trends toward more frequent assessment of literacy milestones and more frequent literacy-related anticipatory guidance</li> <li>- Observation of modeling by a supervising physician was significantly related to an increased frequency of literacy-related assessment and anticipatory guidance</li> <li>- Literacy-facilitative attitudes were significantly correlated with frequency of literacy-related anticipatory guidance</li> <li>- Grand Rounds attendance was the only individual training activity significantly related to frequency of book distribution</li> <li>- Residents who attended the literacy-related Grand Rounds had a higher frequency of book distribution (<math>P &lt; .005</math>)</li> </ul>	<ul style="list-style-type: none"> <li>- Intervention and comparison residents did not significantly differ overall in knowledge or attitude gains</li> <li>- Reading literacy-related material was significantly associated with more positive literacy-related attitudes (<math>P &lt; .005</math>)</li> </ul>	

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**Table 1.** (Continued)

Year	Title	Author(s)	Clinic Location	Study Design	Study Aim (Why)	How ROR Was Implemented (Materials & Procedures)	Modifications	Assessment of ROR Implementation	Barriers	Facilitators	Implementation	Outcomes Impact
2009	Prescriptions to read: early literacy promotion outside the classroom <sup>37</sup>	Billings, E.S.	Not reported	Cross-sectional	To examine effect of ROR on parental literacy beliefs, frequency, and quality of literacy activities among low-income, multiracial families, particularly the Latino community and identify parents' perspectives on the impact of ROR participation, by exploring what ROR participants thought and had to say about the ROR program and its impact on them, their children, and their families	1. Pediatricians and nurses provide literacy guidance to parents during WCV 2. Waiting room with limited children's books 3. At the end of visit, doctor/nurse provided family with free book	Doctors give prescription to families to read for at least 10 minutes per day	1. Literacy-rich spaces: measured by observation 2. Book distribution: measured by caregiver report 3. Anticipatory guidance: measured by clinician report	- Families no longer using ROR book provided because their child was too old for picture books - Parents reported some of the books received were not useful to teach words - Parents reported wanting a greater variety of books - Bilingual Spanish/English parents indicated preference that children develop bilingual literacy skills, but bilingual book availability varied	- Parents identified numerous family members that read with their children - Books shared among siblings, promoting literacy throughout the family	- Volunteer readers not observed during researcher's time in the clinic - Free parenting magazines observed in the clinic but no other literacy-related information (eg, brochures observed) - ROR parents were more likely to report having children's books at home than non-ROR parents (ROR = 100%, non-ROR = 87%) - 16% of ROR parents said that ROR books were the only books in their home - Clinicians reported spending 1–3 minutes of the WCV implementing ROR elements - Clinician self-reports of literacy advice ranged from simple statements about the importance of reading to children to slightly more in-depth advice on how to approach reading with a child	- 14% of parents reported literacy and reading changes due to what they learned from the doctor at ROR - Mixed results about reading frequency - when given choices of ROR parents selected that they read to their child more than once a week, but a higher percentage of non-ROR parents selected reading almost every day - ROR parents were 4 times more likely than non-ROR parents to cite reading as an activity their child does when she is at home
2009	"El Alfabetismo Y Las Familias Latinas": a critical perspective on the literacy values and practices of Latino families with young children <sup>38</sup>	Billings, E.S.	Not reported	Cross-sectional	To identify the literacy values and practices of low-income caregivers of children participating in well-child visits	Not reported	Not reported	Not reported	- Lack of availability of native-language texts - Oral story telling was common however, these forms of literacy are often overlooked or even disregarded	- Extended families excellent for supporting literacy development in the home	- About 50% of ROR parents mentioned social communication and other oral language skills as important for a child who is entering kindergarten, whereas the majority of non-ROR parents focused on physical fine motor skills - Nearly 2x as many ROR parents identified knowing letters as an important skill - 58% of ROR parents and 42% of non-ROR parents said that someone reads to their child every day or almost every day	

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Table 1. (Continued)

Year	Title	Author(s)	Clinic Location	Study Design	Study Aim (Why)	How ROR Was Implemented (Materials & Procedures)		Modifications	Assessment of ROR Implementation	Barriers	Facilitators	Outcomes	
						Study Aim (Why)	Implementation					Implementation	Impact
2009	The role of clinic culture in implementation of primary care interventions: the case of Reach Out and Read <sup>21</sup>	King, T., Muzaffar, S., and George, M.	Not reported	Qualitative	To identify practice attributes associated with variability in ROR implementation and see what aspects of practice teams make for successful ROR implementation	Not applicable	Not reported	1. Regional Coalition Coordinator report and site observation scale 2. Program data	- Staff finding their jobs burdensome - Lack of communication and teamwork among staff	- Openness of staff communication - Staff willing to work as a team - Staff commitment to patients and communities	- Visits in which eligible children received books: Range 2% - 99% - Site observation score: Range 2.6- 3.8 (max score =4)	N/A	
2011	Improving early literacy promotion: a quality-improvement project for Reach Out and Read <sup>28</sup>	Khandekar, A. A., Augustyn, M., Sanders, L., Zuckerman, B.	Urban, Suburban	Health care improvement	To improve the rates of age-appropriate book-giving during well-childcare and the delivery of ROR-recommended anticipatory guidance in 6 pediatric clinics	1. Giving new books to children at each health supervision visit from the ages of 6 months to 5 years of age 2. Advice to parents about the importance of reading aloud	1. Training DVD with reading-related anticipatory guidance and strategies for using books as part of developmental surveillance and milestones based on Bright Futures recommendations 2. Keeping gently used books for siblings and sick visits 3. Targeted book placement and adding a checkbox for giving a book to the encounter serve as reminders to give anticipatory guidance	1. Book-inventory audits 2. Parent report 3. Clinician report	- Clinicians reported not having enough time to give anticipatory guidance - Difficulty remembering to give book	- Clinician integration of general developmental "milestones" into the content for age-specific visits - Having videos of providers modeling ROR for parents - Interested staff were more involved in the process, which led to a smoother workflow	- The median rate of book-giving increased from 97% to 99% - Anticipatory guidance remained at 89% - After OI, the providers that consistently (>75%) distributed books increased from 74% to 97% (P = .02) - Providers reported significant improvement in their self-efficacy for demonstrating reading aloud and using a children's book to assess development (P < .05)	N/A	

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Table 1. (Continued)

Year	Title	Author(s)	Clinic Location	Study Design	Study Aim (Why)	How ROR Was Implemented (Materials & Procedures)			Assessment of ROR Implementation	Barriers	Facilitators	Outcomes	
						Study Aim (Why)	Modifications	Caregiver report				Implementation	Impact
2012	Kindergarten readiness and performance of Latino children participating in Reach Out and Read <sup>10</sup>	Diener, M. L., Hobson-Rohrer, W., and Byington, C. L.	Not reported	Descriptive	To provide descriptive information at Kindergarten on Latino immigrant children's emergent literacy skills and home literacy environment, and correlations between ROR exposure and emergent literacy skills	<ol style="list-style-type: none"> <li>1. Anticipatory guidance about shared book reading provided by pediatricians during preventive visits</li> <li>2. Children receive a book at each well-child check between 62 months and 5 years</li> <li>3. Volunteers model effective shared book reading techniques</li> <li>3. Children receive books in Spanish initially, but subsequent books are bilingual</li> <li>4. The clinic also has a children's library staffed by bilingual librarian</li> </ol>	<ol style="list-style-type: none"> <li>1. All attendings and most resident physicians are bilingual and speak to parents in both English and Spanish</li> <li>2. Parents are taught the importance of looking at the book with their child, rather than reading it to accommodate low parent literacy</li> </ol>	Caregiver report	Not reported	Not reported	<ul style="list-style-type: none"> <li>- Higher ROR exposure associated with enhanced emergent literacy skills on child interview and initial sound fluency on validated measure during the summer before kindergarten</li> <li>- 80% reported that an adult read with the child <math>\geq 3</math> times per week; 67% reported owning <math>\geq 11</math> children's books</li> <li>- Teachers rated 77% of the ROR children as average or above relative to all other children at the same grade level</li> </ul>	<ul style="list-style-type: none"> <li>- Mean number of ROR books received (Range): 6 (0–9)</li> </ul>	
2014	The development and initial assessment of Reach Out and Read Plus Mathematics for use in primary care pediatrics <sup>41</sup>	Jones, V. F., Brown, E. T., Molfese, V., Ferguson, M. C., Jacobi-Vessels, J., Bertsch, C., Abraham, T., and Davis, D. W.	Not reported	Descriptive	To develop a parent-child activities-based mathematics learning program and test its acceptability and initial efficacy	<ol style="list-style-type: none"> <li>1. Resident physicians gave book to families with mathematical content and modeled reading the book to child out loud</li> <li>2. Parents were encouraged to read the book to their child</li> <li>3. Parents given a Parent Guide with additional activities to be used alongside book</li> </ol>	<ol style="list-style-type: none"> <li>1. Book Talk handout given to parent with information about how to incorporate mathematical concepts into the reading</li> <li>2. Developed mathematics activities for parents to do alongside the book</li> </ol>	Caregiver report	Not reported	Not reported	<ul style="list-style-type: none"> <li>- Majority of parents read the books and read them more than once (86.9%–89.6%) across the 3 follow-up weeks</li> <li>- Parents found the book talk information to be helpful (79.7%–83.6%)</li> <li>- Fewer parents reported having read the Parent Guide across each follow-up week (49.3%, 54.1%, and 64.6%) and even fewer parents reported doing the recommended activities with their children (36.1%–43.6%)</li> <li>- Parents reported increased reading activities related to each math topic following the intervention</li> <li>- The total math engagement score for reading improved significantly from preintervention to postintervention (<math>P &lt; .001</math>)</li> </ul>	N/A	

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Table 1. (Continued)

Year	Title	Author(s)	Clinic Location	Study Design	Study Aim (Why)	How ROR Was Implemented (Materials & Procedures)	Modifications	Assessment of ROR Implementation	Barriers	Facilitators	Implementation	Outcomes Impact
2015	Reach Out and Read is feasible and effective for adolescent mothers: a pilot study <sup>42</sup>	Kumar, M. M., Cowan, H. R., Erdman, L., Kaufman, M., and Hick, K. M.	Not reported	Randomized controlled trial	To evaluate the feasibility and effectiveness of ROR among adolescent mothers and their children	1. Clinician gives parent a children's book 2. Clinician provides guidance on shared reading techniques/benefits of shared reading 3. Volunteer student librarians modeled shared reading in the exam room, talked to mothers about reading techniques, libraries/iteracy groups, and signed child up for library card	1. Providing library card and literacy resources 2. HCP trained in customized anticipatory guidance for the developmental level of the adolescent mother	Not reported	Not reported	-Volunteers and motivation for volunteers (fulfillment of praction) cum) - Donations from community (library cards, books) lowered costs	N/A	-Intervention group mothers had increased odds of reporting that reading was one of their child's favorite activities (OR = 2.2) or one of their own favorite activities to do with their child (OR = 1.8) while control group mothers had decreased odds of these outcomes (OR = 0.2 and 0.3, respectively) - By study completion, intervention group mothers were less likely than controls to have a score above the cut-off on the Beck Depression Inventory-Revised (OR = 0.3)
2015	Factors associated with increased reading frequency in children exposed to Reach Out and Read <sup>43</sup>	Rikin, S., Giatt, K., Simpson, P., Cao, Y. M., Anene-Maidoh, O. and Willis, E.	Not reported	Descriptive	To determine if ROR is associated with reading frequency; and to examine associations between caregiver characteristics, attitudes, and practices and shared reading frequency	Not reported	Not reported	Caregiver report	Not reported	- Caregivers expressed positive attitudes and interest toward reading with their child	33.6% of caregivers never received a book, 28.1% received 1-3 books, and 38.3% having received ≥4 books	33.6% of caregivers receiving 4 or more books from pediatricians had a higher frequency of reading to children than caregivers receiving 0-3 books (5.07 vs 3.61, P < .001) and were more likely to read daily to children (OR 3.07; 95% CI, 1.80-5.23)
2016	Effectiveness of a clinic-based early literacy program in changing parent-child early literacy habits <sup>44</sup>	Fricke, J., Navasaria, D. and Mahony, K.	Not reported	Cross-sectional	To increase parent behaviors of early literacy in relation to ROR participation in Wisconsin clinics	Not reported	Not reported	Not reported	Not reported	Not reported	N/A	Parents were more likely to identify an age of <=6 months as an "appropriate age to begin reading" (OR = 1.58, 95% CI, 1.05 -2.38; P = .0285)
2016	Improving early childhood literacy and school readiness through Reach Out and Read (ROR) program <sup>45</sup>	Thakur, K., Sudhan, D. and Sigal, Y. and Mattarella, N.	Not reported	Health care improvement	To increase distribution of books at every WCV from 6 months to 5 years, improve the rate of counseling given by the resident physicians to the families by at least 75%, and train providers in giving good reading counsel to parents and explaining benefits of reading aloud to their children	1. Distributing books during well child visits from 6 months to 5 years of age 2. Primary care physician counseling on good reading habits with families	Not reported	Caregiver report	- Clinic staff had trouble remembering to place a book with the chart; residents had trouble remembering to talk about shared reading - Turnover in residents contributed to the decline in guidance given, suggesting lack of carryover/training/institutionalization	- Having the staff pick a book first before going to room the patient - Putting the books in a more accessible place to make the workflow easier - Charts and posters supporting reading in the examination rooms - Reminder from supervising faculty to talk about reading	- Rate of book distribution improved to 96% - After one QI cycle, families who received counseling improved from 26% to 94%; [however, after 3 months of the project, significant drop in parents receiving reading and literacy advice from resident physicians] - After 2 QI cycles, the percentage of families receiving counseling improved from 69% to 87% - After 3 QI cycles, families reading at least 20-30 minutes >4 days in a week increased from 56% to 80%	

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Table 1. (Continued)

Year	Title	Author(s)	Clinic Location	Study Design	Study Aim (Why)	How ROR Was Implemented (Materials & Procedures)	Modifications	Assessment of ROR Implementation	Barriers	Facilitators	Implementation	Outcomes Impact
2017	Improving adherence to Reach Out and Read: a benchmark intervention <sup>46</sup>	Obus, E.A., Brito, N.H., Sanlorenzo, L., Rea, C., Engelhardt, L., and Noble, K.G.	Not reported	Nonrandomized controlled trial	To examine the effects of adding extra training and bookmarks to ROR	"Standard ROR" clinics distributed age-appropriate books to children during routine well child visits	1. Bookmarks in English and Spanish given to families based on child's age with simple steps for engaging children in reading activities and encouraging literacy across development 2. Training session for clinicians about the components of ROR, its evidence base, and how to administer developmentally appropriate guidance to support families' literacy efforts	1. Clinician report 2. Caregiver report	- Clinicians not having enough time for implementation at WCV	Not reported	Following the intervention, caregivers in the intervention group reported receiving more books from their pediatrician ( $P = .01$ ) and receiving more reading advice on how to read with their child ( $P < .01$ )	Following the intervention, caregivers in the intervention group reported more frequent trips to the library ( $P = .01$ )
2017	Improving the Reach Out and Read program at a student-run free clinic for homeless women and children <sup>47</sup>	Kindratt, T.B., Pagels, P., Salinas, H., Chung, K., and Moehlman, M.	Not reported	Health care improvement	To improve documentation of book delivery and provision of anticipatory guidance in electronic health records and determine changes in student managers' knowledge, attitudes, and practices toward pediatric literacy	1. Children's book delivery 2. Anticipatory guidance	Not reported	Medical record documentation	Not reported	Not reported	-Documentation of book delivery increased (13%–78%) after training ( $P < .0001$ ) -After didactic training, 67% of student managers reported consistently modeling reading aloud or asking the parents to demonstrate shared reading	Student managers' knowledge score increased after didactic training ( $P = .0201$ )
2018	Implementation of Reach Out and Read by health departments increases rural access <sup>48</sup>	Caldwell, A., Cooper, M. T., and Dunlap, M.	Not reported	Descriptive	To evaluate how implementation of ROR in health departments affects access for at-risk children	1. Health department staff specially trained to provide the age-appropriate books 2. Health department staff provide literacy-based anticipatory guidance	ROR delivered in health departments	Not reported	Not reported	Not reported	Not reported	- Health department sites were more likely to be in rural areas: 13 of 18 sites versus 16 of 67 practices ( $P < .001$ ) - They were less likely to be in areas of high poverty: 10 of 18 versus 61 of 67 practices ( $P < .001$ )

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Table 1. (Continued)

Year	Title	Author(s)	Clinic Location	Study Design	Study Aim (Why)	How ROR Was Implemented (Materials & Procedures)	Modifications	Assessment of ROR Implementation	Barriers	Facilitators	Implementation	Outcomes Impact
2018	Literacy promotion strategies within Reach Out and Read: an exploratory study <sup>49</sup>	Needlman, R., Lone, Z., Chae, R., Abdullah, N.	Not reported	Nonrandomized controlled trial	To explore different literacy-related clinician guidance strategies in 2 cohorts of children aged 6 months to 6 years presenting for routine care	Cohort 1: Clinicians were instructed to provide literacy-related guidance based on standard ROR Cohort 2: Clinicians were instructed to provide literacy-related guidance based on an observation feedback protocol that included the following elements: 1) elicit parental concerns; 2) ask the parent to "look at a book with your child, like you would at home," to observe the child's response; 3) observe for 30–60 seconds; 4) give strength-based feedback.	Observation-feedback protocol for literacy related guidance	Video recording of clinician encounter	Not reported	Not reported	-LP took longer when giving feedback after observation of parent-child reading (138 ± 66 seconds vs 73 ± 50, $P < .001$ ) - Clinicians in Cohort 2 used observation-feedback more often (in 86% of visits vs 21% of visits; $P < .001$ ) and spent more time on literacy-related guidance (139 vs 73 seconds, $P < .001$ )	- Parents were more likely to recall having learned about reading aloud (48% vs 8%, $P < .001$ ), even after controlling for time spent - More parents in feedback cohort reported uncertainty about their reading aloud skills (73% vs 22%, $P < .002$ ) and a desire to learn more about reading aloud (100% vs 17%, $P < .001$ )
2019	Evaluation of a language and literacy enhancement program <sup>50</sup>	Yaun, J., Bach, M., Bekke, J., Goedecke, P. J., Baldwin, K. M., and Hare, M.	Not reported	Descriptive	To examine effect of combining ROR with the Touch, Talk, Read, Play intervention at well-childcare visits of children 12–30 months of age	Not reported	Parents received Touch, Talk, Read, Play intervention in addition to ROR	Caregiver report	Not reported	Not reported	96% preintervention and 97% postintervention reported having received books through ROR	96% preintervention and 97% postintervention reported having received books frequently to one's child (P = .007) and Ages and Stages-specific score (P = .052) after Touch, Talk, Read, Play
2019	Attendance at well-child visits after reach out and read <sup>16</sup>	Needlman, R. D., Dreyer, B. P., Klass, P., and Mendelsohn, A. L.	Not reported	Cross-sectional	To examine whether adding ROR to pediatric practices would be associated with increased parent reported WCV attendance	1. Anticipatory guidance 2. Developmentally and culturally appropriate books 3. Volunteer readers	Not reported	Not reported	Not reported	Not reported	N/A	The mean number of reported WCV was significantly higher after ROR implementation versus before (3.0 ± standard deviation 2.0 vs 2.50 ± 2.3, respectively, $P = .009$ )

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Table 1. (Continued)

Year	Title	Author(s)	Clinic Location	Study Design	Study Aim (Why)	How ROR Was Implemented (Materials & Procedures)			Assessment of ROR Implementation	Barriers	Facilitators	Outcomes	
						Study Aim (Why)	Modifications	Assessment of ROR Implementation				Implementation	Impact
2019	Evaluating the effect of Reach Out and Read on clinic values, attitudes, and knowledge <sup>17</sup>	Burton, H., Navsaria, D.	Rural, Urban, Suburban	Qualitative	To examine 1) clinic values and knowledge relating to early childhood literacy affected by Reach Out and Read implementation; 2) how providers and clinic staff feel that the program has changed their clinic environment; 3) barriers to implementation in clinics	Not applicable	Not reported	Not reported	- Time commitments for providers, extra work, and remembering to give the family the book - Majority of participants cited funding as the primary program disadvantage - Logistics, such as stocking books in multiple languages - Fitting in resident training in schedules	Not reported	N/A	N/A	
2019	Shared reading practices and early literacy promotion in the first year of life <sup>31</sup>	Sinclair, E. M., McCleery, E. J., Koepsell, L., Zuckerman, K. E., and Stevenson, E. B.	Urban	Nonrandomized controlled trial	To determine whether early book distribution at 2 weeks compared to standard ROR book distribution at 6 months contributes to shared reading with infants	1. Book distribution by provider Standard group families received developmentally/culturally appropriate books in English or Spanish at 6 months, 9 months, and 12 months - Early Books group fam-3. Residents and families received developmentally/culturally appropriate books in English or Spanish at 2 weeks, 2 months, 4 months, 6 months, 9 months, and 12 months 2. Anticipatory guidance by provider	Not reported	1. Book distribution started at birth 2. Developed content for counseling at the 2-week, 2-month, and 4-month well-care visits and provided teaching sessions 3. Residents and families received developmentally/culturally appropriate books in English or Spanish at 2 weeks, 2 months, 4 months, 6 months, 9 months, and 12 months 4. Reminder to provide ROR in clinic note templates	Not reported	Not reported	Provider survey (27 pediatric residents & 6 pediatric faculty): 82.35% reported usually or always counseling families of infants >6 months	No statistically significant difference between Early Books group and Standard group	

(Continued)

Table 1. (Continued)

Year	Title	Author(s)	Clinic Location	Study Design	Study Aim (Why)	How ROR Was Implemented (Materials & Procedures)	Modifications	Assessment of ROR Implementation	Barriers	Facilitators	Implementation	Outcomes Impact
2020	Effects of early literacy promotion on child language development and home reading environment: a randomized controlled trial <sup>32</sup>	Guevara, J. P., Erko-Urbani, D., Gardes, M., Winston, S., Sands, D., Rogers, K., Haecher, T., Jimenez, M. E., and Mendelsohn, A. L.	Urban	Randomized controlled trial	To determine if early literacy promotion, which consisted of board books and reading promotion beginning with newborns, is more effective at promoting language development than standard literacy promotion beginning at 6 months	1. Child receives age-appropriate book 2. Parents receive standardized literacy guidance from clinician	1. Parents received a bookmark with script used by clinicians 2. Parents in study received weekly text messages to reinforce and remind them about shared reading prior to 6 months of age 3. ROR delivered to kids less than 6 months old 3. For <6-month WCW, clinicians received an electronic alert to provide book 4. Clinician had to check a box once they had provided ROR to the patient	Clinician report	Not reported	Not reported	Overall book distribution and literacy promotion rate of 82% across visits	Children in the early literacy promotion arm had greater STIM-Q reading sub score (SQRS) scores (11.0 vs 9.4; $P = .006$ ) but similar Preschool Language Scale scores at 6 months - No differences in SQRS at 12, 18, and 24 mos. or PLS-5 scores at 24 months between groups
2020	Latino parents' experiences with literacy promotion in primary care: facilitators and barriers <sup>33</sup>	Jimenez, M. E., Crabtree, B. F., Veras, J., Shelton, P. A., Mendelsohn, A. L., Mackie, T. L., Guevara, J. P., Pellerano, M., Lima, D. and Hudson, S. V.	Not reported	Qualitative	To understand literacy promotion from the perspective of Latino parents and to identify barriers and facilitators	Not applicable	Not reported	Caregiver report	- Parents perceived lack of interest in shared reading from their child - Parent time and competing priorities occurring in the context of poverty - Self-reported limited literacy and English proficiency	- Parent trust in clinician - Language concordant book	N/A	N/A

(Continued)

Table 1. (Continued)

Year	Title	Author(s)	Clinic Location	Study Design	Study Aim (Why)	How ROR Was Implemented (Materials & Procedures)			Assessment of ROR Implementation	Barriers	Facilitators	Outcomes	
						Implemented	Not reported	Modifications				Implementation	Impact
2020	Literacy promotion training and implementation in pediatric continuity clinics <sup>5,4</sup>	Caldwell, A., Erickson, E., Shearman, N., Shaif, I., Garbe, M. C., Tyrrell, H., Needlman, R., and Dunlap, M.	Urban (54% of clinics)	Descriptive	To describe literacy promotion training experiences and behaviors of pediatric and internal medicine/pediatrics residents and faculty and the association between LP training and behaviors	Not reported	Not reported	Clinician report	Not reported	Not reported	- More faculty reported providing anticipatory guidance (87% vs 77%, $P < .0001$ ); modeling shared reading (69% vs 45%, $P < .0001$ ); and using books for developmental assessment (80% vs 62%, $P < .0001$ ) compared to residents - Both groups (97%) reported distributing books - More faculty than residents reported that their ROR program had volunteer readers (38% vs 18%, $P < .0001$ ), information about local libraries (34% vs 19%, $P < .0001$ ), and adult literacy information (14% vs 5%, $P < .0001$ ) - Those who participated in formal training were more likely than those who did not participate in formal training to distribute books (98% vs 92%, $P < .0001$ ), provide relevant anticipatory guidance (84% vs 67%, $P < .0001$ ), model shared reading (58% vs 33%, $P < .0001$ ), use books as tools for developmental assessment (71% vs 57%, $P < .0001$ ), and give the book to the child at the beginning of the visit (56% vs 43%, $P = .0005$ )	N/A	

(Continued)

Table 1. (Continued)

Year	Title	Author(s)	Clinic Location	Study Design	Study Aim (Why)	How ROR Was Implemented (Materials & Procedures)	Modifications	Assessment of ROR Implementation	Barriers	Facilitators	Implementation	Outcomes Impact
2020	Encouraging parent-child book sharing: potential additive benefits of literacy promotion in health care and the community <sup>55</sup>	Canfield, C., Seery, Urban A., Weisleder, A., Workman, C., Brockmeyer Cates, C., Roby, E., Payne, E., Levine, S., Meglino, L., Dreyer, B., and Mendelsohn, A.	Urban	Cross-sectional	To examine the effects of ROR on the literacy environment and whether ROR was related to increased library use within the context of the New York City's First Readers initiative	<ol style="list-style-type: none"> <li>1. Provision of a book from a health care provider</li> <li>2. Guidance and support</li> <li>3. Waiting room volunteer</li> </ol>	Not reported	Parent report	Not reported	Not reported	<ul style="list-style-type: none"> <li>-24% did not receive ROR</li> <li>-31% received a book only</li> <li>-45% received a book and guidance</li> </ul>	<ul style="list-style-type: none"> <li>- Toddlers had significantly higher scores on the StimQ READ scale (<math>P &lt; .01</math>)</li> <li>- Parents who received both a book and counseling from a provider scored significantly higher than those who only received a book (<math>P &lt; .05</math>) as well as those who didn't receive any ROR (<math>P &lt; .01</math>)</li> <li>- Parents who received both anticipatory guidance and a book were more likely to read with their children at home, to read a wider variety of books, and to have higher quality reading interactions, involving asking their child questions, pointing to and labeling pictures, and expanding on the written story</li> </ul>
2021	Reach Out and Read and developmental screening: using federal dollars through a health services initiative <sup>56</sup>	Dunlap, M., Lake, L., Patterson, S., Perdue, B., Caldwell, A. and Caldwell, R.	Not reported	Cross-sectional	To examine if using federal funding would facilitate ROR expansion and if this expansion would improve developmental screening and Early and Periodic Screening, Diagnostic and Treatment (PSDT) visits in Oklahoma	Not reported	Not reported	Not reported	Not reported	Not reported	N/A	<ul style="list-style-type: none"> <li>- In 2018 fiscal year, the developmental screening percentage at non-ROR sites was 33% vs 47% at ROR sites</li> <li>- In 2019 fiscal year, the developmental screening percentage at non-ROR sites were 36% vs 48% at ROR sites</li> <li>- The WCV percentage in 2018 was 50% at non-ROR sites vs 69% at ROR sites and in 2019 was 51% at non-ROR sites vs 72% at ROR sites</li> </ul>
2021	Enhancing Reach Out and Read with a video and text messages: a randomized trial in a low-income predominantly Latino sample <sup>57</sup>	Jimenez, M.E., Crabtree, B.F., Hudson, S.W., Mendelsohn, A., Lima, D., Shelton, P.A., Veras, J., Lin, Y., Pellerano, Morrow, L., and Strom, B.L.	Not reported	Randomized controlled trial	To test the effect of adding a video and text messages to ROR on shared reading, home literacy environment, attitudes toward reading, and developmental delays	<ol style="list-style-type: none"> <li>1. Literacy-rich waiting area with children's books and space for reading</li> <li>2. Distribution of an age appropriate bilingual children's book</li> <li>3. Clinician guidance on shared reading</li> </ol>	<ol style="list-style-type: none"> <li>1. Families watched 3-minute video in English/Spanish demonstrating logic reading on a tablet during the visit. The video had local parents reflecting on their experiences with shared reading and addressed common barriers</li> <li>2. Parents received 9 texts per month based on common literacy themes; one message per month requested a response back</li> </ol>	<ul style="list-style-type: none"> <li>- Caregiver report</li> </ul>	Not reported	Not reported	<ul style="list-style-type: none"> <li>-87% of participants reported receiving a children's book</li> <li>-61% reported receiving instructions on how to read with their child</li> <li>-39% reported seeing an example of how to read with their child</li> </ul>	<ul style="list-style-type: none"> <li>- Both groups reported reading more at 6-month follow-up: enhanced ROR parents reported reading 1.8 more times per week while parents in the standard ROR arm reported reading 1 more time per week</li> <li>- No significant difference between groups in shared reading frequency, but enhanced ROR participants reported richer home literacy environments in STIM-Q (<math>B = 0.32; P = .034</math>)</li> <li>- From PBRU, enhanced ROR participants had higher scores on post-ive affect (<math>B = 1.58; P = .017</math>)</li> </ul>

(Continued)



Table 1. (Continued)

Year	Title	Author(s)	Clinic Location	Study Design	Study Aim (Why)	How ROR Was Implemented (Materials & Procedures)	Modifications	Assessment of ROR Implementation	Barriers	Facilitators	Implementation	Outcomes Impact
2021	Clinician experiences with Reach Out and Read: an exploratory qualitative analysis <sup>58</sup>	Erickson, E., Caldwell, A., Caldwell, R., Shearman, N., Sharif, I., Garbe, M. C., Tyrrell, H., Needlman, R., and Dunlap, M.	Not reported	Qualitative	To understand clinicians' experiences implementing of ROR	Not applicable	Not applicable	Not reported	- Lack of resources to buy books - Clinician lack of time to implement the intervention effectively with high fidelity	- Impact elevated by the support and guidance given to families by clinicians along with the distribution of book - Clinicians who participate in ROR derive meaning from the experience of delivering ROR	N/A	N/A
2021	Home language environment of children with orofacial clefts as a target for intervention <sup>59</sup>	Gallagher, E. R., Wallace, E., Thach, J., Kiner, S., and Collett, B. R.	Urban	Randomized controlled trial	To evaluate home language environment of children with orofacial clefts as well as responses to ROR	1. Pediatrician chose developmentally appropriate books in the language spoken at home and the books emphasized a pressure consonant that a child with a cleft would frequently need to practice 2. Pediatrician discussed the importance of shared reading with the family and encouraged parents to use the books to practice speech production	1. Book given contained specific pressure consonants targeting sounds that children with clefts may need to practice 2. ROR delivered at craniofacial center 3. ROR guidance delivered using standard script which occurred in person but was administered over phone when the children did not have regular visits scheduled	Clinician documentation (Book distribution and time required to deliver the intervention)	Not reported	Not reported	The average time the provider spent with the intervention was 9 minutes	- All language outcomes (hourly adult word count, hourly child vocalizations, hourly conversational turns) increased following the ROR intervention. However, estimates varied, and most CIs were wide and included the null - Patient satisfaction survey: majority said that it was helpful to speak with a pediatrician about reading, that they learned more about how to use books to facilitate language development, and that the study encouraged them to spend more time verbally interacting with their child
2021	A combined Reach Out and Read and imagination library program on kindergarten readiness <sup>60</sup>	Szumlas, G. A., Petronio, P., Mitchell, M. J., Johnson, A. J., Henry, T. R., and DeWitt, T. J.	Not reported	Cohort	To examine the effects of a combined ROR/Imagination Library program on kindergarten readiness assessment (KRA) scores.	1. An age-appropriate book 2. Guidance on shared reading from clinician	1. Combined ROR with Dolly Parton's Imagination Library (DPII). Children in DPII received a book delivered monthly to the home via mail until their fifth birthday as administered by the national DPII program 2. ROR delivered to children less than 6 months old	Not reported	Not reported	Not reported	N/A	-The percentages of students "on track" on KRA literacy subtests increased significantly by cohort (2016, 42.9% [95% CI, 34.9%–50.9%] versus 2017, 50.9% [95% CI, 44.9%–56.9%] versus 2018, 58.3% [95% CI, 53.3%–63.3%], $P = .004$ )

(Continued)

Table 1. (Continued)

Year	Title	Author(s)	Clinic Location	Study Design	Study Aim (Why)	How ROR Was Implemented (Materials & Procedures)	Modifications	Assessment of ROR Implementation	Barriers	Facilitators	Outcomes	
											Implementation	Impact
2021	Promoting early literacy using digital devices: a pilot randomized controlled trial <sup>61</sup>	Guevara, J., Erkoboni, D., Gerdes, M., Winston, S., Sands, D., Rogers, K., Haecker, T., Jimenez, M. E., and Mendelsohn, A. L.	Not reported	Randomized controlled trial	To determine feasibility and explore effects of literacy promotion using e-books versus board books on the home reading environment, book reading, television use, and child development	1. Children's book Children in standard literacy promotion (SLP) arm received board books and children in digital literacy promotion (DLP) arm received e-books 2. Anticipatory guidance	1. DLP participants received e-books instead of board books 2. Clinicians provided standardized literacy promotion guidance using standardized bookmarks 3. Parents received bookmark with standardized guidance on it 4. Standard literacy promotion participants who missed a well visit were mailed the corresponding board book and bookmark and asked to reschedule their well visit; digital literacy promotion participants were mailed the bookmark only	Not reported	Not reported	Not reported	N/A	- Parents in the digital literacy promotion (DLP) group reported greater use of digital devices to read or engage their child (65% vs 23%, $P < .001$ ) but similar board book reading and television viewing compared to standard literacy promotion (SLP) - No differences between groups in cognitive or motor scale scores of the Bayley Scales of Infant Development, but DLP participants had marginally lower language scales scores (DLP 85.7 vs SLP 89.7; $P = .10$ ) at the 6-month follow-up compared to SLP

HCP indicates health care professional(s); ROR, Reach Out and Read; and WCV, well child visit(s).

**Table 2.** Reach Out and Read Reviews and Commentaries

Year	Title	Author(s)	ROR Model Described
1998	Bringing an early pediatric literacy program to the clinic setting <sup>64</sup>	Almquist, N. L., Bisson, S. and Wynia, A.	<ol style="list-style-type: none"> <li>1. Volunteers in the clinic waiting room read stories to children and model reading aloud techniques for parents</li> <li>2. Provider discusses how parents can use books to support their child's early brain development and overall wellbeing</li> <li>3. Books given to children at WCV</li> </ol>
1999	Take two board books, and call me in the morning <sup>65</sup>	Feldman, S and Needlman, R.	<ol style="list-style-type: none"> <li>1. Volunteers share books with children in waiting room</li> <li>2. Pediatricians offer parents guidance on how books can enrich learning and lead to joyful parent-child interactions</li> <li>3. Children 6 months of age and older receive free books during each well child visit (WCV)</li> </ol>
2001	Practice notes: strategies in health education. program: reach out and read <sup>66</sup>	Rainey, C., and Kemper, K.	<ol style="list-style-type: none"> <li>1. Pediatricians encourage parents to read aloud to young children</li> <li>2. Pediatricians give books to their patients to take home at all WCV from 6 months to 5 years</li> <li>3. Volunteer readers</li> </ol>
2002	Promoting language and literacy through reading aloud: the role of the pediatrician <sup>67</sup>	Mendelsohn, A. L.	<ol style="list-style-type: none"> <li>1. Waiting room component: volunteer/staff readers model techniques for reading aloud with kids</li> <li>2. Anticipatory guidance: guidance tailored to the child's age/developmental milestone</li> <li>3. Book to take home: children receive new free book at every WCV from 6 months to 5 years</li> </ol>
2002	Reach Out and Read: a pediatric clinic-based approach to early literacy promotion <sup>68</sup>	Atkinson, P.M., Parks, D.K., Cooley, S.M. and Sarkis, S.L.	<ol style="list-style-type: none"> <li>1. Distribution of new carefully selected books to children</li> <li>2. Modeling reading in clinic waiting areas by volunteers</li> <li>3. Anticipatory guidance around book sharing at each WCV from 6 months to 5 years</li> </ol>
2002	Pediatrics by the book: pediatricians and literacy promotion <sup>69</sup>	Klass, P.	<ol style="list-style-type: none"> <li>1. Pediatricians trained to give anticipatory guidance to parents at WCV about the importance of reading aloud from 6 months to 5 years</li> <li>2. New book given to the child by the physician at each WCV</li> <li>3. Volunteers in the waiting room read aloud to children and model techniques for parents</li> </ol>
2003	The developing brain and early learning <sup>70</sup>	Klass, P. E., Needlman, R. and Zuckerman, B.	<ol style="list-style-type: none"> <li>1. Pediatric provider gives developmentally and culturally appropriate books to children at WCV from 6 months to 5 years</li> <li>2. Pediatricians provide developmentally appropriate anticipatory guidance with individualized advice to parents about strategies of enjoying books and reading aloud with their children</li> <li>3. Volunteer readers in clinic waiting rooms read aloud to children and model techniques of reading aloud for parents</li> </ol>
2004	Pediatric interventions to support reading aloud: how good is the evidence? <sup>71</sup>	Needlman, R., Silverstein, M.	<ol style="list-style-type: none"> <li>1. Clinicians distribute free picture books at WCV for children 6 months to 5 years</li> <li>2. Anticipatory guidance about reading aloud</li> <li>3. Volunteers who read aloud to children and model appropriate techniques in the waiting rooms</li> </ol>
2005	Reach Out and Read: promoting pediatric literacy guidance through a transdisciplinary team <sup>72</sup>	Bailey, R., and Rhee, K. B. L.	<ol style="list-style-type: none"> <li>1. Primary care providers learn about early literacy development and intervention strategies to promote literacy in young children from experienced ROR physicians or regional trainers through face-to-face workshops or web-based tutorials. During WCV, clinician gives parents anticipatory guidance about the importance of reading aloud at home along with age-appropriate advice</li> <li>2. Providers give children a new developmentally and culturally appropriate book ever WCV from 6 months to 5 years</li> <li>3. Literacy-rich and print-rich waiting rooms. When possible, trained volunteers read books to children and model reading to parents while families wait for their appointments</li> </ol>
2007	Early literacy interventions: Reach Out and Read <sup>73</sup>	Willis, E., Kabler-Babbitt, C. and Zuckerman, B.	<ol style="list-style-type: none"> <li>1. Health care providers (HCP) trained in techniques to promote the parents' early literacy efforts with their children at WCVs from 6 months to 5 years</li> <li>2. HCP give each child a developmental and culturally appropriate new book to take home</li> <li>3. Medical providers incorporate the new book into the child's developmental assessment</li> <li>4. Volunteer readers in the waiting rooms, providing literacy</li> </ol>

(Continued)

**Table 2.** (Continued)

Year	Title	Author(s)	ROR Model Described
			experiences for the children and modeling reading aloud for parents
2008	Giving literacy a shot in the arm <sup>74</sup>	Schnitzer, M. I., Kaplin, D. B., Keane, V. A., Zuckerman, B., and Sharfstein, J. M.	5. Pediatricians support use of the library as children develop an interest in books, and when indicated, adult literacy referrals for parents who have family literacy concerns 1. Pediatricians give new books to children 6 months to 5 years during WCV 2. Anticipatory guidance including advice to parents about importance and joy of reading aloud to children
2008	Librarians' role in Reach Out and Read <sup>75</sup>	Christopher, K. A. and Duggar, D. C.	1. At each WCV from 6 months to 5 years, health care professionals advise parents about the importance of reading aloud to their children and offer age-appropriate tips 2. Health care professional gives a new culturally and developmentally appropriate book to the child to take home 3. Waiting room with gently used books and, whenever possible, volunteers read aloud to children to model techniques for parents
2009	Military pediatricians join reach out and read at Naval Health Clinic New England <sup>76</sup>	Amaio, A.	1. At every WCV from 6 months to 5 years, HCP give each child a free new book 2. Providers dispense advice to parents about the importance of reading aloud with their children 3. Literacy-rich waiting room, with child-size furniture and bookcases, where ROR-trained volunteers read with the children while their families wait for appointments 4. Additionally children received books designed specifically to calm anxieties about deployment and military service
2009	Reach Out and Read: literacy promotion in pediatric primary care <sup>77</sup>	Klass, P., Dreyer, B. P. and Mendelsohn, A. L.	1. Literacy-rich waiting room: volunteer readers model techniques for reading out loud, or literacy/library information can be displayed, or videos of adults reading can be aired, or professional counselors/librarian can issue library cards, gently used books for children to read or take home 2. Anticipatory guidance: clinician comes into the room with the book and gives guidance to parents about their child's interaction with the book, emphasizing that reading is fun and can help with development, and model dialogic reading 3. Book to take home: developmentally appropriate book given at WCV from 6 months to 5 years
2009	Promoting early literacy in pediatric practice: twenty years of reach out and read <sup>78</sup>	Zuckerman, B.	1. Training pediatricians to give developmentally appropriate advice 2. Giving books to children at WCV from 6 months to 5 years 3. Volunteer readers in waiting room modeling reading aloud for the parents
2010	Reach Out and Read: evidence-based approach to promoting early child development <sup>79</sup>	Zuckerman, B. and Khandekar, A.	1. Pediatrician gives each child a culturally and developmentally appropriate book purchased with public/private dollars at each health supervision visit from 6 months to 5 years 2. Pediatrician gives parent developmentally appropriate anticipatory guidance about how to enjoy book with child and emphasizes that reading is good for language development 3. Literacy-rich waiting rooms with volunteer readers in clinic waiting rooms who read aloud and model to children while they are waiting for their visits, bookshelves with books, small chairs and tables for children, posters, and videos
2011	Books and reading: evidence-based standard of care whose time has come <sup>80</sup>	Zuckerman, B. and Augustyn, M.	1. Provider gives parent advice about the benefits of reading aloud 2. Provider gives child a book 3. Volunteers reading to children and modeling has evolved into literacy-rich waiting room consisting of books, colorful posters, and, when available, volunteer readers reading to children and modeling reading to children
2012	A primary approach to reading: review of early literacy interventions implemented in pediatric settings <sup>81</sup>	Ogg, J. A. and Sundman-Wheat, A. N. and Bateman, L. P.	1. Instruction and encouragement from physicians and nurses for parents to read aloud to their children regularly 2. Providing every child from 6 months to 5 years a developmentally appropriate book at each regular checkup, and

(Continued)

**Table 2.** (Continued)

Year	Title	Author(s)	ROR Model Described
2012	The journey toward literacy begins in infancy: the Reach Out and Read innovation <sup>82</sup>	Fahey, J. C., and Forman, J.	3. Having volunteer readers and/or literacy materials in pediatric waiting rooms 1. Giving new books to children 2. Advice to parents about the importance of reading aloud
2014	Methodological review of the quality of Reach Out and Read: does it work? <sup>83</sup>	Yeager Pelatti, C., Pentimonti, J. M., and Justice, L. M.	1. Medical professionals provide give anticipatory guidance about the importance of reading, strategies to incorporate into shared book-reading activities 2. Provide “prescription” to read a new book
2015	Do office-based literacy interventions promote language development in children? <sup>84</sup>	Pittner-Smith, C. and Martonffy, A. I.	1. Reading advice given to parents 2. Age-appropriate book is given to patients
2015	Early literacy promotion in the digital age <sup>85</sup>	Navsaria, D. and Sanders, L. M.	1. The clinician discusses book sharing with the caregiver, offering age-appropriate tips 2. The clinician gives directly to the child a new, developmentally appropriate book, providing for teachable moments about child development 3. The waiting room is literacy rich, with books, posters about reading, and inviting spaces encouraging reading
2016	Mitigating the effects of family poverty on early child development through parenting interventions in primary care <sup>8</sup>	Cates, C. B. and Weisleder, A. and Mendelsohn, A. L.	1. Provision of children’s books at each WCV by pediatric professional 2. Waiting room program modeling reading aloud 3. Anticipatory guidance by clinician about benefits of shared reading at WCV from infancy
2016	Encouraging children’s literacy in your practice <sup>86</sup>	Reddy, S. and Reddy, B.	1. ROR trains and encourages clinicians to advise parents on importance of reading 2. Provide developmentally and culturally appropriate books at every WCV
2016	Promoting early literacy in the pediatrician’s office: what have we learned? <sup>87</sup>	Golova, N., Cala, L. F. and High, P. C.	1. Anticipatory guidance on benefits and joys of reading aloud to children from their birth 2. New, colorful, age-appropriate book given at WCV for kids 6 months to 5 years 3. Literacy-rich waiting room (includes volunteers reading to children at times)
2020	30 years of reach out and read: need for a developmental perspective <sup>22</sup>	Zuckerman, B. and Needman, R.	Not described
2021	From clinic to kindergarten: a path toward equity in school readiness <sup>88</sup>	Sells, J. M., and Mendelsohn, A. L.	Not described
2021	Creating practical primary care supports for parent-child relationships—language, literacy, and love <sup>89</sup>	Klass, P. and Navsaria, D.	1. Anticipatory guidance 2. Modeling dialogic reading in the examination room 3. Providing developmentally and culturally appropriate books to families

HCP indicates health care professional(s); ROR, Reach Out and Read; and WCV, well child visit(s).

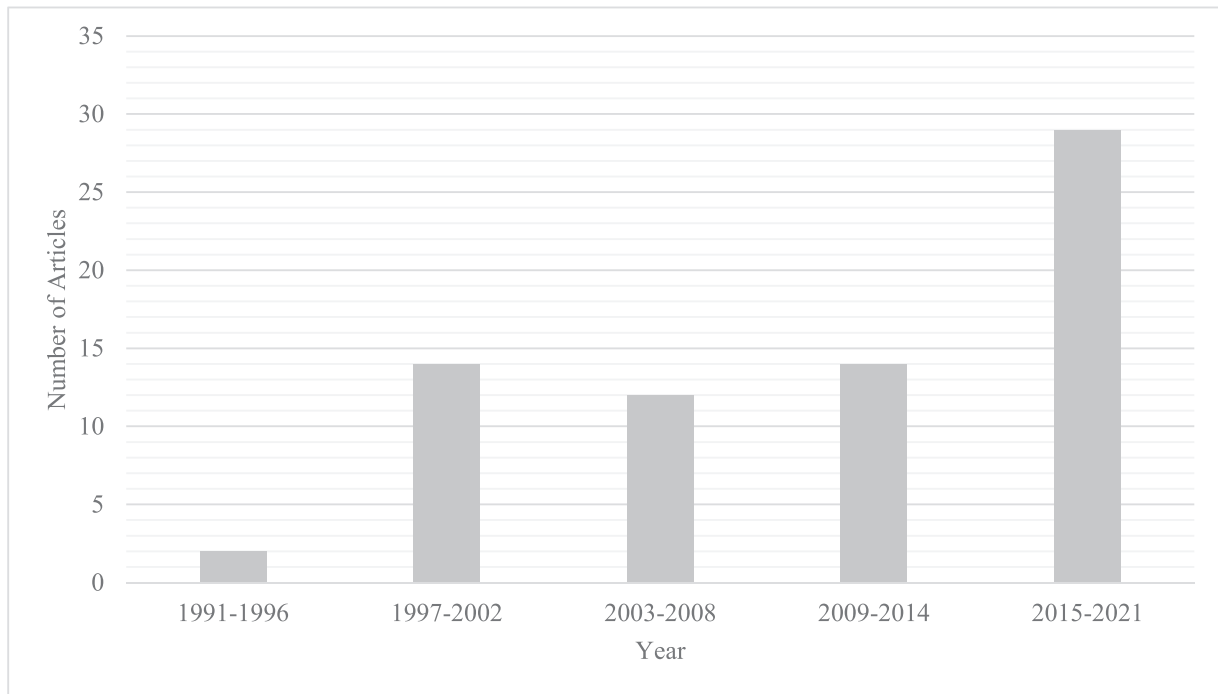
assessing parental perceptions of ROR (2/5, 40%) the impact of clinic culture on ROR (2/5, 40%), and clinician experiences with ROR (1/5, 20%).

### BARRIERS AND FACILITATORS

Thirteen research articles reported barriers to ROR implementation that could be grouped at the system, clinician/staff, and family levels. The most prominent barriers occurred at the system level and included clinician workload and time constraints (7/13, 54%) as well as difficulty obtaining funding and resources (5/13, 38%). Other commonly reported barriers occurred at the clinician/staff

level, including lack of training (4/13, 31%) and clinicians forgetting to implement ROR (4/13, 31%). Articles also commonly reported barriers that families experienced, including social determinants that prevented shared reading (eg, limited social support, other priorities) (2/13, 15%). A complete list of barriers is presented in [Table 1](#).

Sixteen research articles reported facilitators. The most common facilitators occurred at the family and clinician levels: caregivers having a positive attitude toward reading (3/16, 19%) and adequate training for clinicians (2/16, 13%). At the system level, 3 articles reported having adequate funding and resources (4/16, 25%). A complete list of facilitators is presented in [Table 1](#).



\*2015 is the year after the publication of the 2014 AAP policy statement on literacy promotion and is therefore included in the most recent year grouping.

**Figure 2.** The number of articles published per year range ( $N = 71$ ). \*2015 is the year after the publication of the 2014 AAP policy statement on literacy promotion and is therefore included in the most recent year grouping.

### MODIFICATIONS AND ENHANCEMENTS

Twenty-four research articles reported modifications, which can be grouped into 5 categories: 1) distribution of additional resources to families, 2) tailoring ROR to a specific demographic, 3) incorporation of technology, 4) delivery of ROR book to children less than 6 months old, and 5) enhanced clinician training and/or support. Most modifications consisted of providing families with additional resources (20/24, 83%), such as library cards, pamphlets and bookmarks, referrals to adult literacy organizations, “prescriptions to read,” and text messages reinforcing shared reading. See [Table 1](#) for a complete list of modifications.

### COMMENTARIES AND REVIEW ARTICLES

Among the 28 review articles and commentaries, 26 (26/28, 93%) articles described components of the ROR model, with variation in those listed ([Table 2](#)). Twenty of these articles (20/26, 77%) described the ROR model as having at least 3 components: anticipatory guidance from clinicians, distribution of children’s books, and a literacy-rich waiting room. Of these 20 articles, 19 (19/20, 95%) specified the literacy-rich waiting room as including volunteer readers. Five of the 26 articles (5/26, 19%) described only 2 components: 4 described anticipatory guidance from clinicians and distribution of children’s books, and 1 described anticipatory guidance from clinicians and a prescription to read a new book. Some articles noted components beyond book distribution, guidance, and a literacy-rich waiting room. These components

include pediatricians encouraging library use, adult literacy referrals, librarians issuing library cards, and specialized books to reduce anxiety for children whose parents are in the military.

### DISCUSSION

In this scoping review, we identified variation in ROR implementation including differences in components delivered and to what extent implementation was assessed. While the most prominent barriers to ROR implementation (ie, inadequate time and funding challenges) occurred at the system level, most emerging modifications and enhancements address barriers at the clinician and patient level. The current findings can be used to inform more robust evaluations of ROR and early childhood interventions more broadly, which can yield deeper insight into mechanisms that drive outcomes and innovations that can amplify ROR’s already major impact.

Over the past 30 years, ROR has achieved substantial scale and an impressive evidence base. Several articles describe ROR’s exponential growth and demonstrate that the model is effective. The number of articles on ROR has proliferated since 2015, the year after the release of the 2014 AAP policy statement on literacy promotion.<sup>1</sup> The current review identifies 2 key opportunities to build on this momentum and advance research on ROR and early childhood interventions in general. First, there has been substantive variation in how ROR has been implemented, with differences in the components



delivered across published articles. Second, a considerable number of the articles did not assess ROR implementation. Clear description of complex health interventions capitalizing on frameworks like TIDieR, consistent implementation of intervention components, and assessment of implementation outcomes can open the door to unpacking the causal mechanisms underlying the effects of early childhood interventions like ROR and understanding how and why interventions work or do not. Implementation science moves beyond simply describing the average effects of early childhood interventions, which have been modest on average, toward understanding what intervention components matter most for whom.<sup>18</sup> This, in turn, has the potential to move the field toward tailored interventions that have sustained powerful impacts at the population level.

A core pursuit of implementation science is defining those components of an intervention that are essential (ie, thought to cause clinical change) and those in the adaptable periphery (ie, not necessary to cause clinical change).<sup>90</sup> These distinctions are especially critical in interventions, like ROR, that are brought to scale and implemented across diverse settings and cultures. By specifying essential elements, interventionists are better able to balance fidelity with the flexibility required in implementing ROR across diverse settings and populations. Our findings suggest opportunities exist for the field not only to clarify the essential elements of ROR but also how it is both measured and reported. Use of recently developed frameworks, such as the Components & Rationales for Effectiveness, offer opportunities to advance the specification and subsequent measurement and reporting of the essential elements and those implemented to adapt to context.<sup>91</sup> Given ROR's unique role as an innovation that has capitalized on the near-universal access to children and frequent contact in primary care, future research on ROR that leverages implementation science has the potential to make a major impact on the field of early childhood research.

Despite its remarkable scale and documented effects, barriers to ROR implementation are well known. ROR sites are remarkably resilient and the articles in this review identified multiple facilitators, including mobilizing volunteers, emphasizing teamwork, and engaging philanthropy for funding, that help make the model so successful. Along the same lines, innovations have organically risen in the form of modifications and enhancements to the ROR model, which comprise a growing number of articles in the existing literature. Most of these innovations have focused on patient/caregiver and clinician levels. Relatively few innovations have focused on the system level, which is critical to addressing barriers like financing and time that were most commonly described. Notably, one article described work in Oklahoma that implemented a health services initiative through the Children's Health Insurance Program.<sup>56</sup> This initiative leveraged federal matching dollars to expand ROR. In turn, ROR sites were more likely to achieve higher developmental screening rates and higher percentages of well-

child visits compared to non-ROR sites. Similar policy and advocacy efforts could help ensure sustainable funding and reimbursement for developmental screening through ROR.

There are certain limitations to this study. This review was limited to articles that focused on ROR, thus articles that focus on other evidence-based interventions that grew out of ROR were not included.<sup>92</sup> Along these lines, it is possible that innovations exist that have not been published in peer review journals. Only papers published in English and in North America were included, thus the review does not encompass findings on international literacy promotion efforts in ambulatory settings and programs that may be similar to ROR.<sup>93</sup> Also, while we used a comprehensive search strategy guided by a medical research librarian, it is possible that relevant articles may have been missed. Overall, scoping reviews excel in organizing the available evidence in a field, clarifying key concepts and definitions, and identifying key characteristics related to a concept like ROR implementation. Future work is needed to deepen our understanding of ROR implementation. For example, we did not examine program startup activities (eg, identifying a medical consultant and site coordinator, submitting necessary documentation) which can be important barriers to ROR initiation and implementation. Future studies using primary data collection strategies (eg, program surveys, interviews) are needed to examine program startup in addition to the participant facing components examined here.

## CONCLUSIONS

The scale and impact achieved by ROR in the past 30 years set it apart as an exemplary primary care innovation to promote optimal developmental health with the potential to address inequities in school readiness at the population level. In this scoping review, we identified substantial variation in ROR implementation and inconsistent assessment of implementation in the existing literature. While studies examining ROR have increased in recent years and modifications are emerging, relatively little published work has focused on system-level barriers like financing and time. Future work with clear descriptions of intervention components and corresponding measurement of ROR implementation can enhance our understanding of what components are most important for whom and the mechanisms underlying the observed effects of ROR. Such knowledge can help inform policy solutions and advocacy efforts for sustainable funding and reimbursement, which would further amplify the effects of this model intervention and inform early childhood intervention research more broadly.

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## SUPPLEMENTARY DATA

Supplementary data related to this article can be found online at <https://doi.org/10.1016/j.acap.2022.11.012>.

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