

# Reach Out and Read: evidence based approach to promoting early child development

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## Purpose of review

This article describes the evidence about why reading aloud to children is important to help them develop the language and early reading skills necessary for school readiness.

## Recent findings

This information supports the value of Reach Out and Read; physicians advising parents to read aloud.

## Conclusion

Reach Out and Read should be implemented in health care sites serving low-income children.

## Keywords

child development, primary care prevention, Reach Out and Read

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## Introduction

In the 1980s, clinical observation revealed that many parents in the primary care clinic at Boston City Hospital were not reading to their young children and did not have children's books at home. Parents gave multiple reasons, including no children's book stores in the inner city, no experience – their parents did not read to them, especially those raised in other countries – the high cost of books, or that reading was not a pleasurable experience. In response, in 1989 a few doctors started giving their patients books and their parents advice on reading aloud [1]. Nineteen years later, in 2008, doctors in over 4000 clinics and practices gave approximately 5.7 million new books and reading aloud advice to over 3.5 million children in all 50 states. Reach Out and Read anticipatory guidance moved beyond traditional parent education of telling parents what to do, to creating real time learning experiences by modeling developmentally appropriate 'reading' strategies (e.g. pointing, naming, asking questions) and then giving a book to take home to implement the recommendation. This paper will review the problem being addressed by Reach Out and Read, the contribution of the interplay of early experience and brain development to language and early reading, the importance of parents reading aloud, and the opportunity for pediatricians to impact this critical activity.

## The problem

Low literacy among American adults is a severe and pervasive problem in the United States. Approximately 20% of Americans are functionally illiterate, reading below

a fifth grade level, which is inadequate to cope with everyday demands. Minorities are also overrepresented in this group; 39% identified themselves as Hispanic and 20% identified themselves as Black [2]. However, this is just the tip of the iceberg; an additional 30% of adults cannot read at an eighth grade level. These figures have important health, economic and social consequences.

This adult problem, like many others, starts in childhood; approximately 35% of disproportionately low-income American children lack the basic language skills needed to learn to read when they enter kindergarten, ultimately leading to school failure, truancy, and drop outs, which in turn leads to higher risk for early pregnancy, drug and alcohol use, illegal activity and poor health literacy. One of the most studied and important contributors to reading readiness is exposure to words and subsequent vocabulary [3]. Large social class differences are reported in children's exposure to oral language and their vocabularies. Hart and Risley [4] reported that, at the age of 3 years, children in professional families heard an average of 2153 words per hour whereas children in working-class families heard 1251 words per hour and children in welfare families heard only 616 words per hour. This led to enormous differences in children's vocabularies. At age 3, children in professional families had an observed cumulative vocabulary of 1100 words, while children in working class families had an observed vocabulary of 750 words and children in welfare families had an observed vocabulary of just above 500 words.

Parents who were professionals not only talked more, but they also used more complex words and provided a

greater richness of nouns, modifiers and verbs. They also spent a lot of time and effort asking their children questions, and affirming and expanding their responses [4]. Welfare parents, on the contrary, spent less time talking and used more imperatives and prohibitions; 'look at that', 'do not do that', etc.

Children acquire about 860 words per year from age one to the end of second grade, or about 2.4 words per day, resulting in 6000 words. Unfortunately, the variability is significant; the bottom 25% of children average only approximately 1.6 words per day, resulting in only having 4000 words by the end of the second grade. Low-income children are also much less likely to be exposed to these new and unusual words compared with frequently used and common words, which foster later language development [5].

Although reading aloud to young children promotes language and prereading skills [6,7], a recent national survey in the United States found that 16% of parents of children aged 3 years do not read at all with their children, and 23% do so only once or twice a week [8]. Reading is even less among low-income children or those whose mothers have less than a high school education. A typical middle-class child enters first grade having been read to for approximately 1000 h, compared with 25 h for low-income children [9]. Children starting school with lower levels of experience with books and reading become poorer readers [10].

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### **Understanding the role of brain development in reading aloud**

Much of the new understanding of the developing brain in the early years of life emphasizes the translation of early experiences into neuronal connections, which in turn may influence later child development. Children are born with all their neurons already formed. However, synapses between these neurons are in large part established and elaborated after birth, reaching a peak by 3 years of age. Half of these synapses are lost by age 15 through the 'pruning' of unused neural connections due to lack of environmental exposure, whereas those synaptic pathways that are stimulated are strengthened.

At birth children's brains are sensitive to all language, especially in the first 6 months; newborns and even fetuses can discriminate their mother's voice from the voice of a stranger [11,12]. Infant-directed speech increases blood flow to the frontal lobe of the brain [13]. Infants progress beyond voice discrimination to discriminating among sounds of almost any language before 6 months. By 6–12 months, the brain begins to become more sensitive to the sounds of their home language, and over time they can lose the ability to

discriminate sounds in other languages if they are not exposed to them [14]. The synaptic connections are strengthened by the sounds heard and are lost (pruned) when not exposed. For example, individuals who have spent their first decade hearing Asian languages in which the phonemes *r* and *L* are interchangeable are unable to differentiate those sounds [15]. Positron emission tomography (PET) scans have shown that the *r* and *L* sounds are decoded in separate parts of the brain of an English-speaking person, but these sounds are processed in the same part of the brain of someone in whose native language these phonemes are not differentiated [16].

The evolution of the 'reading brain' required brain wiring to go beyond processing written symbols that represent concrete objects, such as animals or fire, to strengthening previously unused connections to process letters (circles and lines) to meaningful symbols with associated sounds [17]. This evolutionary step of brain development is illustrated in an imaging study showing limited neural activity in response to seeing a pseudo-word such as MBLI. However, when presented with the same letters that make up a real word (LIMB), maximal activity is elicited in the visual area, leading to stimulation of a whole network of processes and regions in the temporal lobe (auditory and language-based processes including comprehension), parietal lobe (language) and association areas that take up half the cortex [18].

Another example of the developmental nature of experience and brain development is the difference in the ease of acquiring a second language in the early years compared with adolescence. If a child learns two languages in early childhood, he will speak both languages with sophisticated grammatical construction and accent. If a second language is learned in high school or college, even proficient speakers generally do not have as complete a mastery of grammatical construction or accent as early speakers or native speakers. Furthermore, PET scans have shown that, when a child grows up learning two languages, all language activity is found in the same place in the brain. Children who learn a second language at a later age show two foci of language activity.

One interpretation is that learning a second language later takes more effort than when language is learned at its developmentally optimal time, because it is processed and wired in a different place [19]. Acquisition of language in early childhood is captured by the expression that language is caught not taught. Acquisition of another language in later childhood or older is different and may rely much more heavily on memorization of words, rules of grammar or other processes.

Reading aloud to children beyond infancy plays an important role in preparing children to read. It is a

pleasurable activity that promotes the development of language and other emergent literacy skills [20–23], which in turn helps children get ready for school [20,22]. Children learn basic book skills; recognizing letters, understanding that print represents the spoken word, learning how to hold a book, turning the page and starting at the beginning [24–26]. Reading aloud is also associated with learning print concepts [25], exposing children to written language, which is different from spoken language [27], as well as story structures (e.g., stories have a beginning, middle and end) and literacy conventions such as syntax and grammar, which are essential for understanding texts [28].

Reading aloud also promotes phonological awareness (the ability to manipulate the sounds of spoken language [9,29]) necessary for learning to read. Many alphabet books, for example, contain the letter name accompanied by objects whose names begin with the critical sound such a D, shown with pictures of dog, deer, and doctor. When parents stress the initial sounds in these words when reading with their children, they are teaching awareness of initial phonemes or shared phonemes across words [30]. There are important differences in letter knowledge between children from middle-class and lower-class families. Four-year-olds from middle-class families know an average of 54% of the letter names and 5-year-olds know 85% of the letters [31] compared with low-income children, who know on average about four letters at age 4 and who learn an additional five while enrolled in Head Start [30,32]. Children learn the meaning of new words during bookreading interactions with their parents [33].

The most effective reading style, *dialogic or interactive reading* [34], which involves asking questions, providing feedback and letting the child become the narrator of the story, can be taught [35]. Children whose parents received training in dialogic reading had significantly better expressive language skills postintervention 9 months later than children whose parents did not use dialogic reading [36]. The effectiveness of reading aloud interventions is systematically reviewed in a recent report from the National Early Literacy Panel (NELP) [37].

Culture influences parents' attitudes about literacy and reading aloud to children. In some cultures, reading is an activity of teachers when a child enters school and not part of parenting. Older siblings, however, may read books to younger children. Even where parents do not read to their children, they expose children to language by singing songs, reciting nursery rhymes and other rhyming games and story telling, talking and conversation, especially at meal time. For example, Spanish-speaking parents tend to engage in fewer home-learning activities such as reading or singing to their children

compared with their white counterparts. They also have fewer reading materials in the home. Hispanic families, however, engage their children in 'explanatory talk' during dinner or stories [38].

Oral storytelling in African–American homes is more common than reading aloud and is used to preserve a cultural identity [39,40]. Also when reading, low and middle socio-economic status African–American mothers label pictures for the child to imitate, and 'stick to the text', as opposed to white middle-class mothers, who frequently ask questions about the text [41].

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### The opportunity for pediatricians

Reach Out and Read is based on over 30 years, progressive emphasis in pediatrics on child development and behavior. The reframing of the scope of pediatric practice under the construct of 'new morbidities', the influential 1987 report from the Task Force on Pediatric Education [42,43] and influential leadership of Julius Richmond, MD, T. Berry Brazelton, MD, Morris Green, MD and Robert Haggerty, MD contributed to this emphasis. In 2009, the American Academy of Pediatrics added Early Brain and Child Development as a major focus for the future.

Reach Out and Read is designed to operate in the special circumstances of the medical setting and consists of three linked interventions: the pediatrician (or other pediatric primary care giver) gives each child a book purchased with public and private dollars at each health supervision visit from 6 months to 5 years of age. It is important to note that the doctor gives the book as part of the visit. This is not a book giveaway in which the child takes a book on the way into or out of the office. The books are chosen to be developmentally and culturally appropriate, and as appealing as possible, with brightly colored pictures; board books are available for young infants, and bilingual books are available where appropriate, and, where possible, the pediatrician gives the parent developmentally appropriate anticipatory guidance about how best to enjoy the book with the child, advising, for example, that it is normal for a 6-month-old to mouth the book immediately, but that the baby will enjoy having the parent point to pictures and offer names, or helping a parent understand that a 2-year-old may have a short attention span, or may want to hear the same book over and over. Clinicians also emphasize that reading aloud is fun and stimulates language development, and literacy-enriched waiting rooms include a range of enhancements ranging from volunteer readers in clinic waiting rooms who read aloud to children while they are waiting for their visits (thereby modeling techniques of reading aloud for parents), book shelves with books, and small chairs and tables so children can look at books by themselves or with their mother, posters, videos, etc.

**Table 1 SAFER strategies for literacy guidance**

S	Show the child the book early in the visit (do not wait until the end) Share (look at or read) the book with the child yourself, modeling for the parent
A	Ask the parent about reading aloud ('Have you started looking at books with Jane yet?') Assess the child's development and the child-parent relationship
F	Give feedback about what you have observed the child do Give feedback about parents' attitudes and interactions with the child
E	Encourage the parent to read aloud daily to the child Explain the benefits
R	Refer (to the library or family and adult literacy programs) Record in the chart what you did

Reproduced with permission from [44].

The distinction between a book-giveaway program ('take a book on the way out') and a clinical intervention of modeling and advice by the physician is emphasized to physicians receiving training in Reach Out and Read. Although brief (30 seconds to two minutes), engaging a parent and child with a book is reported by pediatricians to be a pleasurable and important teachable moment. Specific clinic-based strategies [44] for best practice are seen in Table 1.

We discovered that giving books to children changed the whole pediatric visit experience for young children from one of fear to one of pleasurable anticipation. Similarly, observing different capacities of children with books at different ages stimulates pediatricians to think in a more developmental framework (e.g., when do children recognize letters or hold a book right side up, how many objects or animals can they point to or name, and when do they do so?). The clinician modeling reading aloud with a child provides parents with an opportunity to observe another adult with their child and to see that sharing a book involves verbal responsiveness, which is very important [45] to infants. For example; in response to seeing the young child looking at an object or picture book, a clinician can model by making a sound like 'Ba', the clinician might respond 'that is a baby' and, for older children, asking questions, pointing out pictures, and responding to the child's interest. The clinician can also

demonstrate, model and/or observe other age-appropriate skills and parent-child interaction as part of developmental surveillance (Table 2). Even parents who are illiterate can and do point to and name pictures in books, thus creating the same language and positive emotional environment as literate parents.

**Evidence of effectiveness**

All published studies on the effectiveness of ROR using different outcomes, including blinded direct assessment of language and the home, and from different investigators and sites are remarkably consistent, showing positive benefits [46-58].

**Parent behavior**

Parents who received ROR had a higher likelihood of reporting looking at books with their child or naming 'looking at books' as a reported favorite activity [47]. Similar findings were obtained from both a clinic for residents [48] and one serving primarily Hispanic families. In the latter clinic, implementing literacy advice and giving books utilizing bilingual materials resulted in a 10-fold increase in the odds of parents reading to their child three or more times per week [49]. Another study, involving a home observation, demonstrated that more ROR clinic encounters are associated with a richer home literacy environment [56]. Finally, a multicenter assessment of Reach Out and Read, at 19 clinical sites in 10 states, found increased odds of reading aloud, reading at bedtime, and increased ownership of picture books in parents who were exposed to Reach Out and Read compared with those not exposed [57].

**Language outcomes**

In addition to parental behavior change, investigators began to examine the critical question of the potential effects of Reach Out and Read on children's development. Does giving a book, along with advice about the importance of sharing books, at well child visits actually translate into improved language and literacy skills? In a prospective

**Table 2 Age-specific child and parent behaviors with books for physicians, modeling and/or observing**

	Child behaviors	Parent behaviors
6-12 months	Reaches for book Puts books in mouth Looks at pictures	Follows baby's eyes
12-18 months	Points when asked 'where?' Makes sound for some pictures Joint attention	Follows baby's eyes Lets child control book Asks 'where is' questions Asks 'what's that?'
24 months	Names familiar pictures Fills in words to familiar stories Recites parts to well known stories Joint attention	Relate books to child's experience
3 years and older	Can re-tell familiar stories Begins to recognize some letters	Ask 'what's happening here?' Let child tell story

study of low-income families, after an average of three visits, parents read to their toddlers more frequently and reported increased enjoyment of book reading. The increased book reading was associated with higher scores on tests of expressive and receptive vocabulary, even for words not in the books being distributed [50].

Another study found that an increased number of ROR pediatric visits is associated with higher receptive and expressive language scores [46]. Of note, the scores of the intervention group still fell below the national average, underscoring the underlying challenges in place for this high-risk population. In a comparison at two similar inner-city pediatric practices, the children from the ROR practice had higher scores on receptive language and on a measure of home-reading environment [53].

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### Parent-physician relationship

There are also reports of other benefits from participating in Reach Out and Read, for both families and pediatric providers. Families in a continuity clinic for pediatric residents who were given early literacy-related anticipatory guidance and a book were more likely to rate their doctor as helpful, and were twice as likely to report enjoyment in reading together compared with those who were only given the anticipatory guidance. The pediatricians in this intervention group were also more likely to rate parents as receptive than those in the group that gave anticipatory guidance alone [52].

In a qualitative study from one ROR clinic serving a large Spanish-speaking immigrant population, providers encouraged parents in Spanish to 'look at books' with their children and opened an on-site children's library which not only lent out books but held story-time and provided community literacy resources in addition to giving bilingual books and advice. This clinic received 133 thank you notes spontaneously during 1 year. The notes thanked the clinic for the books and for running the library, expressed benefits such as motivating children to read and to come to the clinic, and revealed positive perceptions of the clinic staff, for example 'respect for the family' [58].

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### Reach Out and Read: critical components for success

Reach Out and Read is a relatively simple, inexpensive and low-technology intervention, which is implemented in over 4000 clinical sites reaching 32% of children below the poverty line in the United States. There are 32 regional coalitions nationwide that help raise funds and provide training and support for local sites. Reach Out and Read has received federal funding for almost 10 years with additional support coming from 12 states and private individual and corporate donors. There are special

coalitions for American Indians and military families. ROR or adapted versions are practiced in over 11 countries from Italy, Israel and Ireland to Africa and El Salvador.

The following critical factors contributed to ROR's successful growth [1<sup>•</sup>]: first, it was an innovation to address a problem identified in primary care of low-income children. Second, the innovation was simple and made common sense. Third, support and dissemination occurred at a grass-roots level. The 'early adapting physicians' and physician champions were passionate about the importance of helping children have books in their home and parents reading to them. Not surprisingly, reading to their children was a specially valued activity of these physicians, and their support had a strong base in equity between their children and their patients. Fourth, data was generated to support its effectiveness. Fifth, communication about the intervention through published articles, Grand Rounds, continuing medical educating courses, and stories in pediatric media made it possible to reach early adapters. Sixth, nonphysician community volunteers helped provide needed service and donors, and public officials, specifically First Lady Hillary Clinton and Senator Ted Kennedy, provided leadership to ensure federal and philanthropic funds to help purchase books.

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### Conclusion

Reach Out and Read represents a special effort in which evidence about the importance of reading aloud to young children was applied to pediatric practice. The future includes further expansion to reach all high-risk low-income young children, quality improvement efforts to ensure advice and books are given by physicians to all children under 5 years at their well child visits, and finally the adaptation and evaluation of related evidence-based strategies to promote more effective reading aloud, interactive reading, designated books emphasizing rhymes to enhance learning sounds, as part of Reach Out and Read to enhance effectiveness of children learning to read.

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### References and recommended reading

Papers of particular interest, published within the annual period of review, have been highlighted as:

- of special interest
- of outstanding interest

Additional references related to this topic can also be found in the Current World Literature section in this issue (pp. 000-000).

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