

Health Literacy and Child Health Promotion: Implications for Research, Clinical Care, and Public Policy

abstract

The nation's leading sources of morbidity and health disparities (eg, preterm birth, obesity, chronic lung disease, cardiovascular disease, type 2 diabetes, mental health disorders, and cancer) require an evidence-based approach to the delivery of effective preventive care across the life course (eg, prenatal care, primary preventive care, immunizations, physical activity, nutrition, smoking cessation, and early diagnostic screening). Health literacy may be a critical and modifiable factor for improving preventive care and reducing health disparities. Recent studies among adults have established an independent association between lower health literacy and poorer understanding of preventive care information and poor access to preventive care services. Children of parents with higher literacy skills are more likely to have better outcomes in child health promotion and disease prevention. Adult studies in disease prevention have suggested that addressing health literacy would be an efficacious strategy for reducing health disparities. Future initiatives to reduce child health inequities should include health-promotion strategies that meet the health literacy needs of children, adolescents, and their caregivers. *Pediatrics* 2009;124:S306–S314

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KEY WORDS

health literacy, health disparities, disease prevention, health promotion

ABBREVIATIONS

AAP—American Academy of Pediatrics
NAAL—National Assessment of Adult Literacy
OTC—over-the-counter
NHES—National Health Education Standards

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Providing all children and families with clear information about health promotion and disease prevention is a national priority. Each of the 10 leading health indicators (physical activity, overweight and obesity, tobacco use, substance use, responsible sexual behavior, mental health, injury prevention, environmental quality, immunizations, and access to care) outlined in Healthy People 2010 requires effective health promotion beginning in early childhood. Several national organizations have developed guidelines for child health promotion, including the US Preventive Services Task Force¹ and the American Academy of Pediatrics (AAP) with its National Center of Medical Home Initiatives² and Bright Futures guidelines.³ Meeting these national health care standards relies on the delivery of actionable information that is easily understood by children and families. Health literacy is an individual's capacity to understand and use health information to meet individual and family health needs.⁴ This capacity includes conventional literacy skills (the ability to understand written information, complete forms, and understand and use numbers) as well as the ability to access health information, communicate with health care providers, and navigate the health care system.

Unfortunately, child health information is frequently written at reading grade levels that exceed the literacy skills of most adults in the United States.^{5–14} The resulting “health literacy burden” may be damaging to the public's health. Controlling for income, gender, and age, several studies have demonstrated that adults with limited literacy skills are significantly less likely than those with stronger skills to receive basic preventive care, including vaccines, weight management, and screening for breast, cervical, and prostate cancer.^{15–18} Eight of the 10

Healthy People 2010 leading health indicators are significantly and independently associated with increased adult literacy skills.^{19–21}

Although less is known about the relationship between literacy and child health, the mismatch between complex health information and low parental literacy skills may be an important moderator of child health disparities. In this article we examine the role of health literacy in child health promotion by (1) reviewing the current evidence concerning the impact of health literacy on pediatric preventive care and (2) recommending priority areas for improving child health promotion by addressing health literacy at the levels of patient care, health systems, educational systems, and community systems.

THE RELATIONSHIP BETWEEN HEALTH LITERACY AND PEDIATRIC PREVENTIVE CARE

Several factors must be considered when assessing the effect of health literacy on preventive care, including the health literacy skills of patients, increasingly complex health information, and subsequent barriers to access, care, and health-promoting action.

Health Literacy of Parents With Infants and Young Children

Many caregivers of young children do not have adequate literacy skills to understand and follow child preventive health messages. At least 1 in 3 US adults has limited health literacy.^{4,22,23} According to the 2003 National Assessment of Adult Literacy (NAAL), 78 million US adults (36% of the population) are unable to perform “basic” child preventive health tasks such as using an immunization schedule, following recommendations from a preventive health brochure, and interpreting a growth chart.²⁴ According to the NAAL, just over 1 in 10 adults between

the ages of 16 and 64 years cannot complete “below-basic” health-literacy tasks for their children, such as using the dosage chart on an over-the-counter (OTC) medication.²⁴ A complete discussion of the health literacy of US parents can be found in another article in this supplement to *Pediatrics* by Yin et al.²⁵

Health-Literacy Burden of Child Preventive Health Information

Important information regarding the preventive care of infants and young children is often provided in wordy, multipage documents that are too difficult for most adults to use. National and state information for parents about the expanded newborn genetic screening program is written at the 10th-grade level (range: 9th–12th grade),^{5,6} and primary care providers' verbal communication about newborn screening is hindered by the complex jargon they use.⁷ Twenty-six states have enrollment forms for the State Children's Health Insurance Program (SCHIP) that are written above the 10th-grade level.⁸ Caregiver information brochures produced by the AAP and the Injury Prevention Program are written, on average, at the 10th-grade level (range: 6th–16th grade).^{9,10} The Centers for Disease Control and Prevention's vaccine information pamphlets and 4 handouts in the AAP's new plain-language pediatrics guidebook are among the very few nationally standardized examples of preventive health information for children that are written below the 8th-grade level.^{11–13}

The complexity of child health information is amplified by its volume and diversity, facilitated by the proliferation of often well-intentioned Internet health resources and patient care guidelines. Internet-based child health information designed for parents is written above the 10th-grade reading

level.²⁶ The Internet is the most common source of health information for adolescents and young adults, and access to Internet information is growing rapidly, even among individuals with limited literacy skills. When the third edition of *Bright Futures: Guidelines for Health Supervision of Infants, Children, and Adolescents*³ was published by the AAP in 2007, the authors recognized that the complexity and volume of health-promotion information exceeded the time available for information exchange at each pediatric office visit. In an attempt to address this conundrum, the AAP identified 5 anticipatory guidance priorities for each visit and provided an extensive toolkit that includes parent/adolescent questionnaires and health-information handouts that summarize the anticipatory guidance information for that visit. These national guidelines acknowledge the challenges of imparting information to individuals with low literacy, yet the mechanisms for doing so are left up to the clinician or health care delivery system to develop.

Associations Between Health Literacy and Child Preventive Health Outcomes

The widening gap between limited health-literacy skills and increasingly complex health information may be responsible for preventable disparities in child health. Controlling for income, gender, and age, several studies have suggested that children of parents with limited literacy skills and adolescents with limited literacy skills are less likely to receive some of the benefits of basic preventive care.

Access to Pediatric Primary Care

Children living in families with low literacy have decreased access to primary preventive care. Compared with children of caregivers with adequate literacy skills, children of caregivers with low health literacy are more likely

to have unmet health care needs²⁷ and to make more unnecessary visits to the emergency department.²⁸ Adjusting for income, age, and English-language proficiency, a recent analysis of the NAAL indicated that children of caregivers with low health literacy are significantly more likely to be uninsured.²⁵

Injury Prevention

Several studies have demonstrated that caregivers with low literacy were significantly less likely to understand other critical aspects of pediatric anticipatory guidance regarding home safety, including how to perform a home-safety check and how to handle common household emergencies.²⁹ In an intervention trial among adults with known intellectual disabilities, home-safety behaviors improved more significantly among caregivers with better reading skills.³⁰

Medication errors may be more likely in families with limited literacy skills. Interpretation of dosing charts for OTC medicines is significantly more difficult for caregivers with limited literacy or numeracy skills.^{31–33} A recent study by Lokker et al³⁴ demonstrated that at least 2 in 3 caregivers considered OTC cough and cold medications appropriate for infants despite viewing package labeling that suggested otherwise; misinterpretation of OTC-product age indication was highest among those with the lowest numeracy skills.

Adolescent Health Behaviors

Adolescent health behaviors are strongly associated with adolescent literacy skills. Four studies have provided good evidence that children and adolescents who read below their grade level are at an increased risk for violent and aggressive behavior when compared with those who read at or above their grade level.^{35–38} Two other studies demonstrated an association between adolescents' reading below

their grade level and 2 additional categories of risky behaviors: substance use and acquisition of sexually transmissible illnesses.^{39,40}

Nutrition and Obesity

Several recent studies have demonstrated independent associations between limited caregiver literacy skills and indicators of poor child nutrition. Breastfeeding is less common among women with limited health literacy even after adjusting for race and family income. One large cross-sectional study indicated a strong, independent association between low maternal health literacy and a decreased likelihood of exclusive breastfeeding 2 months after birth.⁴¹ After reading a page from the breastfeeding guide produced by the AAP, only 17% of mothers accurately understood the information provided.

Several studies have noted that parents with low literacy skills are less able to understand food labels, identify appropriate portion sizes, and mix infant formula correctly. In a multisite study of 200 caregivers of infant children (aged 0–1 year), Rothman et al⁴¹ demonstrated that only 56% of parents could determine if a juice had adequate vitamin C to be eligible for the Supplemental Nutrition Program for Women, Infants, and Children (WIC). In another study, parents with inadequate health-literacy skills were significantly less likely to look at nutrition labels on food products; these results were adjusted for caregiver language, education, ethnicity, and child age and weight.⁴² Health literacy also seems to be associated with inaccurate perception of child weight. Yin et al⁴³ found that nearly 75% of parents of overweight children studied perceived their child to be of normal weight or underweight. Parents with inadequate health literacy were twice as likely to have an inaccurate perception of their

child's weight. In the study by Rothman et al,¹⁸ only 56% of the subjects could interpret a percentile on a Centers for Disease Control and Prevention growth chart.

Environmental Tobacco Smoke Exposure

Children of parents with low literacy may be at an increased risk of exposure to environmental tobacco smoke. Adjusted for socioeconomic status and ethnicity, several studies have suggested that mothers with low health-literacy skills are more likely to smoke tobacco.²⁹ This association, however, is not consistent across all studies.²¹

Maternal Mental Health

Maternal mental health is a critical determinant of child health, and the diagnosis and treatment of maternal depression is an important element of child preventive health care. Several studies have demonstrated a strong, independent relationship between low maternal literacy and increased rates of maternal depressive symptoms. One intervention trial and 2 cross-sectional studies documented a strong, independent relationship between maternal depression and maternal literacy skills.^{44–46} Maternal depressive symptoms improved in the context of an intervention that was aimed at improving maternal literacy skills.⁴⁷ Adjusted for socioeconomic status and ethnicity, mothers with low health-literacy skills are also more likely to smoke and to be obese,²⁹ factors that in many studies have been strongly associated with major depression.^{48–50}

AN AGENDA FOR HEALTH LITERACY AND CHILD HEALTH PROMOTION

In 2004, an Institute of Medicine (IOM) report recommended health-literacy interventions at 4 different levels: individual patient care, health systems, educational systems, and community systems. To meet the preven-

tive health needs of children, such interventions must be informed by proven models of health-behavior change,^{51,52} by the experience of families with low literacy, and by a review of the available evidence. In keeping with IOM-recommended levels of intervention we make the following sets of recommendations.

Individual Patient Care

Providing clear, actionable preventive care information should be a critical goal of each child's medical home. Such health information should include not only preventive health topics, such as immunizations, reading aloud, nutrition, car safety, home safety, and breast and testicular examinations, but also critical community services such as early-intervention programs, mental health providers, pediatric dentists, after-school programs, and smoking-cessation classes. For children with special health care needs, this should include condition-specific information for injury prevention, physical activity, and nutrition, as well as how to obtain and carry out individual emergency-care plans and individual education plans.

- **Training:** All members of the pediatric care team (primary care physicians, nurse practitioners, specialty care providers, nursing staff, paraprofessional staff, office staff, social workers, and trained volunteers) should be trained in the effective communication of preventive care information. Such training should emphasize “teach-back,” reduced use of jargon, the effective use of communication and informational materials, and the use of motivational interviewing and shared decision-making.^{53–60}
- **Modeling:** All members of the pediatric care team can model health-literacy behaviors through the active engagement of the child/patient

and by encouraging questioning as well as demonstrations of self-care action.

- **Expanded inquiry:** Pediatric providers should routinely inquire about child literacy skills to determine if a child is reading below his or her grade level. In early childhood, providers should encourage parents to read aloud with their children. In late childhood and adolescence, providers should encourage evaluation and individualized education plans for children who are reading below their grade level.
- **Print materials:** Pediatric office settings should provide easy-to-use forms of written information about preventive health that are audience appropriate. This approach may include revising text and increasing visual cues on commonly used handouts, replacing existing materials with user-friendly versions, and making clear the recommended action by explaining it in easy-to-follow steps.^{61,62}
- **Nonprint options:** Nonprint materials should be used as communication tools at the point of care and thereafter. Video illustrations may be most suitable to demonstrate and reinforce certain health-promotion activities⁶³ such as proper hand-washing techniques, reading aloud with a young child, proper use of “time outs,” dental care for toddlers, or performing a home-safety check. Other examples of nonwritten health information include medication dosing instruments, “sippy cups” that denote the recommended daily intake of fruit juice, plates that outline appropriate portion sizes, or timers for limiting television-viewing.
- **Waiting-room opportunities:** Pediatric offices and clinics should make child health information available during both “active time,” when the

provider and family engage in conversation, and “passive time,” when the family is waiting for clinical care, diagnostic testing, procedures, or results. Some offices may consider other innovative techniques such as group well-child visits to help families learn health-literacy skills interactively with health care providers, as well as from other patients and their families.^{64,65} In waiting or examination rooms, electronic kiosks outfitted with audio headphones may help deliver tailored child health-promotion messages to parents or children with limited literacy skills.^{66,67}

- Research: Controlled studies should assess whether such improvements in the delivery of child preventive health information increase the receipt of preventive care services, decrease the use of urgent care services, or improve the quality of care.

Health Systems

Major reforms to the health care system, particularly to child health and preventive care services, should include standardized approaches to developing and disseminating preventive health information to families and adolescents.

- Leadership: The AAP, along with appropriate pediatric organizations and government agencies, should work to develop standardized, low-literacy health messages for child health promotion.^{68–74}
- Dissemination: The AAP, as well as federal and state health agencies, should provide public access to timely, low-literacy health information for all children and parents.
- Point-of-service information: Electronic health records systems (electronic medical records and personal health records) should include low-literacy child health-

promotion messages. In each system, point-of-care prompts should include low-literacy, family-centered health-promotion messages that are tailored to the child’s health needs, family history, and developmental stage.

- Quality of care: Health-literacy-related metrics should be included in health-systems measures of quality, including the Consumer Assessment of Healthcare Providers (CAHPS), Healthcare Effectiveness Data and Information Set (HEDIS), and measures developed by the National Committee for Quality Assurance (NCQA).^{75,76}

Educational System

The educational system has a vested interest in building each child’s health-literacy skills from preschool through young adulthood. The National Health Education Standards (NHES) are guidelines for developing and assessing health-education information and curricula from prekindergarten through 12th grade.^{77–79} In fact, some school systems are beginning to recommend or require health literacy as a competency for graduation. The specific criteria for achieving competent health literacy, however, are inconsistent, and curricula to teach these competencies vary widely. Several successful child health interventions have demonstrated their efficacy in kindergarten through 12th-grade classrooms,^{80–83} although the role of child or parent health literacy in the success of these interventions has not been examined. Educators and education researchers, partnering with child health researchers, can add critical information to the evidence base in child health promotion by implementing the following recommendations.

- Skill building: Child health researchers should work together with educators to identify the

most clinically important health-literacy skills in the context of the NHES guidelines. Adapted from both the NHES and the Bright Futures guidelines, Table 1 describes the expected development of health-literacy skills from childhood through young adulthood.

- The NHES: With input from child health professionals, the NHES should guide curricula development from pre-K through 12th grade. Preschool curricula should be designed to reinforce health-promotion activities among both toddlers and their caregivers. Kindergarten through 12th-grade curricula should incorporate health-literacy competencies in all educational disciplines (eg, mathematics, reading, social studies). Adult-education modules should teach pediatric health-literacy competencies within existing general educational development (GED) and English for speakers of other languages (ESOL) curricula.
- Integration: Classrooms should be used more effectively as laboratories to reinforce critical messages about individual health behaviors. Such efforts may be modeled on evidence-based campaigns that target adolescent health behavior, such as the “Choose Respect” campaign to prevent dating abuse, the “Truth” antitobacco campaign, and the “Parents: the Anti-Drug” campaign.

Social Systems and Communities

We know relatively little about the role of health literacy in the context of other social determinants of child health. To target public health strategies most effectively, we must know more about the relationship between health literacy and common child health problems that are known to be sensitive to the psychosocial environment, including preterm birth, malnu-

TABLE 1 Examples of Child Health-Literacy Skills in Health Promotion: A Developmental Perspective

	Prose/Document-Literacy Skills	Oral Literacy Skills	Numeracy Skills	Systems-Navigation Skills
By age 4 y, a child should be able to . . .	NA	Communicate with an adult caregiver or health provider about health behaviors (eg, tooth-brushing, physical activity).	Recognize the relative value of health choices (eg, food portion sizes).	NA
By age 10 y, a child should be able to . . .	Understand the content of a child-oriented handout about bike-helmet use.	Describe ways to prevent common childhood injuries and health problems.	Identify the characteristics of healthy versus nonhealthy foods on the basis of sugar or fat content in nutrition labels.	Describe how the media can influence health behaviors.
By age 14 y, a child should be able to . . .	Develop a written plan to attain a personal health goal that addresses personal strengths, needs, and risks.	Demonstrate refusal, negotiation, and collaboration skills to enhance peer and family influence on health behaviors.	Analyze personal susceptibility to injury, illness, or death if engaging in unhealthy behaviors.	Evaluate the validity of health information, products, and services and access valid health information and counseling services.
By age 18 y, a child should be able to . . .	Complete a document with child's medical history and health needs and read and understand patient bill of rights.	Identify a child or family's health behaviors and establish personal health goals for a family or child.	Understand and use OTC medications and understand results of child health screening tests (eg, newborn screening results, growth chart).	Complete the enrollment process for child health insurance (eg, SCHIP) and obtain school-based health services.

NA indicates not applicable; SCHIP, State Children's Health Insurance Program. Adapted from the Bright Futures³ initiative and the NHES⁷⁷.

trition, obesity, asthma, dental caries, injuries, and developmental and behavioral problems.⁸⁴⁻⁸⁷ One model for the relationship between health literacy and child health is shown in Fig 1. To test this model in the context of community systems, we make the following recommendations.

- Evaluation: Public health, communication, and marketing researchers

should examine the effectiveness of low-literacy, child health-promotion messaging in educational and community settings. This community-based participatory research should include, but not be limited to, home-visiting programs, prenatal classes, parenting classes, early child learning centers, and after-school programs.

- Instrumentation: Health services researchers should develop brief and meaningful instruments to assess parent and child health literacy in the context of child health promotion. The most common measures of health literacy do not capture meaningful pediatric information,⁸⁸⁻⁹² but some newly validated measures may be able to do so.
- Trend data: Large cross-sectional and longitudinal cohort studies of child health should include measures of parent and child literacy skills. This should include the National Children's Study, the Early Childhood Longitudinal Study, the National Longitudinal Study of Youth, the National Health and Nutrition Examination Survey, the Medical Expenditure Panel Survey Medicaid, and other nationally representative health surveys.

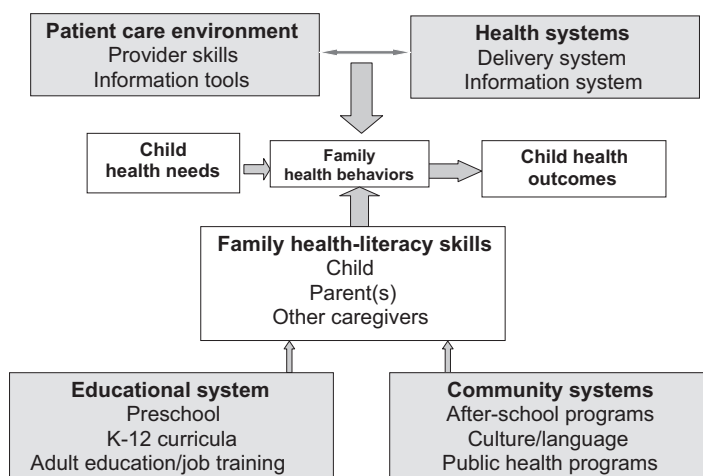


FIGURE 1 Model for health literacy and child health promotion. K indicates kindergarten. (Adapted from Wagner EH. *Eff Clin Pract.* 1998;1(1):2-4.)

CONCLUSIONS

In 2002, the Institute of Medicine released the report *Unequal Treatment: Confronting Racial and Ethnic Dispari-*

ties in Health Care,⁹³ which identified health literacy as an important, cross-cutting theme to address in any efforts to reduce ethnic and racial health disparities. It is premature to conclude that low parent or adolescent health literacy is an important cause of preventable child health disparities. In the peer-reviewed medical literature, we could identify no rigorous studies of literacy-based interventions in child preventive care. Still, children of parents with higher literacy skills and adolescents with higher literacy skills are more likely to have better outcomes in child health promotion and disease prevention. These outcomes include primary care access, sexually transmissible illness, substance use, obesity, behavioral health problems, maternal depression, and environmental tobacco smoke.

The child health-promotion agenda should include evidence-driven approaches to developing, delivering, and evaluating clear health communication in 4 settings: patient care, health systems, educational systems, and community systems. These approaches should include training all child health providers to more effec-

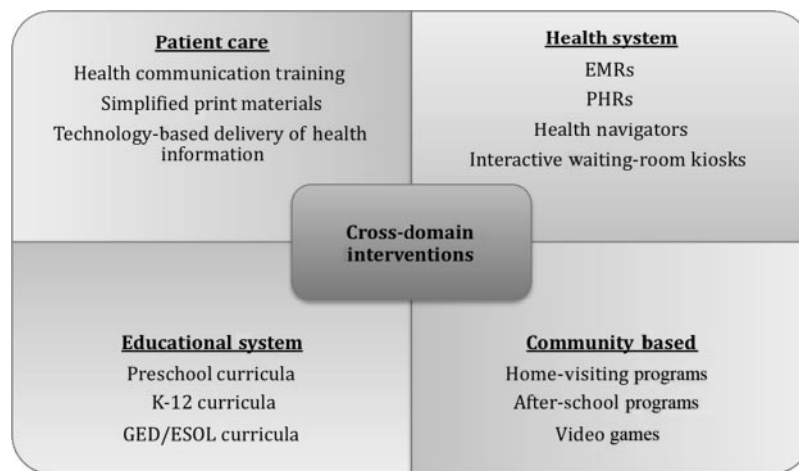


FIGURE 2

Five domains for literacy-based intervention in child health promotion. EMRs indicates electronic medical records; PHRs, personal health records; K, kindergarten; GED, general educational development; ESOL, English for speakers of other languages.

tively deliver anticipatory guidance, integration of low-literacy child health-promotion messages in electronic medical records systems, integration of the NHEC into prekindergarten through 12 curricula, and longitudinal cohort studies to examine the independent role of health literacy as a social determinant of child and adult health (see Fig 2).

Leadership and cross-disciplinary partnership are needed to make this agenda a reality. Leadership may arise

from the child health community, but partnership will be necessary with policy makers, health systems leaders, education advocacy groups, professional educators, health services researchers, and the adult low-literacy community. Integrating a health-literacy perspective with the activities of federal, state, and local agencies, as well as large health systems, will be necessary to turn these health-promotion innovations into real gains in the lives of children.

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