



**PRIMARY CARE SERVICES:
PROMOTING OPTIMAL CHILD DEVELOPMENT
FROM BIRTH TO THREE YEARS**

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EXECUTIVE SUMMARY

The first three years of a child's life are an important time for brain growth: they offer a window of opportunity to optimize children's development in many ways. Increasing recognition of the developmental sensitivity of this period has heightened the attention of professionals, parents, and policymakers. Among the recent trends that provide the impetus for this report are research that validates the importance of early experience for child brain development, recognition of the importance of addressing psychosocial concerns in health care (Shonkoff & Green, 1998), parents' growing need and demand for child-rearing information, and the extension of the Individuals with Disabilities Education Act (Part C) to include services for infants and toddlers. Both the American Academy of Pediatrics (AAP) and the Maternal and Child Health Bureau support and encourage the increasing focus on the provision of these kinds of services in their respective health supervision guidelines, which emphasize the promotion of optimal development.

Pediatric health care providers are positioned to play a pivotal role in delivering a variety of these services. However, managed care and related reimbursement issues have imposed constraints on the range and scope of developmental services they can provide. Changes in the criteria for authorizing and reimbursing services require that medical necessity be justified with evidence of effectiveness, and in many cases, cost effectiveness (Eddy 1997). There are also questions about what constitutes routine developmental services and how they should be provided. Both clinical practice and health care policy decision-makers require answers to these questions.

This report defines and examines the evidence for the effectiveness of health services specifically targeted at promoting optimal development in children from birth to 3 years of age. The services reviewed are provided in general pediatric settings as part of routine well-child care and health supervision. This literature was compelling in identifying promising approaches toward promoting optimal child development in health care settings, in raising important issues relevant to delivering developmental services in pediatric practice, and in suggesting avenues for future work.

Methods and Findings

We used the two major health supervision guidelines for pediatricians—AAP and the Bright Futures Project—to define the scope and array of primary care services intended to promote child development during the first three years of life. This list was augmented with service enhancements derived from innovative primary care demonstration programs

such as the Commonwealth Healthy Steps Program (Zuckerman et al. 1997) and Zero to Three's Developmental Specialist Program (Eggbeer et al. 1997). We then conducted a literature search for articles published between 1979 and 1999 that evaluated the efficacy, effectiveness, or cost effectiveness of services. The 47 articles that met criteria for review were separated into four categories—assessment, education, intervention, and care coordination. Our findings are summarized by category.

Assessment

Seventeen articles examined the effectiveness of surveillance and screening assessments in identifying children's risk of developmental disability and evaluating the psychosocial context of development and child behavioral characteristics.

Assessment for developmental problems

The review raises important questions about the adequacy of clinical assessment for developmental problems. Physicians identify relatively few developmental problems that would qualify a child for early intervention or special education before school entry. The reasons for this are unclear, although a reliance on non-validated “informal” assessment practices and ineffective assessment strategies may be a factor. The review suggests two alternative strategies. First, if large populations are to be screened routinely, the use of a more structured assessment at less frequent intervals may be more effective than the current AAP recommendation to address development at every health-supervision visit. Second, a short, validated questionnaire (the Parents' Evaluation of Developmental Status, or PEDS) based on parental concerns shows promise as a cost-effective strategy that warrants further evaluation in pediatric settings. From a clinical standpoint, the elicitation of parents' concerns was shown to improve communication about behavior and development at the health visit.

Assessment of the psychosocial context of development

Articles reviewed examined the effectiveness of assessments of psychosocial risk factors associated with poor parenting practices (e.g., maternal depression, substance abuse, domestic violence, and parental history of abuse as a child), as well as the quality of the home environment and the quality of mother–infant interaction. Most approaches to the assessment of these risk factors used questionnaires that were brief adaptations of longer instruments, e.g., the Kemper Family Psychosocial Questionnaire. The use of structured questionnaires by and large identified more problems than clinical judgment alone. Brief adapted measures to assess the child's home environment were shown to compare favorably to the longer validated version. Finally, a valid assessment of mother–infant interaction (e.g., observing sensitivity to infant behavior, effectiveness at soothing the infant) in the office setting was demonstrated. Although efficacy studies of psychosocial,

home, and parenting assessment lead to valid measures of function, their utility and effectiveness in general pediatric practices will require additional evaluation.

Child Behavior Assessment

The literature on the assessment of behavior in children from birth to 3 years is largely limited to the literature on the assessment of temperament. Studies that examine the use of temperament questionnaires—e.g., the Infant and Toddler Temperament Questionnaires—in pediatric practice garnered general acceptance and ratings of usefulness from parents of children whose temperament was perceived as difficult. Limited validation in different practice settings and the length of the questionnaires may pose barriers to the routine use of temperament assessment in clinical practice. On the other hand, targeted assessment of temperament at certain ages—at age 4 months for example—may be a feasible and useful strategy for parents with concerns relevant to temperament. An automated system for assessing temperament, studied in a large managed care organization, shows promise.

Education

Twenty articles qualified for review. Although there has been much emphasis on anticipatory guidance in general health supervision, surprisingly few studies examine the effectiveness of this time-honored practice. The only reviewed study of the overall effectiveness of physician teaching efforts directed toward increasing positive contact between parent and child showed that physician teaching was indirectly related to child development outcome. Yet physicians actually spend very little time encouraging positive and harmonious social interaction between parents and their children. Instead, most educational efforts that address development are limited to the discussion of developmental stages and common behavioral problems. This practice may in fact increase knowledge without necessarily having any effect on outcomes like developmental performance, mother-child interaction, or maternal perceptions and attitudes. Smaller, more narrowly focused studies demonstrate the efficacy of efforts to enhance mother-infant interaction, optimize infant sleep habits, help parents promote their children's learning, and encourage the use of time-out as a discipline technique. Taken together, this literature suggests that the straightforward teaching role in which the pediatrician's goal is increasing parents' knowledge of child development in and of itself may less be effective than assumed and, in fact, may be somewhat misguided.

Finally, several studies suggested that group well-child care is at least as good as traditional well-child care in providing basic services. The group well-child care setting appears to foster the discussion of non-medical issues, e.g., personal and child-rearing concerns, and may be an option for delivering services in certain settings.

Intervention

Pediatricians are consulted frequently to help manage developmental and behavioral concerns. Fourteen studies that examine the management of two concerns often brought to their attention—excessive infant crying (infant colic) and pediatric sleep disturbances (night waking and bedtime settling disturbances)—were reviewed as representative of a wide range of potential concerns. Counseling that addressed soothing techniques was effective in reducing infant crying duration in most studies. Behavioral approaches that included ways to respond to children’s crying at night or tantrum behaviors at bedtime were effective to varying degrees in managing night waking and settling problems. These studies were largely experimental studies of efficacy, and, again, their potential effectiveness as part of routine pediatric care is implied and remains to be demonstrated. The role of medication is uncertain and, at best, very limited.

Care Coordination

We found no studies that addressed this issue in primary care pediatrics. Yet strategies for coordinating and monitoring the service needs of children with developmental and behavioral concerns are integral aspects of comprehensive care. This includes follow-up for office interventions and the monitoring of referrals to other specialists and services. Most of the few studies available in this area were program descriptions of approaches to case management outside of primary care settings for children with disabilities, e.g., during the transition from hospital to home. This aspect of care represents a constant logistical problem for many practices and a source of frustration for parents who must confront an overwhelming and fragmented service network for early intervention, special education, and social services. Pediatric providers would most likely benefit from more information about effective practices in this aspect of care.

Summary and Recommendations

Most of the studies we reviewed documented the efficacy of various screening and surveillance, educational, and intervention activities in small-scale efficacy trials, usually at one practice site or location. These studies show that the services and interventions can work. Unfortunately, and for the most part, there have been no wide-scale, multi-site effectiveness studies of these delivery approaches. The literature suggests avenues for further investigation and evaluation and makes a compelling case that these seemingly effective developmental services can be more generally employed to promote optimal child development during the first three years of life. Many of these promising approaches should be tested in broad-based effectiveness trials.

The review also suggests a need to develop more specific service-delivery pathways to improve the feasibility of wide-scale implementation. This process should include reconsideration of currently recommended clinical approaches to developmental and behavioral activities that are largely based on consensus opinion and traditions of practice. Finally, the review raises important issues relevant to the training of pediatricians and to health care policy in general. The following recommendations are offered:

1. Future studies of effectiveness should examine cost- and time-efficient approaches to developmental assessment in the first three years of life.
2. Further evaluation of efficient, validated approaches to developmental, psychosocial, and behavioral assessment should be done to determine the best use of these techniques in pediatric practice. Specific clinical strategies for these types of assessment are needed.
3. Studies examining the effectiveness of physician teaching activities should be expanded to address methods for promoting positive social experiences between the parent and child that are harmonious in the emotional sense as much as stimulating in the cognitive sense.
4. Although the literature suggests that counseling and behavioral interventions for common developmental and behavioral concerns are efficacious, their effectiveness in pediatric settings remains to be explored. The feasibility of pediatric management of developmental and behavioral concerns for today's practitioners is uncertain. Boundary issues between other behavioral subspecialties (e.g., with psychology and psychiatry) have not been defined. Guidelines for evaluating and managing concerns about development and behavior and criteria for referral to other sub-specialists should be defined and empirically evaluated.
5. Strategies for care coordination and monitoring of services for children with developmental and behavioral concerns should be elaborated.
6. Training should target physician attitudes toward and understanding of the concepts of developmental surveillance, screening, and early intervention. Although most of the studies addressing the effectiveness of physicians' efforts to identify developmental disabilities predate Part C of the Individuals with Disabilities Education Act, there appears to be continued and widespread misunderstanding of these concepts and their application in routine pediatric care.

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INTRODUCTION

The first three years of a child's life are an important time for brain growth: they offer a window of opportunity to optimize children's development in many ways. Increasing recognition of the developmental sensitivity of this period has led to heightened attention from professionals, parents, and policymakers—several recent state and national policy initiatives aimed at improving pediatric care have focused on the provision of appropriate developmental services to young children. (Green & Palfrey 2000; Guyer et al. 2000). However, while the importance of providing such services during this sensitive period is widely acknowledged, the current pediatric practice environment presents significant barriers to realizing the benefits of these efforts.

Managed care and related reimbursement issues have imposed constraints on the range and scope of developmental services that pediatricians can provide. Changes in the criteria for authorizing and reimbursing services require that medical necessity be justified with evidence of effectiveness, and in many cases, cost effectiveness (Eddy 1997). There are also questions about what constitutes routine developmental services and how they should be provided. Historically, services such as developmental assessment and anticipatory guidance about developmental concerns have been bundled together with, and are indistinguishable from, other primary pediatric and preventive services. This makes it impossible to target developmental services specifically for quality improvement or augmented service-delivery strategies. Moreover, some argue that the current recommendations for developmental health supervision of the American Academy of Pediatrics and the Maternal and Child Health Bureau are neither feasible nor consistent with new evidence that is emerging about developmental surveillance and monitoring approaches (Young et al. 1997; Schuster et al. 2000).

Therefore, it is important to define and examine the evidence base for the efficacy of developmental services in order to guide both clinical practice and health care policy decisions. This review addresses pediatric services that promote optimal development in children from birth to 3 years of age as described in reports published over the last two decades. In an attempt to distinguish recommended developmental services as separate from other health-supervision activities, we categorize these services into four groups: assessment, education, intervention, and care coordination. This review aims to provide a framework for thinking of pediatric service-delivery in terms of specific health care

outcomes and to explore whether or not the current evidence base supports this kind of approach to evaluating health services intended to promote optimal development and/or prevent developmental morbidity.

METHODS

Defining the scope and array of pediatric developmental services

A review of recommendations detailed in health-supervision guidelines of the American Academy of Pediatrics (AAP 1997) and Bright Futures Project (Green & Palfrey 2000) yielded a list of child development services to be provided during the first three years of life (Table 1). This list was augmented with service enhancements derived from innovative primary care demonstration programs such as the Commonwealth Healthy Steps Program (Zuckerman et al. 1997) and Zero to Three's Developmental Specialist Program (Eggbeer et al. 1997). The various services were grouped into four major categories—assessment, education, intervention, and care coordination. Eight subcategories were defined within the four major categories:

- Assessment activities include evaluation of information from parents, developmental monitoring (including screening for developmental problems), psychosocial assessment, parent–child observation, and assessments of child behavior.
- Education services include anticipatory guidance that addresses the parent–infant relationship, child behavior, and various developmental challenges (e.g., promoting healthy sleep habits, discipline practices), as well as parenting education in different formats.
- Intervention includes various types of problem–focused counseling in the office, as a telephone service, or through home visits.
- Care coordination refers to the management of service needs, e.g., referrals for diagnostic assessments or to other specialists for care, and was not further subdivided.

Literature search

We created a list of key words and subject headings for each service category. A computerized search of the literature using the Medline and PsycInfo databases between 1979 and 1999 yielded a list of 312 publications that included original research, commentaries, and committee guideline statements. These were reviewed for additional relevant references. We abstracted all these publications and compiled them into tabular form under the subject headings of service category, author and year published,

description and purpose of the publication, quality of the evidence, methods, and results. Inclusion of a publication in the final list was based on the following criteria:

- Evaluation of efficacy (tested experimentally under tightly controlled conditions), effectiveness (evaluated in the real-world setting), cost effectiveness, or validation of assessment approaches;
- Performance in a pediatric-office setting, in conjunction with a pediatric practice, or applicable to office practice;
- A target population that included the birth to age 3 group; and
- Publication in English.

The primary purpose of the review was to examine general health supervision that addresses child development. Therefore, our methodology was different from other approaches toward the systematic review of clinical trials. This broad topic area encompasses many different clinical activities, each of which requires a search unto itself. In many instances, there were few or no studies to examine. On the other hand, some service categories required boundaries to limit the work to a manageable volume. We made three decisions to define the scope of the review.

First, we employed the concept of developmental surveillance (Dworkin 1989) to organize the developmental-services category and to narrow the scope of activities to those most relevant to current practice. The process of developmental surveillance entails the elicitation and evaluation of parents' concerns, the monitoring of developmental progress, and the performance of skilled observations (Dworkin 1989). Because the routine use of developmental screening tests is considered impractical, this clinical activity was excluded from the review. Other aspects of assessment from the category were targeted instead.

Second, although we intended to examine the effectiveness of office-based, developmentally focused interventions, the search for publications in this service category resulted in a diverse array of clinical interventions. Therefore, two common clinical issues—interventions for excessive infant crying and sleep problems—were selected as prototypes for a larger grouping of developmentally focused interventions.

Finally, to limit the scope of the review to well-baby care, studies that addressed biologically high-risk infants and studies that examined the clinical application of techniques and tools requiring specialized training, e.g., newborn neurobehavioral assessment (Nugent & Brazelton 1989), were excluded.

RESULTS

Application of the inclusion and exclusion criteria led to the selection of 47 articles from the larger list of abstracted articles. The selected articles examine the clinical efficacy or effectiveness of child development services, or the validity of assessment approaches in any form relevant to this typology. Of these, 30 were reports of controlled clinical trials. The remainder reported cross-validation studies of assessment approaches and one cost-benefits analysis. Our analysis of this literature is summarized below, organized by service category.

Developmental Assessment

Seventeen articles examined the efficacy of developmental assessment techniques in pediatric office settings (Table 2).

Evaluating parents' concerns about child development

Glascoc and Dworkin (1995) reviewed the literature that addresses the use of information from parents relevant to the detection of developmental and behavioral problems. They classified parental information into two basic categories—descriptions and appraisals. Descriptions include recall of past information and reports of current skills. Appraisals include estimations of the child's current ability, predictions of future skill, and concerns about current development or behavior. Of these, the use of parental reports of current skills and concerns was judged to be the most reliable and accurate. Those studies that examine the use of parental concerns about their children's development or behavior are reviewed here.

Triggs and Perrin (1989) examined the types of concerns that parents have at health-supervision visits and whether or not the use of a checklist was an effective way to improve communication about behavioral concerns between physician and parent. In a sample of 396 children ages 12 months through 6 years, they found that parents' concerns about their children's behavior were discussed more often when a checklist was used (53% vs. 30%). When a checklist was not used, there were important differences between the concerns parents most often noted and those that pediatricians actually discussed. Parents were most concerned about the child's behavior and contemporary issues important to parents (e.g., both parents working and daycare concerns), while pediatricians were more likely to discuss general development and appetite (general development was a concern of only 8% of parents). The use of a checklist appeared to influence both parents and pediatricians in ways important to effective communication about child behavioral concerns.

From a different perspective, studies by Glascoe and her colleagues suggest that specific and systematic elicitation of concerns about development and behavior may serve

as an effective screening strategy. The authors demonstrated how this practice may be helpful in deciding upon referrals for patients and for targeting families who should receive in-office counseling. In a cross-sectional study of children between the ages of 2 weeks and 6 years attending a well-child clinic, parents were asked to list concerns about their child's development while their children received screening tests of development and articulation (Glascoe et al. 1989). Children who passed developmental screening tests tended to have parents who had either no concerns, or concerns about behavior control, social-affective skills, personal-adaptive skills, medical status, gross motor skills, or school skills. Children who failed screening tests tended to have parents with concerns about speech articulation, expressive and receptive language, fine motor skills, or global development. The accuracy of the parents' concerns for identifying risk for developmental problems approached standards for more formal screening tests.

In a second study, Glascoe (1997) examined parental concerns about development and behavior using a sample of children ages 21 months to 7 years in daycare centers. The accuracy of parental concerns was validated against standardized tests of achievement, intelligence, and development. Concerns about language, school skills (children ages 4 years and older), global/cognitive skills, fine and gross motor skills, and hearing status were highly related to developmental problems (sensitivity = .79). No concerns or concerns in the areas of socialization, self-help, or behavior were specific for absence of disabilities (specificity = .72). Children whose parents had inaccurate concerns (false positives) tended to have subtle developmental differences indicated by lower scores as a group on developmental testing. The authors suggest the use of caution in generalizing the findings because predictors of true developmental problems varied somewhat with differences in the study setting (well-child clinic vs. daycare).

Glascoe's group also examined the usefulness of using parental concerns to guide referrals. Glascoe, MacLean, and Stone (1991) examined parental concerns about children's behavior as predictors of significant conduct problems. In a sample of children ages 2 to 6.5 years from well-child care clinics, parental concerns about behavior showed a sensitivity of .70 and specificity of .73 for significant behavioral problems. When compared to other screening tests, parental concerns about speech and language showed a sensitivity of .72 and specificity of .83 in identifying such problems (Glascoe 1991). Parents of children with global developmental delay had concerns about behavior, speech/language, and emotional status more often than concerns about global development.

Summary

The literature that examines the elicitation and evaluation of parents' concerns about their children's development provides important validation for using developmental surveillance as a clinical strategy. These studies suggest that structured and systematic approaches to eliciting parents' concerns improve communication at the health visit and also appear to be reliable and fairly accurate in the detection of developmental problems. Given the potential efficiency of this approach (the questionnaires and checklists require less than 5 minutes to administer), it deserves serious attention as a key strategy for organizing the activities of the health visit.

Developmental monitoring and screening

Few studies have directly examined the effectiveness of surveillance as a way to identify infants and toddlers with developmental problems. Glascoe and VanDervoort (1985) examined the screening and referral practices of physicians in middle Tennessee. They analyzed data on 641 children ages birth through 15 years who were referred to the Vanderbilt University Medical Center's Comprehensive Developmental Evaluation Center between 1977 and 1983. The analysis was designed to examine the referral practices of physicians compared with other sources (which included medical centers, developmental programs, and social services). In the case of children the center diagnosed with mental retardation, physicians did not differ from other referral sources on the basis of the child's gender, age, level of retardation, observability (presence of other physical findings or associated problems), or reason for referral. The mean age at referral was 2.9 years. Parents of children referred by physicians had significantly higher levels of education. Children with other handicapping conditions (e.g., learning disabilities, autism, and language problems) referred by physicians were significantly older and had participated in significantly fewer programs than those referred from other sources.

The authors also surveyed 500 middle-Tennessee physicians about their developmental screening and referral practices. Of these, 40 percent were family practitioners, 28 percent general practitioners, and 32 percent pediatricians. Forty-seven percent of responding physicians reported using formal screening tests. The Denver Developmental Screening Test was used by 96 percent of physicians. Fifty-three percent reported using "informal" assessments; 88 percent used informal questions to the parents. Twenty-nine percent reported screening every patient. Forty-three to 45 percent reported screening some patients on the basis of observed difficulty or reported problems; 34 percent reported screening on the basis of significant illness. When screening results suggested a problem, 45 percent of physicians indicated that they would observe the patient across visits. Sixty-four percent of physicians reported informing the parents of a

developmental diagnosis. Physicians referred to medical specialists (80%), school systems (43%), private programs (49%), and to psychologists or some other kind of professional for developmental evaluations (73%). The authors suggest that physicians are able to identify mental retardation early enough for the child to benefit from early educational intervention.

Palfrey, Singer, Walker, and Butler (1987) examined the relative contributions of the health care and educational systems to identifying children in need of early intervention services. They did a cross-sectional survey of 1,726 parents of special-education students in five urban communities across the United States and selected a stratified random sample from all special-education students, K-6th grade. Four percent of children in special education were identified as having developmental problems at birth, 16.4 percent by age 3 years, 28.7 percent by age 5 years, 47.9 percent between 5 and 7 years, and 23.3 percent after age 7 years. The child's primary handicap explained most of the variance (32%) in age at first identification. Two distinct clusters of disabilities were identified: low-prevalence conditions (Down syndrome, cerebral palsy, other neurological problems, general medical conditions, sensory impairments, mental retardation) and high-prevalence handicaps (speech impairment, hyperactivity, emotional problems, learning disabilities). Physicians were most successful in identifying children with low-prevalence, high-severity conditions. High-prevalence conditions were most likely to be identified after age 5 by non-physicians. Physicians were more likely to identify children with high-prevalence conditions if they had multiple problems; they were more likely to be identified early if they had more complex problems and mothers with higher education levels. Children with low-prevalence handicaps who were identified by non-physicians were far more likely to be identified earlier if their mothers were better educated (an average of two years earlier).

Regarding the question of effectiveness, relatively few problems were identified before school entry, including 24 percent of low-prevalence, high-severity conditions that physicians were most likely to identify. Current pediatric approaches to early identification of children at risk for problems are effective for the small minority of children with severe disabilities who present in the first three years of life. This has been suggested by other studies that used data from the National Health Interview Survey (Halfon & Newacheck 1999). Current pediatric approaches seem inadequate for the majority of children with more biologically subtle conditions. It appears that the developmental-assessment strategies in current use are not sensitive enough to identify most children, particularly those of low socioeconomic status, before they reach school age. This has important implications, since the prevalence of these conditions is greater in children from families of low socioeconomic status, where access to appropriate health services may be constrained (Halfon & Newacheck 1999).

Drillien, Pickering, and Drummond (1987) used data from a longitudinal study of child development in Scotland to examine the accuracy of developmental screening. The purpose of the study was to determine the areas and ages for screening that provided the best predictors of later developmental problems. The data reported were collected as part of the Dundee Developmental Screening Programme and involved two studies. A preschool study focused on developmental screening provided by a health visitor at 8 weeks with subsequent screening by community physicians. Motor, language, and adaptive development, neurological items, and behavior were assessed in 5,334 children from birth to three years. The second study addressed educational achievement and behavioral problems of 4,004 children at the end of their second school year. In the preschool study, 9 percent of children were identified as having moderate or more severe developmental disabilities. In the school study, 12 percent of children were reported to have significant problems. Children considered suspect on a previous screening were three times more likely to have school problems than were children screened as normal. The authors reported that developmental screening was most accurate when done at nine months and two years of life and that tests of adaptive and neurological function were best for identifying later school and behavior problems.

A retrospective case-control study used a subsample that comprised 417 children, ages birth to 3 years, with abnormal questionnaire scores matched to an equal number of children of the same sex and ages with normal questionnaire scores. Significant associations existed between screening tests of motor and adaptive development at ages 39 weeks, 15 months, 2 years, and 3 years. Abnormal language development screening was predictive of later school problems at 15 months, 2 years, and 3 years. Behavioral developmental screening was predictive only at 39 weeks and 2 years. Neurological screening was predictive only at 39 weeks and 3 years for later school problems. Children who had gross and/or fine motor problems at age 3 years were three times more likely to have significant school problems.

A second prospective analysis used another subsample of 570 children with suspect screening results and a sex- and age-matched control group of children selected at 4.5 to 5.5 years. In this subsample, adaptive screenings were the best predictors of later school performance, with significant associations at all ages after 39 weeks. Neurological screening was predictive at 20 weeks and 3 years. Behavior screening was predictive at 15 months and 2 years of age. Language screening showed little relationship to later school problems. Behavior problems in school were associated with adaptive screening at 39 weeks through 3 years of age and with neurological screening at all but one age (39 weeks). Preschool behavior problems did not predict school behavior problems. Expressive

language problems in school were associated with adaptive screening after 15 months of age and with neurological status at 20 weeks and 3 years of age. Impairment of gait and/or hand function at 3 years had the highest risk for expressive language problems in school. Reading problems in school were associated with adaptive and neurological screening. Again, neurological status at 3 years carried the highest risk of reading failure. Problems with number work were predicted by adaptive screening at 2 and 3 years, and by neurological screening at 20 weeks, 15 months, and 3 years. Writing problems were best predicted by neurological screening at all ages, by adaptive screening at 20 weeks, and by motor screening after 15 months.

To summarize, adaptive and neurological screening yielded the best prediction of later school problems. Any abnormal result places the child at increased risk for later problems. Based on their results, the authors recommend more extensive screening at less frequent intervals—at 39 weeks and 2 years—with a review of suspect children at 3 years to allow opportunities for early intervention.

Glascoc, Foster, and Wolraich (1997) examined the costs and benefits of four strategies for the detection of developmental problems. The analyses were conducted using data from previously reported studies. The sample for these analyses included 247 parents and their children from birth through age 6 years. Subjects were recruited from daycare centers ($n = 103$) and pediatric practices ($n = 144$). The developmental-assessment strategies included the use of a parental-concerns questionnaire only, direct screening with a standardized test, two-stage positive screening, and two-stage negative screening. Two-stage positive screening entails the elicitation of parents' concerns with a questionnaire and the provision of direct screening only if parents raise significant concerns. Referrals are made for diagnostic testing only when parents have significant concerns and a positive direct screening. Two-stage negative screening involves the elicitation of parents' concerns with a questionnaire with the provision of direct screening only if parents do not raise concerns. Referrals for diagnostic testing are made either when concerns are significant or direct screening is positive. Different licensed psychological examiners administered the screening tests and diagnostic measures. The short-term costs of administering the different screenings were estimated and long-term costs and benefits (the effect of early intervention) were estimated from other longitudinal studies. In estimating treatment costs, it was assumed that false negatives would be identified one year later (to distinguish early vs. late identification). Simulated treatment costs were estimated according to level of disability and all future costs were converted to net present value using a discount rate of 4 percent.

The authors determined that the long-term benefits of all four approaches to developmental screening and surveillance are equivalent. Short-term costs varied significantly depending on the strategy. Two-stage negative screening was the most costly, while screening on the basis of parents' concerns only was the least costly. However, if early intervention is to produce more dramatic changes in long-term outcome, then two-stage negative screening is most cost beneficial because of its higher sensitivity. Given equivalent long-term benefits, these data inform decisions to be made about individual practice approaches on the basis of short-term costs and liabilities.

Summary

These four studies suggest that current community efforts to identify children with developmental problems are not very effective. The literature reviewed is unclear about how much of this deficit is explained by a lack of an efficiently organized service-delivery effort in the pediatric sector. There have been few validated and recommended assessment options for pediatric providers beyond the use of lengthy developmental screening tests and little direction given about how recommended assessments could be accomplished, particularly in busy, high-volume settings. Taken together, these studies are important because they suggest alternative approaches to increase the accuracy of early detection of developmental problems; these approaches range in intensity, costs, and time efficiency, permitting their adaptation to different clinical populations or to the time constraints of different practice settings.

Psychosocial assessment

Articles that addressed psychosocial assessment included assessment of psychosocial risk factors, the quality of the physical environment, and the quality of the social and emotional context of development. Approaches to the assessment of psychosocial risk factors examined the use of questionnaires to identify factors associated with poor parenting. Approaches to the assessment of the child's physical environment adapted the Home Observation for Measurement of the Environment (HOME) inventory for pediatric use. Approaches to the assessment of the quality of the child's social and emotional context used office observations of mother-child interaction.

Eight articles addressed the assessment of psychosocial risk factors. Wissow, Wilson, Roter, Larson, and Berman (1992) examined the prevalence of exposure to intra-familial violence and associated problems and physicians' ability to identify these problems in a hospital-based pediatric residents' continuity clinic. The sample was 243 mothers and their children, ages 6 months to 14 years (69% of children were younger than 2 years of age). Ninety percent of the sample received Medicaid or had no insurance. The Conflict

Tactics Scale (CTS) (Strauss 1979) was used to assess violence between any persons considered to be a member of the family. Measures included behavior problems, child temperament, and adult psychosocial distress. Physicians were asked to rate the likelihood that intra-familial violence had occurred in the home and to observe any developmental, behavioral, or psychosocial problems.

Thirty-nine percent of families reported severe violence in their families. Twenty-three percent of mothers reported significant psychosocial problems. Mothers who reported violence were significantly more likely to report psychosocial distress. Physicians' predictions of intra-familial violence and psychosocial distress were inaccurate when compared to the CTS (sensitivity = 27%, specificity = 81% and sensitivity = 11%, specificity = 95% respectively). Although mothers who reported intra-familial violence also reported more behavior problems and were more likely to rate their children as more emotional, physicians' ratings of child behavior and emotional health did not differ between families with and without violence.

Kemper (1992) examined the clinical utility of a questionnaire for the detection of families with psychosocial risk factors for poor parenting. Psychosocial risk was assessed with questions about alcohol and substance abuse, depression, self-esteem, social support, domestic violence, housing stability, and parents' own childhood history of abuse. Alcohol and substance abuse, maternal depression, self-esteem, and social support were assessed with questions from other instruments validated in other studies. Mothers completed items on the questionnaire more frequently than was noted in the medical record (alcohol use, 95% vs. 37%; substance abuse, 97% vs. 42%; depression, 58% vs. 4%; self-esteem, 69% vs. 0%; social support, 69% vs. 21%; domestic violence, 89% vs. 4%; housing instability, 88% vs. 25%; and parental abuse as a child, 76% vs. 3%; all differences were statistically significant). The medical record identified potential risk factors not identified by the questionnaire (substance abuse, 10%; depression, 17%; social support, 28%; domestic violence, 40%; housing instability, 19%; and parental abuse as a child, 4%). However, the accuracy of either method of identification in this study was not validated. The overall response rate for the questionnaire was not reported.

Kemper & Babonis (1992) compared the accuracy of a three-item screening questionnaire for depressive disorders with the eight-item original RAND screening instrument in a cross-sectional survey of 667 mothers attending five pediatric clinics. The RAND screening instrument has a sensitivity of 96 percent and specificity of 95 percent for detecting depression compared with the Diagnostic Interview Schedule (Burnam et al. 1988). Nineteen percent of respondents were positive on the eight-item questionnaire

while 28 percent were positive on the three-item questionnaire. Compared with the eight-item questionnaire, the three-item screen had 100 percent sensitivity, 88 percent specificity, a positive predictive value of 66 percent, and a negative predictive value of 100 percent.

Kemper, Greteman, Bennett, and Babonis (1993) compared the performance of a questionnaire consisting of four screening questions for maternal alcohol abuse and two screening questions for drug abuse with the longer original questionnaires, the Michigan Alcoholism (MAST) and Drug Abuse Screening Tests (DAST), respectively. The sample comprised 507 mothers attending five pediatric clinics. Sixty-eight percent of mothers responded to the questionnaires. Approximately 30 percent of mothers stopped answering either the MAST or DAST by the fifth question, while more than 80 percent of mothers completed the experimental screening questionnaires (four alcohol and two drug-use questions). The MAST was positive in 18 percent of mothers; the DAST was positive in 3 percent. The sensitivity of the experimental questionnaire for alcohol-use problems was 91 percent compared with the MAST. The sensitivity of the experimental questionnaire for drug-use problems was 88 percent compared with the DAST. Furthermore, the screening questionnaire appeared to have identified women who had both drug and alcohol problems that the MAST or the DAST missed.

Kemper, Carlin, and Buntain-Ricklefs (1994) examined the accuracy of a brief questionnaire for the detection of a maternal history of physical abuse as a child. A parental history of abuse during childhood is a risk factor for abusing a child. Therefore, screening for parents' childhood experiences of abusive punishment could lead to preventive intervention addressing discipline and punishment at routine health visits. A self-administered screening questionnaire of four questions was derived from the physical abuse subscale of the Emotional and Physical Abuse (EPAB) questionnaire. The EPAB is a questionnaire developed to determine a history of childhood abuse and neglect among adults (Carlin, Kemper, Ward, Sowell, Gustafson, Stevens 1994). Sensitivity and specificity of the four-item questionnaire were determined in comparison to the EPAB. The four-item questionnaire was administered to 428 mothers. Sensitivities were 92 to 95 percent, specificities were 87 to 92 percent, positive predictive values were 78 to 93 percent, and negative predictive values were 90 to 97 percent compared with a criterion-based definition of physical abuse using the EPAB.

Measures of the home environment

Two studies used a modification of the HOME Inventory (Bradley & Caldwell 1984) for use in the pediatric office to assess the quality of the home environment.

Frankenburg and Coons (1986) adapted the HOME Inventory into a screening questionnaire (Home Screening Questionnaire, HSQ) that takes 15 to 20 minutes to administer to parents of children ages birth to 3 years. Compared with the parent measure, the questionnaire's co-positivity was 81.2 percent, co-negativity was 65.7 percent, and the positive predictive value was 77.3 percent. In the total sample of 799 low-income families, a correlation of 0.71 was observed between the HSQ and the HOME Inventory.

Casey, Bradley, Nelson, and Whaley (1988) examined an adaptation of the HOME Inventory as part of a more comprehensive office assessment, the Pediatric Review Of Children's Environmental Support and Stimulation (PROCESS). A 24-item questionnaire addressed the organization of the physical environment and the quality of developmental stimulation it provides. The clinician rates a 20-item inventory of items based on observations of the parent-child interaction during the pediatric office visit. In this study, two pediatricians evaluated 76 mother-infant pairs during 15- to 20-minute health visits. Infants ranged in age from 2 to 18 months. Inter-observer agreement (κ coefficient) for the total scale was 0.92 and internal consistency (α coefficient) was 0.76 for the entire measure (range 0.61–0.76). Correlations between the PROCESS (observation and questionnaire sections) and the HOME were significant, ranging from 0.35 to 0.73. Correlations between the PROCESS and a summary score of parent-child interaction were significant and ranged from 0.69 to 0.85. Correlations were also significant between the PROCESS and measures of home safety, use of infant seats, and family income.

Assessment of the parent-child relationship

Both the AAP and Bright Futures guidelines suggest observations of parent-child interaction as part of every general health-supervision visit. Only one systematic approach to this activity adapted for pediatric office use has been studied. Casey, Barrett, Bradley, and Spiker (1993) extended their initial work using the PROCESS with assessments of mother-infant interaction during routine pediatric office visits at eight months.

Assessments of mother-infant interaction using the PROCESS observations scales correlated significantly with the HOME Inventory at 12 and 36 months, with laboratory ratings of mother-child interaction at 30 months, and with scores on the developmental, intelligence, and language tests, and a measure of behavior problems at 36 months. This work demonstrates that it is possible to make valid clinical observations of mother-infant interaction in the pediatric office. These types of observation may be useful in identifying parents who would benefit from services to help with child-rearing concerns and to intervene in families found to be using maladaptive child-rearing practices.

Summary

The literature on the effectiveness of psychosocial assessment in office settings indicates that the use of questionnaires can improve the accuracy of psychosocial risk-factor identification. There is also some evidence to support the validity of home environment and parent-child assessments. Although these studies are essentially examinations of efficacy, they should provide a strong incentive for further investigations of this aspect of pediatric care. Better psychosocial-assessment tools and procedures could enhance the pediatric service provider's ability to screen for and refer common and debilitating psychosocial problems, from maternal depression to family violence. Pediatric health care supervision could be an effective entry point for "two generation" family interventions, e.g., referrals to an Early Head Start program or to family literacy programs.¹

Assessment of child behavior

We did not find any assessment approaches in the published literature to behavioral problems specific for the first three years of life. This is a reflection of the absence of a universally accepted diagnostic classification scheme for behavioral problems in this age period (Stancin & Palermo 1997). Behavior-problem checklists standardized for children beginning in the third year of life (e.g., Achenbach 1992, Eyberg & Ross 1978) have not been examined in terms of their effectiveness in pediatric practice. Instead, approaches to temperament assessment have been used to address behavioral concerns in infants and younger children (Carey 1985, Sturner 1991). Both the AAP and Bright Futures health-supervision guidelines recommend the discussion of infant temperament as part of routine well-child care. We believe that the context for the use of temperament assessment is better suited to anticipatory guidance in helping parents understand their child's individuality.

Developmental Education

Many early developmental concerns are related to feeding and nutrition, infant and child sleep behavior, discipline, and temperament. Anticipatory guidance that addresses these topics has been a major focus of child development services in primary care. Anticipatory guidance is defined as the provision of information to parents and children to influence knowledge, attitudes, and behavior, and to promote healthy development. Only one study in the past two decades has examined the overall effectiveness of anticipatory guidance (Chamberlain et al. 1979). Other studies have examined the efficacy of specific aspects of anticipatory guidance, in particular teaching efforts intended to enhance parent-child interaction, increase parents' knowledge of child development, and promote good sleep

¹ In another study that we are completing, we found that pediatric practices are less inclined to perform psychosocial assessments if there are no services to which to refer families once a problem is detected.

habits, early literacy orientation, and nonviolent discipline techniques. The use of parent groups for delivering well-child care has been studied as an alternative, more effective, approach to address parent concerns about non-medical issues. Twenty articles were selected for review in this category (Table 3).

Effectiveness of anticipatory guidance

Chamberlin, Szumowski, and Zastowny (1979) examined the effect of physicians' teaching efforts and the content of anticipatory guidance on improving mothers' knowledge of child development and enhancing caregiving. The authors followed 480 English-speaking mothers of firstborn children from birth to 18 months. Thirty-five pediatricians participated, and of these, 23 were interviewed regarding the use of 10 techniques to teach new mothers about child development and behavior. The scoring system for physicians' use of teaching techniques was validated by randomly interviewing mothers seen by each physician about the teaching approaches physicians used at the 6- or 9-month well-child visit. A 45-item questionnaire assessed mothers' knowledge of child development. Mothers' attitudes, child-rearing styles, and child behavior problems were assessed when the child was one year old. Child development was assessed at 18 months.

Mothers whose pediatricians taught more reported greater use of positive contact with their children and more feelings of being helped in the child-rearing role. Mothers with more knowledge reported more use of positive contact with their children and were more likely to describe their children as friendly and outgoing, but these associations were weak. Physician teaching effort and mothers' knowledge were not related to the child's developmental status. The strongest predictor of child development outcome was mothers' reported use of positive contact. Mothers' reported use of positive contact was accounted for mostly by characteristics of the mother at the time of her child's birth, with physician teaching effort contributing a small amount of the variance. The findings support the hypothesis that physician teaching may affect child development indirectly through positive effects on the mother-child relationship.

Chamberlin and Szumowski (1980) reported a one-year follow-up of the sample in the previous study. They hypothesized that the effect of pediatric teaching efforts may become more apparent over time. Data were available for 371 mothers. Physician teaching was significantly related to the mothers' knowledge of child development and feelings of being supported by the practice. Physician teaching effort was no longer related to mothers' use of positive contact with their children. Mothers' use of positive contact with their children was still related to knowledge of child development and was still the strongest predictor of child development outcome. Physician teaching effort was not

directly related to child development outcome. The authors concluded that physicians' teaching effort affects mothers' knowledge of child development and feelings of being supported. However, child development knowledge per se is not as important as mothers' interactions with their children in affectionate and cognitively stimulating ways. Physician teaching effort directed toward encouraging this kind of maternal behavior was minimal compared with that of discussions about stage-related behavior, individual differences, and common behavior problems. Interestingly, mothers whose physicians spent more time teaching reported more behavioral problems (a weak, but significant relationship).

Dworkin, Allen, Geertsma, Solkoske, and Culina (1987) reached a similar conclusion. They evaluated the effectiveness of discussing the developmental basis of anticipatory guidance with parents at routine pediatric office visits. Eighty-three mothers and their healthy normal firstborn infants were randomly assigned to intervention and control groups. The providers for both groups were two pediatricians and one nurse practitioner. The same clinician saw subjects at routine well-child visits through the first six months of life. Both groups received anticipatory guidance at each health visit. The intervention group received a discussion of developmental stages relevant to each anticipatory guidance topic. Dependent variables included measures of mother-infant interaction, maternal perceptions and attitudes, and maternal satisfaction with pediatric care. There were no differences between the intervention and control on any of the outcome measures. The authors concluded that discussing the developmental basis did not improve the effectiveness of anticipatory guidance.

These articles examining the effectiveness of pediatric anticipatory guidance in the first two years of life suggest that physicians' teaching efforts have an indirect effect on child development and are important for the feelings of support they engender in first-time mothers. However, they suggest that the traditional practice of teaching to improve or enhance parents' knowledge of child development may not be an effective strategy for improving child development outcomes. While positive and cognitively stimulating mother-infant interaction was related to a positive child development outcome, physicians actually directed little teaching effort toward this end. Given the importance of this finding, it is remarkable that only three other studies in the literature were found that examine interventions to enhance mother-infant interaction with infants not at biological risk.

Parent education to enhance parent-child interaction

In a randomized controlled study, Casey and Whitt (1980) engaged mothers in discussions about infant social development during well-child visits to encourage sensitivity and

responsiveness to infant cues, promote understanding of infant development, and enhance feelings of competency and self-confidence. Thirty-two first-time mothers were assigned to experimental and control groups. At all visits, the experimental mothers received discussions designed to increase their ability to provide affectionate and cognitively stimulating experiences for their infants. Mothers who received the intervention demonstrated more favorable interactive behavior with their infants.

Bristor, Helfer, and Coy (1984) evaluated the efficacy of a skill-training program designed to teach new parents the competencies of newborn infants with the goal of enhancing parent–infant interaction. The sample consisted of 42 mothers and their healthy full-term newborn infants recruited sequentially. Coaching took place on postpartum days one, two, and seven. The control group received routine postpartum care only. Mother–infant interaction was videotaped on postpartum day 28. Questionnaires measured maternal stress and adaptation. The intervention group scored significantly higher on five of nine categories of behavioral interaction. One of the more striking differences, the authors noted, was the increased attentiveness of the newborns of the experimental mothers. Mothers in the intervention group reported less stress but the difference was not significant.

Black and Teti (1997) evaluated the efficacy of using a 15-minute videotape to enhance mealtime communication and attitudes among adolescent African-American mothers. The videotape portrayed culturally sensitive, reciprocal mealtime communication between mothers and their infants using real-life vignettes and messages from their peers. The subjects were 64 first-time mothers randomly assigned to intervention and control groups. The intervention group viewed the instructional videotape and was given a copy to take home. The control group did not receive or view the videotape. Both groups of mothers were videotaped before randomization then again two weeks later during feeding interactions with their infants. Mothers in the intervention group demonstrated enhanced mother–infant interaction during feeding and reported more favorable attitudes toward mealtime communication.

In summary, surprisingly few investigations of efforts to optimize mother–infant interaction as part of routine primary care have appeared in the literature. However, the reviewed studies demonstrate the potential of several different methods pediatricians might adapt to affect the early mother–infant relationship in a positive manner. This is an area of primary care service delivery that deserves more attention.

Temperament-based anticipatory guidance

An understanding of a child's behavioral individuality is important to encouraging positive contact between parents and their children. Physicians are encouraged to discuss the child's temperament as a way of imparting an understanding of this individuality to the parent and promoting a "good fit" between them (Carey 1985). Both guidelines for pediatric health-supervision (AAP 1998, Green & Palfrey 2000) recommend the discussion of infant temperament as part of routine well-child care.

Despite the existence of an expansive literature that addresses child temperament, very few studies have examined the clinical use of temperament assessment in pediatric primary care. Little (1983) reported the results of a survey of his own practice that addressed the use of an Infant Temperament Questionnaire (ITQ) (Carey & McDevitt 1978). The ITQ was distributed to parents at the six-month well-child visit with instructions to complete and return the questionnaire by mail prior to the eight-month visit. The author spent approximately five minutes at the eight-month visit explaining the results of the questionnaire to the parents. The explanations were intended to address the individuality of each child and how it might affect parenting and the child's behavior. These discussions were framed in a positive perspective, avoiding the use of designations such as "difficult" or "easy." After one year of reviewing the questionnaires with parents, a survey was mailed to those who had completed the ITQ.

Of those who had completed the survey, 89.9 percent believed the information gave them a better understanding of their child, 8.8 percent reported that it was not helpful, and 1.2 percent were equivocal. Fifty-seven percent reported that the ITQ altered their approach to parenting, 27.8 percent felt it did not change their approach to parenting, and the remainder was equivocal. Eighty-seven percent felt that completing and interpreting the questionnaire was worthwhile and only 3.8 percent did not. Therefore, in this one practice, most of the parents who participated in the study considered the use of temperament assessments to be helpful and felt that the information influenced their parenting approaches.

Cameron and Rice (1986) developed temperament-based anticipatory guidance materials to help parents understand and manage caregiving challenges from their infants. Expected temperament profiles were developed (a total of 48) for six clinical issues occurring between the ages of 5 and 12 months. These were sleep problems, eating or mealtime issues, assertiveness, accident risks, sensitivities, and passivity or dependency. Expected temperament profiles were estimates of temperament patterns likely to characterize the behavior of infants encountering the six clinical issues. Parents, who were

mothers ages 17 to 21 years of healthy firstborns ($n = 177$), completed temperament questionnaires when their infants were 4 months old. A computer program selected two clinical issues per month for the expected temperament profile that most closely matched the study infant. Parents received written anticipatory guidance by mail about the clinical issues tailored to the infants' temperament profile.

Temperament measured at four months demonstrated significant discriminate predictability. Different temperament patterns corresponded to the different clinical issues and problems at eight months. Temperament energy level (activity and intensity) predicted accident risks, assertiveness, and mealtime issues. Adjustability (mood, approach-withdrawal, adaptability, and rhythmicity) predicted sensitivities and passivity/dependency issues. Both factors predicted sleep issues. More than 80 percent of parents perceived the guidance materials as useful in helping them understand the clinical issues; more than 70 percent found the anticipatory guidance tips helpful.

In a second study of the same procedure, all parents with normal newborns delivered in the maternity services of a health maintenance organization in Phoenix, Arizona, over a two-year period were contacted by mail to participate in an experimental evaluation of the anticipatory guidance materials. All birth orders were included ($n = 1,165$). Parents were randomly assigned to either an experimental group that received the temperament questionnaire and anticipatory guidance materials or to a control group that received the temperament questionnaire only. Participants were primarily middle-class, suburban parents. Follow-up was at eight and twelve months. In general, the discriminate predictability of the temperament ratings resembled those of the first study with a few notable differences (e.g., assertiveness and passivity/dependency were more a function of adjustability for 9- to 12-month-old infants). At eight months, most problems parents reported were related to high-energy, fast-adjusting infants. Parents of 8-month-olds who reported the most problems also reported greater satisfaction with the help they received from completing the temperament questionnaire and from the anticipatory guidance suggestions for handling infants. They also reported greater understanding of why issues occurred, greater understanding of parental feelings, and reduced anxiety levels as first-time parents. Parents of 9- to 12-month-old infants reported fewer problems, though parents of high-energy, slow-adjusting infants reported relatively more problems. The authors conclude that temperament-based anticipatory guidance is useful as a preventive mental-health strategy.

To summarize, temperament assessment was demonstrated to have clinical utility in pediatric settings. Many parents perceive discussions of temperament—particularly with

respect to informing approaches to child rearing—as useful. A temperament-based anticipatory guidance system was shown to have validity with respect to commonly encountered clinical parenting issues. Parents who tended to see their children as difficult were more likely to find temperament materials useful. These studies demonstrate the potential for using temperament-based clinical material on a large scale.

Parent education to promote healthy sleep habits

Wolfson, Lacks, and Futterman (1992) reported that preventive counseling sessions and handouts provided during and shortly after pregnancy were effective in promoting better infant sleeping patterns and reducing parental stress at nine weeks. Sixty first-time parents and their healthy, full-term infants were recruited from Lamaze classes and randomly assigned to treatment and control groups. The treatment group received training in the use of behavioral strategies to promote self-sufficient sleep patterns. Training sessions included two prenatal small-group sessions and two post-birth sessions beginning when infants were 6 weeks old. The initial prenatal training session addressed sleep-wake patterns, sleeping through the night, the association between sleep and feeding, the basic physiology of infant sleep, confident parenting, and the importance of establishing a sleep routine early on. The follow-up prenatal training session addressed strategies to help the infant sleep through the night. Post-birth training (“booster”) sessions were held two weeks apart when the infant was deemed ready to settle. Infant sleep-wake patterns were assessed with a 24-hour sleep diary over a three-week period.

Infants in the treatment group had fewer and longer sleep episodes, slept more often for stretches of five hours or more (sleeping through the night), and had significantly fewer waking episodes and fewer feedings over the three-week post-birth period. The group differences were no longer significant at follow-up when the infant was 16 to 20 weeks old. Parents in the treatment group reported significantly fewer hassles and a greater sense of efficacy. Although the intervention was not carried out by pediatricians, the content of the intervention, techniques used, and scheduling appear easily adaptable to the pediatric setting.

Adair, Zuckerman, Bauchner, Philipp, and Levenson (1992) used a prospective design with historical controls to evaluate the effectiveness of anticipatory guidance using written information about sleep practices to reduce night waking during infancy. The intervention was based on a previous study by the authors that documented that parental presence at the infant’s bedtime was associated with later night waking (Adair et al. 1991). Parents in the experimental group (N = 164) were given written information about sleep-onset associations at the four-month well-baby visit. Parents were informed that night

feedings would soon be unnecessary and were advised to put their babies in their cribs partially awake to allow them to fall asleep without the parent present. Parents completed a sleep chart prior to the six-month well-baby visit, where it was discussed with the pediatrician. A questionnaire eliciting information about the infant's sleep and feeding habits was administered at nine months. The control group (N = 128) was recruited at nine months and completed the sleep and feeding habits questionnaire only. Parents in the experimental group reported that their infants experienced significantly less night waking and settled to sleep more easily. Parents in the experimental group reported being present at bedtime less often than those in the control group. Parents who were absent when their infants fell asleep reported significantly less night waking. There was no reduction in breast feeding as a result of the intervention. The results suggest that a brief and inexpensive intervention in the pediatric office can be helpful to parents who want to encourage sleeping through the night.

Pinilla and Birch (1993) reported that exclusively breast-fed infants could be taught to sleep through the night during the first two months of life. Twenty-six first-time mothers and their healthy full-term newborns were randomly assigned to treatment and control groups. Members of the treatment group received verbal and written instructions on how to teach their infants to sleep through the night. Differences in temperament were assessed before and after the intervention. Weekly home visits were made to retrieve sleep diaries and to reinforce instructions. By eight weeks, total nighttime sleep, average sleep duration, and longest sleep episodes were longer in the treatment group. Also, treatment infants slept through the night sooner than controls (38% vs. 7% at 4 weeks; 100% vs. 23% at 8 weeks). Total daily sleep and volume of feeding were similar between the two groups. Control parents rated their infants as less predictable.

These three studies demonstrate the efficacy of preventive educational efforts to teach parents about caregiving practices that help infants develop good sleep habits. The practices were effective not only in helping infants sleep through the night but also in reducing parental stress and increasing parents' confidence (Wolfson et al. 1992).

Parent education to promote nonviolent discipline

Only one study was found that evaluated the effectiveness of anticipatory guidance that addressed parents' use of discipline. Sege, Perry, Stigol, Cohen, Griffith, Cohn, and Spivak (1997) evaluated the short-term effectiveness of anticipatory guidance materials that promoted the use of "time-out" in place of corporal punishment as a single, focused preventive measure directed at reducing subsequent violent behavior. The study participants were members of a local health maintenance organization that had a state

Medicaid contract to care for indigent patients as well as traditional contracts with employers. The “time-out” study targeted parents of children between the ages of 15 months and 2 years (a second aspect of the study addressed an intervention for reducing older children’s exposure to television violence). The sample was English-speaking and a majority had some college education. A control group (n = 129) was recruited prior to staff training to provide the intervention. The intervention group (n = 159) received discussion about the topic from providers, coupled with written information materials. Parents were interviewed by telephone two to three weeks later. There were no significant differences between intervention and control groups in the use of “time-out” before or after the well-child visit. However, intervention parents who had not used “time-out” in the past were more likely to report using “time-out” for the first time than were controls who had not used the technique in the past.

This study suggests that counseling, together with written handouts promoting nonviolent discipline techniques, may change the behavior of parents who have not previously used the technique. In spite of its limitations, e.g., the use of self-reported behavioral change, this study is important in addressing a topic that is a priority for parents (Young et al. 1998).

Promotion of early literacy

Three studies examine the effectiveness of a book-distribution program for promoting early literacy. Needlman, Fried, Morley, Taylor, and Zuckerman (1991) conducted a pilot study of a clinic-based literacy program with three components: volunteer readers in the waiting room, counseling about literacy development by pediatricians, and book distribution. Seventy-nine parents participated. The study evaluated the program’s effectiveness in promoting literacy orientation, i.e., activities that include looking at books or magazines with children. Seventy-three percent of the sample consisted of parents of children 2 years old and younger.

Of the three components, having received a book from the pediatrician was associated with literacy orientation. Parents who had received books from their child’s pediatrician were approximately four times more likely to report literacy orientation. The intervention was particularly effective for poor parents.

High, Hopmann, LaGasse, and Linn (1998) examined the short-term effectiveness of a clinic-based program for promoting early literacy practices and bedtime routines. The sample comprised low-income, Hispanic, African American, and non-Hispanic white families. An intervention group (n = 100) of families with children ages 6 to 36 months

received two books and educational materials about book-sharing and bedtime habits that included book-sharing at all well child visits conducted in the clinic of a pediatric residency program. The control group ($n = 51$) was recruited before the institution of the intervention program. Intervention parents reported significantly more literacy-related behaviors than the control group, including book-sharing as a favored activity of the child and book-sharing at bedtime six to seven nights per week. Positive literacy behavior was associated with the intervention for single or separated parents and for Hispanic and non-Hispanic white families. Higher odds ratios were seen with parents who had not graduated from high school compared with high school graduates (7.1 vs. 3) suggesting a stronger effect for these subgroups. Literacy behavior with children was also associated with parents who read books themselves at least a few times per week. There were no group differences in reported sleep problems.

Golova, Alario, Vivier, Rodriguez, and High (1999) used a prospective, randomized, controlled design to examine the effectiveness of an intervention to promote an early literacy orientation in Hispanic families, a population at disproportionate risk for reading problems and school failure. This study recruited 135 families with children between the ages of 5 and 11 months from two community-based pediatric health centers serving low-income, primarily ethnic, minority families. Families in the intervention group received an age-appropriate, bilingual children's board book, a handout explaining how to enjoy books with children, and literacy-related anticipatory guidance. The intervention was provided at enrollment and two consecutive well-child visits. The control group received routine pediatric care without books or handouts. Parents were interviewed about their literacy habits and the child's language development after the last study visit.

Significant group differences were noted in literacy behaviors and the number of books parents reported having at home. Parents in the intervention group were more likely to report reading to their children at least three days per week (66% vs. 24%) and to report that one of their three favorite activities was reading books with their child (43% vs. 13%). Overall, the odds that parents would read to their children three or more days a week were 10 times greater in the intervention group. Parents in the intervention group were more likely to report having at least five children's books in the home (52% vs. 19%). While language development was equivalent in the two groups, there was a significantly higher receptive language score for words present in the books pediatricians distributed.

In summary, we found three studies that evaluate pediatric efforts designed to help parents promote their children's learning through book-sharing activities. These studies all addressed the effectiveness of the same program to promote early literacy activities with infants and toddlers. These studies are important in demonstrating that book-distribution programs in pediatric offices are effective in encouraging book-sharing activities at home. The study by Golova et al. (1999) also suggested that the program may affect language development in a positive way. The potential for this kind of intervention may be far greater, since all the studies were short-term with limited interventions.

Parent groups

Several articles examining the effectiveness of group well-child care compared with traditional (individual) care have reported equivalent or more favorable outcomes relative to child development services.

In a study by Osborn and Wooley (1981), 78 mothers and their healthy full term newborns were sequentially assigned to experimental (group well-child care) or control (traditional care) groups. Group sessions lasted 45 minutes and were followed by a brief physical exam. Efficiency (time spent per patient), effectiveness (patient compliance and utilization of health services), content and process of visits, and patient satisfaction were examined. The authors found that group sessions were equally efficient and more effective in that experimental mothers were significantly more compliant in attending prescribed well-child visits. Although no difference was found in the use of health services, mothers who participated in well-child care groups were less likely to seek advice between well-child visits. Subjects in well-child care groups spent significantly less time discussing the physical aspects of care and significantly more time discussing personal issues. Compared to pediatricians, family practitioners were more likely to discuss physical aspects less and personal issues more. They were also more likely to use open-ended questions and give fewer explanations. Patient satisfaction was equal in both groups.

Dodds, Nicholson, Muse, and Osborn (1993) examined the extent to which pediatricians covered recommended topics in well-child visits and compared group visits with traditional well-child visits on that score. A checklist of topics recommended for discussion by the AAP Guidelines for Health Supervision II was used in direct observations of office visits for children 2 months through 12 years of age in both traditional and group formats. For four of five topics, significantly more content (percentage of topics covered within a category) was discussed in the group format. Topics included safety, nutrition, behavior/development, and sleep. More content was discussed for parenting issues in the group setting, however, the difference did not reach

significance. Parents were more likely to initiate discussion of behavioral topics. It appears, therefore, that the group well-child format was more effective in altering the process and content of the health visit in favor of parenting and child behavioral concerns.

Rice and Slater (1997) evaluated the effectiveness of group health-supervision for conveying child development knowledge, providing social support, and mitigating postpartum depression compared to traditional well-child care. First-time parents of healthy 2-week-old infants were sequentially allocated to intervention or control groups. The intervention group participated in one-hour group sessions that included 45 minutes of discussion and 10 to 15 minutes for an age-appropriate video addressing immunization, illness, safety, and behavior at 2, 4, 6, and 10 months. The control group received traditional well-child care visits that lasted 15 minutes. Measures of child health care and development knowledge, social support, and depression were administered before the 2-month visit and after the 10-month visit.

Fifty families (largely middle class and Caucasian) completed the study. Differences in pre-test and post-test scores on all measures were not statistically significant. Illness-related visits were significantly fewer in the intervention group from 4 to 6 months of age. The authors concluded that group health-supervision visits were at least as good as traditional visits in conveying knowledge, providing social support, and mitigating maternal depressive symptoms. The intervention appeared effective in reducing the number of sick-child visits.

Taylor, Davis, and Kemper (1997) evaluated group well-child care for high-risk children in improving mother-child interaction and development compared with traditional well-child care. They hypothesized that group well-child care might be particularly effective in providing social support for high-risk families. The study used a randomized controlled design. Mothers were eligible if they had one or more psychosocial risk factors (e.g., poverty, single marital status, education less than 12 years). The length of the study included health-supervision visits between 4 and 15 months of age. Nurse practitioners provided care to both groups with a curriculum that addressed nutrition, development, and anticipatory guidance aimed at improving mother-child interaction. Group visits lasted 45 to 60 minutes. Child developmental status, mother-child interaction, and the quality of the home environment were measured after the 15-month well-child visit. Two hundred twenty children were enrolled in the study.

Measures of child development outcome, mother-child interaction, and home environment were not significantly different between groups. Provider time and

compliance with health supervision were also similar in both groups although there was a significantly lower show rate for patients assigned to group care. The authors concluded that group health supervision was as good as traditional well-child care in providing care to high-risk families. There were concerns about logistical issues in providing group well-child care, e.g., scheduling problems, that may have resulted in a lower show rate.

Taylor & Kemper (1998) examined maternal outcomes with group well-child care using data collected from the sample in the previous study (Taylor et al. 1997). The authors hypothesized that a group of high-risk mothers receiving group well-child care would report increased social support, increased feelings of competence as a parent, and better functional outcomes compared with high-risk mothers receiving traditional well-child care. There were no significant group differences in reports made to child protective services, measures of parental competence and social isolation, or measures of social support.

Summary

Anticipatory guidance appears effective during the first three years of life when teaching efforts are directed toward increasing positive contact between parent and child. The efficacy of efforts to enhance the quality of mother-child interaction using methods accessible to most pediatricians was demonstrated. Temperament-based counseling appears particularly helpful to parents with challenging infants, but its potential role in preventive mental health remains to be addressed. The literature also suggests that anticipatory guidance can be effective when it is targeted to specific issues such as sleep habits, discipline, and promoting children's learning. On the other hand, this literature suggests that efforts to increase parents' knowledge of child development may do so without necessarily having any effect on child development outcomes. Finally, several studies suggested that group well-child care is at least as good as traditional well-child care in providing basic services in certain settings and appears to encourage the process and content of health visits in favor of non-medical issues.

Developmental Intervention

Since there is a wide range of potential problem-focused interventions, we examined the effectiveness of office-based interventions for two common pediatric concerns—excessive infant crying and sleep problems. In both cases, the issues that pediatricians must address are usually non-medical in nature. Fourteen studies were selected for review (Table 4).

Excessive infant crying

Of the many approaches to the management of infantile colic, the view that excessive crying represents a temperament–environment mismatch has had the most consistent support in the pediatric literature (Carey 1994). The treatment of infant colic has been the subject of other reviews (e.g., Lucassen et al. 1998; Treem 1994). We do not intend to replicate these reviews or address the dispute surrounding the role of cow’s-milk-protein allergy in this phenomenon. Instead, we focus more narrowly on the evidence relevant to developmental services—in this case the efficacy of behavioral or counseling interventions. Five controlled studies examined the effectiveness of counseling approaches to helping parents in managing the “colicky” or “fussy” baby. Four of the studies supported the temperament–environment mismatch hypothesis and demonstrated the efficacy of counseling parents to use specific strategies to help calm fussy babies.

Taubman (1984) examined the effect of counseling parents on appropriate responses to crying in infants. The subjects were 30 infants identified as “colicky” based on parental reports. The control group, matched for age, sex, and the presence of siblings, but had no symptoms of colic. Group One was treated with instructions to decrease stimulation on the basis of a hypothesis that over-stimulation contributes to excessive crying. A second group was treated based on the hypothesis that infants cry to express a desire or need. Counseling addressed consideration of several possible responses to meet those needs, e.g., feeding, non-nutritive sucking, holding, etc. Behavior diaries were completed before and during the treatment. The first treatment group showed no changes in crying or sleeping behavior. In the second treatment group, crying was significantly less than in the first group without a change in sleep behavior. The author concluded that parent–infant interaction is a factor in colic.

In a second study, Taubman (1988) used a randomized, controlled design to evaluate the relative effectiveness of counseling approaches to infant colic compared with dietary elimination of soy- or cow’s-milk-protein. The effectiveness of both approaches has received support in the literature. Parents of infants younger than 3 months of age completed a 72-hour behavior diary. Infants with baseline crying greater than two hours per day were eligible for study after a history and physical exam ruled out other causes of crying. They were assigned to one of two treatment groups and the study was conducted in two phases. In the first group (n = 11), phase one consisted of written instructions to parents on how to respond to infant crying followed by two telephone calls to discuss progress during the nine-day period. In the second group (n = 10), phase one consisted of a trial of hydrolyzed casein formula for formula-fed infants and milk-product dietary elimination for the mothers of breast-fed infants. They also received two telephone

progress calls. In phase two, group two mothers and infants returned to their pre-phase one diet and received counseling on approaches to responding to infant crying. Group one infants did not participate in phase two.

By the end of phase one, both groups had significantly decreased crying times. The decrease in crying time was significantly greater for group one than for group two. Group one showed a more rapid decrease in crying time, i.e., a significant change within the first three days, while group two's change was not significant until after six days. At the beginning of phase two, group two infants were still crying more than two hours per day on average. After three days of counseling, group two crying decreased to a level similar to that of group one. The author concludes that infant colic is the result of misinterpretation of infant crying, and in many cases is treatable with counseling to help parents respond more effectively.

MacKenzie (1991) conducted two studies to examine the hypothesis that excessive crying is related to ineffective caregiving, leading to over-stimulation of the infant. Subjects were infants younger than 1 year. The first study identified 31 infants with troublesome crying, defined as crying that parents felt they could not tolerate and for which they sought help. They were compared with 31 age-matched controls. Though randomization of the subjects into groups to receive hospital vs. home-based care was not possible, 13 of the infants were hospitalized for excessive crying. These infants cried much less within three days (two to five hours/day compared to 12 hours/day before admission) and infants managed at home also improved with advice to reduce stimulation. In a second study, Mackenzie used a randomized, controlled design (N = 45) to examine the efficacy of advice to reduce infant stimulation compared with an empathic interview. After seven days in the empathy group, mothers were given advice about reducing stimulation as well. Subjects given advice showed a significant reduction of infant crying and maternal distress compared to empathy alone.

Parkin, Schwartz, and Manuel (1993) examined the effectiveness of three interventions in the management of infant colic over a two-week period in a sample of 38 infants. The interventions were assessment and reassurance from a pediatrician (control), counseling regarding specific management techniques, and a car-ride simulation device that provided a vibratory stimulus. All mothers received a home visit from a nurse to reinforce group-specific counseling. All groups showed decreases over time in the amount of crying and in maternal anxiety. There were no differences between groups.

Wolke, Gray, and Meyer (1994) reported on the effectiveness of a lay telephone counseling service for reducing fussing and crying in colicky infants. Subjects were infants younger than 6 months of age whose mothers reported their infants' crying as lasting for more than four weeks and more than three hours per day on average over the baseline diary period. Ninety-two mothers and infant pairs were recruited sequentially into three groups: Group one received empathy and emotional support only, Group two received behavioral management counseling by telephone from lay counselors trained in the technique. Group three, a control group, received no treatment. Parental and infant behaviors were monitored with the use of diaries and self-report questionnaires. Differences were found between the three groups in the reduction of total fussing and crying behavior (Group 2 > Group 1 = Group 3). The treatment effect was most pronounced for the evening (compared to morning, afternoon, and nighttime) and for fussing compared to crying, and was significant for both duration and bout frequency. Mothers rated the behavioral management approach as more helpful. This approach led to a reduction in fussing and crying without altering mothers' ratings of temperament.

Therefore, from available studies of pediatric counseling interventions for fussy babies, most suggest that counseling that provides specific advice and caregiving strategies to parents is an effective intervention compared with empathic listening or no intervention and, in one case, compared with the dietary elimination of cow's-milk-protein. The data support the view that excessive infant crying is in large part a manifestation of infant temperament that can be mitigated by addressing the caregivers' responses to the babies' behavior.

Sleep problems

Night waking and settling difficulties are common sleep concerns for parents of infants and toddlers. Treatment approaches include behavior-management counseling and medications, which are widely used in the treatment of sleep disturbances in both adults and children (France & Hudson 1993). Behavioral approaches include the use of extinction (ignoring the child's crying for attention at bedtime), reinforcement, shaping (adjustments of the child's bedtime), and cueing (institution of a bedtime routine). Numerous baseline-treatment studies using small sample sizes have been reported on various behavioral approaches to sleep problems in children (France & Hudson 1993). We identified nine controlled clinical studies that evaluated different approaches to infant and toddler sleep disturbances.

Three studies examined the use of medication in the treatment of sleep problems. Richman (1985) evaluated the effectiveness of trimeprazine tartrate as a hypnotic in a

group of children with severe waking problems. A survey identified children ages 1 to 2 years with sleep problems. Those who awoke five or more nights per week, three or more times per night, for more than 20 minutes, or who spent time in the parents' bed were considered to have severe sleep problems. Thirty children were randomly assigned to a diary (control) or drug treatment (experimental) group. After 10 weeks of keeping a diary, the control group was offered the opportunity to take part in the drug trial; seven accepted. Children assigned to an experimental group, but whose parents did not wish to use medication, comprised another control group. A double-blind trial of drug or placebo for two weeks was employed. The dosage of trimeprazine tartrate was 30 mg at bedtime increased to 60 mg if there was no improvement after three nights. The parents kept sleep diaries that were used to compute a weekly composite sleep score.

The experimental group had significantly lower composite sleep scores after 10 weeks compared with the control group for which drug treatment was not acceptable. Parents reported that the medication was helpful, that the child's settling to sleep and night waking improved, and that the child's appetite had improved significantly more often for the drug condition compared to placebo. However, the improvement in sleep composite scores was limited. At the end of the trial, children on the drug were waking nearly four nights a week; only five children on the drug woke less than three nights per week, and only two slept through the night. Furthermore, the composite sleep score was no different from the baseline for the experimental group at the six-month follow-up. In other words, although the differences between medication and placebo were significant, they were not clinically meaningful. One third showed no improvement at all and improvement was only moderate in the others. There was no evidence that the drug had a permanent effect on sleep patterns.

Simonoff and Stores (1987) used a double-blind crossover trial with placebo to evaluate the efficacy of trimeprazine tartrate in 1- to 3-year-old children with persistent and severe night waking. Twenty subjects were recruited by referral from general practitioners in England. Severe night waking was defined as children who awoke at least five nights per week and stayed awake at least 20 minutes. Half of the children had never slept well at night and all had other behavior problems to varying degrees. Eight mothers had clinical psychiatric problems (all depression) and five fathers had past psychiatric problems (3 with depression, 2 with psychosomatic problems). A trimeprazine dose of 6 mg/kg (45 to 90 mg) was used for a four-week trial alternated with a four-week trial of placebo.

While on the medication, children slept longer at night, had fewer night wakings, and spent less time awake at night. No differences in daytime sleep were found. Medication effects were independent of the order in which drug and placebo were given. At follow up, there was significantly less night waking and less time awake at night. Parents thought trimeprazine was better on all measures of sleep.

The authors note several problems with their study. For example, most parents guessed correctly which part of the trial contained the active medication, thereby biasing their reports. Some children continued to have night waking on higher doses of trimeprazine and there were no carry-over effects to the placebo condition, suggesting that this treatment is only a temporary measure. Finally, the sample was not representative of night waking problems in the general population.

France, Blampied, and Wilkinson (1991) evaluated the effects of combining extinction and medication (trimeprazine tartrate) for the treatment of night waking. The rationale for this study was that parents frequently find that allowing their child to cry without responding is stressful. The use of a sedative medication in a reducing dose over the initial part of extinction may make the treatment more effective by helping families with the stress of the procedure.

Thirty-five subjects, ages 7 to 27 months, were recruited from referrals to the Canterbury Sleep Project. The study used three subject groups: extinction ($n = 13$), extinction plus placebo ($n = 12$), and extinction plus trimeprazine ($n = 10$). The extinction group was recruited first by consecutive referrals. The remaining groups were created by random, double blind assignment. In addition to learning the extinction program, regular pre-bedtime and bedtime routines were established for each child and the child was not attended to once placed in bed. Those given trimeprazine began with a dose of 30 mg tapered by 6 mg every other day. Parents completed a sleep diary throughout the trial and for two weeks thereafter. Children were evaluated 18 months after the intervention with questionnaires addressing the infant's sleep patterns and parents' anxiety.

Subjects in all groups woke less often after treatment began. The medication group improved immediately and more rapidly than the others in the first intervention phase (first 10 days). At the beginning of the second treatment phase (days 11–13), mean wakings in the medication group increased above the level maintained throughout phase one. This was seen for fewer children in the other subject groups. Duration of night waking decreased substantially over treatment phases in all subject groups and there were

no group differences. The reduction was immediate in the medication group and durations were shorter in the medication group compared to the placebo group only during the first phase. Post-extinction response bursts, i.e., increased crying and waking after beginning the extinction procedure, was seen in fewer children and was lower in intensity in the medication group compared with the other two groups. There were no group differences in measures of infant security and maternal anxiety.

The authors conclude that extinction is an effective treatment for infant sleep disturbance, that the use of trimeprazine with extinction resulted in a level of undisturbed sleep one week faster than extinction alone, and that it reduced post-extinction response bursts. Extinction did not worsen mothers' anxiety and did not affect infant security. Anecdotally, the authors noted that many parents commented negatively about the "doped up" condition of their child with the medication.

The remaining intervention studies examined the use of behavioral approaches to sleep problems. Rickert & Johnson (1988) used a randomized controlled design to compare the use of scheduled awakenings with systematic ignoring (letting the child "cry it out") to treat spontaneous night waking and crying in a sample of 33 children, ages 6 to 54 months. A no-treatment condition was used to control for the effects of maturation. Scheduled awakening involved the parent awakening the child at scheduled times during the evening and doing the activities they normally do when the child awakens spontaneously. The scheduled awakenings were determined from baseline sleep data and the duration between awakenings was systematically increased in 30-minute increments, then gradually eliminated. In the systematic ignoring condition, parents were instructed to respond to the child's nighttime crying in a stereotypic, mechanical manner and not to provide soothing.

The systematic ignoring condition produced the quickest response. Children in the scheduled awakening group also showed a decline in number of awakenings per week compared to the control group. At two post-treatment follow-up checks, both experimental groups differed from the control group, but not from each other. In other words, both approaches were equally effective at the end of the treatment but the scheduled awakening procedure was slower. The authors note that the many parents declined to participate because they did not want to participate in the systematic ignoring condition.

Adams and Rickert (1989) examined the relative efficacy of using positive bedtime routines versus the use of graduated extinction for the management of bedtime temper

tantrums. With extinction, the parent ignores the child's tantrum until the child falls asleep. Graduated extinction refers to ignoring the tantrum for short periods of time, gradually increasing the length of time the parent ignores the tantrum behavior. In the use of positive routines, a child's bedtime is first changed to coincide with the time the child naturally falls asleep. Then parents are taught to engage in a "positive routine" of bedtime activities, giving praise and encouragement to each. Once a chain of bedtime activities is established, bedtimes are systematically scheduled earlier.

Thirty-six children with bedtime tantrums, ages 18 to 48 months, were randomly assigned to one of three groups—two experimental groups (graduated extinction and positive routines) and a control (no-treatment group). Subjects had at least one bedtime tantrum three times per week. Treatment lasted six weeks with three- and six-week follow-up visits. Both graduated extinction and the use of positive routines resulted in reduced tantrum activity at bedtime compared with the control group. Improvements were seen in the parents' marital relationship for both experimental conditions.

Seymour, Brock, During, and Poole (1989) examined the efficacy of a three-hour sleep management program. Forty-five children between the ages of 9 months and 5 years with sleep problems attending a community family counseling program were randomly assigned to one of three groups. The sleep management group received a standardized sleep management program (an 8-page parent guide and hour-long interview followed by telephone contact totaling 2–3 hours per family). An intermediate group received the parent guide with minimal staff contact (5–10 minutes) and no telephone contact. A control group received neither. Both the sleep program and written guide were more effective than no intervention in reducing night waking and bedtime settling problems. Children in the sleep program showed a decrease of 23 minutes awake per night while the written information group showed a decrease of 12 minutes awake per night. The control group showed an increase of 12 minutes awake per night. The number of awakenings per week declined by 8.7, 7.4, and 1.1 times for the sleep program, written information, and control group respectively. Bedtime was earlier by 28 minutes in both sleep treatment groups while it increased for the control group by three minutes. The results show that a parent-administered behavior-management program was effective in reducing sleep problems in children and that the sleep program showed significant effects when administered in the form of a handout with minimal staff contact. Although it was not evaluated in a pediatric practice, the effective components of the approach seem readily adaptable to that context, particularly the intermediate intervention.

Scott and Richards (1990) examined the effectiveness of providing parents with a written booklet of information, support, and advice about the management of night waking. Subjects were 90 families whose infants, ranging in age from one to 18 months, had established night waking patterns. The families were randomly assigned to one of three groups—advice and support, booklet, and booklet-control groups. A fourth group—30 infants without night waking problems—formed a sleep-comparison group. The advice-and-support group received a booklet and a visit from Scott for extended discussions of the baby’s sleeping patterns at intervals of three weeks for four months. The booklet group received the booklet only. The booklet-control group received no intervention. The sleep-comparison group was treated in the same way as the booklet-control group. The booklet contained background information on sleep and various solutions to night waking problems and emphasized the importance of changes in parental expectations, perceptions, and attitudes as opposed to more direct strategies such as behavior modification. Parents were encouraged to seek their own solutions. Over a period of three months, families kept sleep diaries for one week at two- to three-week intervals. The authors found that neither advice nor written information altered the pattern of night waking and the interventions had no effect on measures of maternal well being.

Weir and Dinnick (1988) evaluated the effectiveness of behavioral modification by health visitors in the treatment of sleep problems. Fifty-one children, ages four to 54 months, comprised the sample. Almost all had night waking problems (94%), 77 percent had settling problems, and 70 percent had both. Seventy-three percent were rated severe (6 to 7 nights/week of combined settling and night waking problems). Sixty-four percent had tried medication.

Health visitors were taught behavioral modification techniques. Their intervention was compared to that of a control group of health visitors who went about their usual routine of advice and referrals. There were no group differences in improvement of sleep problems or associated behavior problems over the course of treatment. Both groups improved over the six-month period, with 39 percent having settling problems and 76 percent with night waking, and 37 percent with both. Although the intervention was delivered by health visitors, the study is relevant to pediatric interventions as some pediatric practices may have access to home-visitor services, e.g., in collaboration with Early Head Start programs.

Reid, Walter, and O’Leary (1999) evaluated the effects of standard and graduated ignoring (extinction) procedures in treating sleep problems. They recruited 49 children, ages 16 to 48 months, with settling and night waking problems and randomly assigned them to one of three groups—standard ignoring, graduated ignoring, and control.

For the standard ignoring procedure, parents were instructed to follow their usual bedtime routine, say good night, leave the room, and not return. Instructions were given on how to manage problems such as the child leaving the room. For the graduated ignoring procedure, parents were instructed to respond to fussing or crying after five minutes with brief checks at 10- to 15-minute intervals thereafter if the child was still crying. On subsequent nights, all checking intervals were lengthened by five minutes. Parents were to use the same procedures if the child woke them during the night. Transitional objects, night-lights, and positive reinforcement of successful nights using praise and small rewards were encouraged.

Compliance in both experimental groups was high and there were no group differences at bedtime or nighttime. There were no significant group differences in maternal stress at bedtime. The graduated group reported less nighttime stress than the standard group. Both experimental groups did not differ from each other and had better bedtimes and nighttimes than the control group during the treatment period. After the intervention, both experimental groups scored lower on the Child Behavior Checklist sleep problems subscale than the control group. Mothers' satisfaction ratings did not differ between groups. Graduated ignoring was easier to implement, especially at nighttime. Regarding feasibility in the pediatric setting, treatment involved about three hours of staff contact per case, amounting to between 5 and 10 well-child visits depending upon the length of the visit (20 to 30 minutes). Treatment requires monitoring parental compliance and offering support during the process.

To summarize, the data suggest that many sleep problems may be managed successfully despite the constraints of the pediatric practice setting. Several behavioral approaches are effective. Medication's role is uncertain, although it appears to be a limited one. Because most of the studies reviewed involved children with chronic, severe sleep disturbances, the effectiveness and feasibility for less severe problems in the pediatric context is assumed.

Effectiveness of Care Coordination and Monitoring Practices

Coordinating and monitoring the service needs of children with developmental and behavioral concerns is a necessary aspect of care though it has received little attention in the literature. Follow-up for office interventions and monitoring of referrals to other specialists and services are included in this category. No studies were found that addressed this issue in primary care pediatrics.

DISCUSSION

This report reviews two decades of pediatric literature that investigates primary care activities to promote optimal child development in the first three years of life. We used a service-delivery perspective to approach this issue, specifying a continuum of services for promoting healthy development “unbundled” from the larger group of activities that comprise well-child care. Our approach differs from others in the child development literature because it asks whether or not these activities are *effective health services* for accomplishing their specific assessment, education, or intervention goals, instead of asking if these activities are important within a specific domain of development, e.g., for improving cognitive development or language development.

This perspective is based on the premise that primary care health services should address the needs of the developing neurological system, taking into account our clearer understanding of the role of experience and brain development (Carnegie Task Force on Meeting the Needs of Young Children 1994). The pediatric leadership has responded in concept with the development of health-supervision guidelines for children based on a science of child development (Green & Palfrey 2000). At the same time, consumers see the need for these services as growing. Parents of young children from birth to three years want and expect these services from pediatricians (Young et al. 1996).

What have we learned about the effectiveness of developmental services?

Although a very wide range of topics was selected for review, the resulting literature base was not extensive when relatively stringent methodological criteria were used for selection. Nevertheless, there is reason to be optimistic—this literature was compelling in identifying promising approaches toward promoting optimal child development in health care settings, in raising important issues relevant to delivering developmental services in pediatric practice, and in suggesting avenues for future work.

Assessment in Clinical Practice

The available evidence suggests that assessment of developmental issues might benefit from the wider use of structured, validated approaches. This pertains to addressing parents’ concerns about development and behavior as much as other areas. In addition to facilitating discussion of these concerns, systematic assessment of parents’ concerns can play a role in identifying children with developmental problems, replacing or supplementing longer and more costly developmental screening assessment utilizing instruments like the Denver II screening test. One drawback to this approach is that it may not be tailored with enough sensitivity to the needs of parents during the child’s first three years, when child-rearing concerns are high priorities. Still, it merits more attention as a strategy for

improving developmental surveillance and may help to improve the current low rate of identification of children with developmental problems before school entry.

There are other implications for structuring care through the targeted use of specific assessment instruments that focus on a particular developmental domain. For example, it appears that a temperament assessment timed for the four-month health visit may provide very useful information for parents and pediatricians. While the potential efficacy of a temperament assessment is suggested in the studies that were reviewed, the feasibility and effectiveness of such assessment strategies in real-world settings have not been evaluated. The introduction of such a routine assessment may require that the four-month visit last a little longer. This, in turn, would require modification in front- and back-office administration procedures and further training of pediatricians and office personnel as well as other practice modifications to accommodate such a change in routine procedures.

There are other concerns about adding standardized assessment to the periodic pediatric developmental screening process. In addition to increased staff time and paperwork, structured assessments may interfere with listening to parents and may lead clinicians to forsake the use of clinical observation skills. Use of structured instruments must be integrated with the clinical interview, stressing basic communication skills and skilled observation honed by experience. Other problems include the accurate interpretation of the information obtained and having adequate or appropriate places to which to refer children and/or families once a problem is discovered. Indeed, the greater use of validated instruments to assess developmental progress, the psychosocial context of development, and children's temperament all represent significant technological advances in pediatric practice. How practices should be restructured to utilize these new effective tools and techniques and the way communities respond to an increase in service needs are critical questions. One possibility is to pay attention to the timing of assessment—more extensive assessment at less frequent intervals or at particular office visits may be more efficient than a more cursory and less sensitive assessment at every visit.

Developmental education in clinical practice

The studies reviewed highlight several important issues relevant to promoting optimal development in clinical practice, i.e., what is largely considered anticipatory guidance. Studies demonstrated that physicians' teaching efforts can be effective in promoting healthy development. Advising parents about social interaction with infants, temperament, healthy sleep habits, children's learning, and the use of discipline were all effective to some degree. However, the only direct examination of physicians' teaching efforts from two

decades ago suggested that these activities are not part of practicing physicians' repertoires. The recent Commonwealth Survey of Parents suggests that little has changed in this regard and that the needs of most parents for help and advice with child-rearing concerns are not being met (Young et al. 1996; Schuster et al. 2000). Part of the reason may be that physicians' teaching efforts emphasize general development instead of more specific topics. Furthermore, activities that do affect later development, i.e., efforts to promote more positive and harmonious social relationships and cognitively stimulating experiences between parents and their children in the first three years of life, are not within the pediatric clinical repertoire. This literature suggests that pediatric anticipatory guidance requires restructuring to meet the demand for these activities and to affect later development.

Primary care interventions for developmental and behavioral problems

The literature demonstrated that counseling and behavioral interventions for excessive infant crying behavior and night waking and settling disturbances are efficacious. The review also highlighted the limitations of medication, which is widely prescribed, in treating infant sleep disturbances (France & Hudson 1993). The effectiveness of these interventions in pediatric settings remains to be explored and many questions are raised, e.g., feasibility and time costs. There are also boundary issues between other behavioral subspecialties (e.g., developmental-behavioral pediatrics, psychology, and psychiatry) that have not been defined, primarily for the management of severe sleep problems. Health service pathways that address evaluation and management of developmental and behavior problems, and referral criteria to other sub-specialists are needed.

Coordination of care and monitoring of services

The literature neglects this aspect of care although it represents a constant logistical aggravation for many practices and a source of frustration for parents. Pediatricians report that they are less likely to conduct psychosocial assessments if there is not a reliable network of family support services to which to refer the families identified as needing care. (Barthauer et al. 2000). Confronting an overwhelming and fragmented service network for early intervention, special education, and social services requires a staff with both broad and local knowledge of the service system as well as a commitment to advocacy. Pediatric providers cannot be expected to screen for maternal depression if there is no place to send that mother for treatment. Primary care practices that expect to provide the full range of developmental services would benefit from information about effective practices and the costs of addressing this aspect of care.

Implications for clinical practice

Although the evidence base for developmental services has expanded since 1979 (Casey & Loda 1979), it is still composed primarily of efficacy studies that demonstrate the validity of interventions or procedures in controlled situations. Therefore, we can only note the potential of these services for effectiveness in actual practice. The question still remains of whether or not it is possible to make a difference in the care of children if pediatricians provide developmental services more often and effectively. It is also unclear if pediatricians will be able to implement these innovative practices. A recent national survey of selected, developmentally oriented pediatric practices suggests that very few actually provide formal developmental and/or psychosocial screening assessments (Halfon et al. 2000). At present, there appear to be a number of barriers to the effective delivery of these services including training and expertise, adequate reimbursement, and availability of appropriate referral services to address discovered needs, among other organizational constraints.

The challenge for improving the quality of pediatric health care is to institute the most effective service package(s) and processes for delivering those services. We suggest that two major barriers stand in the way of efforts toward reaching these goals. First, our typology highlights the wide array of potential activities that can be delivered as developmental services. A major challenge is to organize these developmental services into a practical strategy that can be delivered effectively and, at the same time, integrate other health priorities, e.g., nutrition and safety counseling. This must be done in a time-efficient manner that makes sense within the constraints of today's busy practices. Even though more recommended activities have been added to the list of services to be provided at a routine health-supervision visit, little has been done to provide an organizational and delivery framework that would permit the effective and efficient delivery of all these services. To our knowledge, no overall strategy exists other than more general guidelines from the AAP and MCHB; what actually happens in practice is anyone's guess. We feel that an *individualized* approach to parents' needs and concerns is in order, i.e., one based on an assessment of parents' concerns, knowledge, resources, attitudes, and capabilities that would enable the physician to deliver services *selectively* from a broader array of potential services suggested by the overall typology (Regalado & Halfon 1998).

Implications for physician training

A second challenge is to bridge the gap between the knowledge and skills required to provide these services, and the limited training that many clinicians receive. The clinical skills required to determine children's and parents' developmental and psychosocial needs or the most appropriate intervention for effecting and maintaining a change in parents' behaviors, have not been the major focus of either pediatric or family medicine training.

Data from a recent study of pediatric practices revealed that many pediatricians report the need for additional training to appropriately address parents' psychosocial concerns (Barthauer et al. 2000). Defining these knowledge and skill criteria is a necessary first step for evaluating effectiveness, as they enable a more accurate determination of the intensity or adequacy of service. The outcome of this process has direct implications for physician training.

A critical focus of attention in training, then, must be the definition of competencies in developmental and behavioral pediatrics. The Future of Pediatrics Education II (AAP 2000) has reaffirmed the emphasis of the original task force on training in child development and behavioral pediatrics in its recommendations. The Society for Behavioral Pediatrics has released comprehensive curriculum guidelines for residency training in developmental and behavioral pediatrics (Coury et al. 1999). Moving to incorporate those guidelines and recommendations creates significant challenges for many training programs. One question is how residency training should be restructured to create the appropriate learning environment for residents. The tension this issue creates is all too apparent in today's academic settings that remain focused on acute care and oriented toward the disease model. Another question pertains to the teaching and clinical practice roles that developmental/behavioral and general pediatricians play now that developmental and behavioral pediatrics has moved closer to sub-specialization. Defining and controlling a market share is critical to the survival of a medical subspecialty (Halpern 1988) adding further complexity to the boundary issues we raised earlier. These factors will affect the way training programs are structured and operated.

Policy implications

Although the existing literature suggests a potential for the effectiveness of several types of developmental services, policy questions remain. Who should be responsible for the provision of developmental and behavioral assessments, for the provision of health education and developmental promotion, and for the payment for home-based, practice-based, and community-based interventions? The boundary that designates where pediatric care ends and community-based early intervention services begin is not well defined and is blurred in many communities. This boundary is often determined by the availability of other funding mechanisms including local and state maternal and child health funds, Individuals with Disabilities Education Act funding, and other early childhood programs. In addition, since the provision of the developmental and behavioral assessments can result in the identification of a range of developmental and behavioral problems, questions arise regarding the payment for treatment and intervention programs. Since a large proportion of children most at risk for adverse developmental outcomes are also children covered by

the Medicaid program (Title XIX) and the State Child Health Insurance Program (Title XXI), these two governmental programs potentially have a major role in determining what services are provided and how they are paid for.

Therefore, while there are many convincing arguments for providing optimal developmental supports to families with young children, there are a number of unsettled issues regarding what services are most effective, how these services should be delivered, and who should bear the burden of payment. At the same time, there is heightened public awareness of the importance of early childhood development and of the need to act in the direction of providing supports and services to families. Future evaluation in this area should expand the depth and breadth of topics investigated, involve the participation of practicing physicians to a greater extent, and address important methodological details.

SUMMARY

In this report, we have examined the evidence for the effectiveness of pediatric health services to promote optimal child development using a new organizational typology of the various types of activities that physicians provide in general health supervision. Our approach was to conceptualize these activities as an evidence-based service system that has relevance to today's clinical practice orientation. Such an approach is necessary to develop appropriate service delivery models and systems for reimbursement, and to evaluate quality of care.

The work reviewed suggests that effective and efficient approaches to providing developmental services exist, although most of the literature remains limited to studies of efficacy. Nevertheless, there have been important advances in the knowledge base with respect to assessment, education, and intervention in this service area. Although the literature supported the efficacy of many approaches to the delivery of services in these areas, several challenges remain to effectively implementing these services on a wide scale basis. Issues related to organizing service delivery packages, defining assessment and treatment pathways, determining professional boundaries and role responsibilities in the larger community, and implications for training and health care policy must be addressed.

TABLE 1. DEVELOPMENTAL SERVICES TYPOLOGY

Service	Timing			Guidelines
	Prenatal	Perinatal	Postnatal	
Assessment				
<u>Parental Concerns</u>				
Parental concerns assessment				AAP, BF
<u>Developmental Screening</u>				
Developmental history				
Developmental screening test			¶†*	AAP, BF
<u>Psychosocial Risk Screening</u>				
Psychosocial history			¶†*	
Psychosocial risk assessment	†	†		AAP, BF
Stress management interview				
Home environment screening			¶†*	AAP, BF
<u>Parent–Child Relationship</u>				
Parent–child interaction observation				AAP, BF
<u>Behavior Concerns</u>				
Child behavior problems assessment		¶†*	¶†*	AAP, BF
Temperament assessment			¶†*	AAP, BF
Education				
<u>Anticipatory Guidance</u>				
Optimizing parent–child interaction		¶†*	¶†*	AAP, BF
Temperament-based counseling				
Sleep habits counseling				AAP, BF
Promoting children’s learning				
Discipline practices counseling				
<u>Parent Education/Support Groups</u>				
Developmental behavioral brochures		¶†*	¶†*	
Audio-visual materials			¶†*	
Parenting classes/training				
Group well-child care				
Intervention				
<u>Problem-Focused Intervention</u>				
Office counseling				AAP, BF
Telephone advice line				
Home visitation	†	¶†*	¶†*	BF
Care Coordination				
Office care coordinator			¶†*	
Developmental passport/journal			¶†*	
Sub-specialist/program referrals			¶†*	
Developmental services resource manual		¶†*	¶†*	
Office tracking system			¶†*	AAP, BF

Subcategories used as the topics for literature searches are underlined.

Suggested timing of services based on risk status: ¶ Biological, † Psychosocial, * Multiple.

Sources: AAP, Bright Futures (BF).

TABLE 2. DEVELOPMENTAL ASSESSMENTS

Authors	Description/Purpose	Design	Methods	Outcomes/Comments
Triggs & Perrin 1989	<p>To determine:</p> <ul style="list-style-type: none"> A. types of behavioral concerns parents have at pediatric visits B. what behavioral issues are discussed at pediatric visits C. whether a pre-clinic checklist improves communication about behavioral concerns 	<p>CC'T N = 396</p>	<p>Setting: Pediatric office 3 subject groups: C: Completed checklist after visit E1: Completed checklist before visit without pediatrician's knowledge of result E2: Completed checklist before visit with pediatrician informed of results before visit Measures: pre-clinic behavior checklist; questionnaire assessing content of the visit Age range: 12 m-6 y</p>	<p>87% listed at least one behavioral concern Percentage of behavioral concerns discussed by pediatricians: E2 (53%) > E1 (43%) > C (30%) Parents were most concerned about behavioral issues—negative behavior, discipline, eating behavior, and sleep problems Pediatricians discussed general development, appetite, and restless sleep most often There was no examination of the data to determine the percentages, types, and discussion of concerns for the 0 to 3 y group</p>
Glascoe et al. 1989	<p>To examine the relationship between developmental screening test results and the nature of parents' concerns about development</p>	<p>CSS N = 100</p>	<p>Setting: Pediatric office Parent concerns were elicited with a behavior questionnaire then compared to results of developmental and language screening tests Measures: Behavior concerns questionnaire; Developmental Profile-II screening test; Articulation Screening Test. Age range: 2 w-6 y</p>	<p>45% of all parents expressed concerns about development Group A concerns: none or those about behavior control, social-affective skills, personal-adaptive skills, medical sensory status, gross motor skills or school skills Group B concerns: articulation, expressive and receptive language, fine motor skills, or global development 94% of children who passed screening had Group A concerns 80% of children who failed screening had Group B concerns Parents whose children failed screening had more concerns than parents whose children passed screening</p>

Authors	Description/Purpose	Design	Methods	Outcomes/Comments
<p>Glascoc et al. 1991</p>	<p>To determine the relationship between parental concerns about children's behavior and significant conduct problems</p>	<p>CV N = 95</p>	<p>Setting: Pediatric office Parent concerns elicited by the Parents' Evaluation of Developmental Status (PEDS) were compared with results of behavior problems screening Measures: PEDS; Eyberg Child Behavior Inventory (ECBI) Age range: 2-6.5 y</p>	<p>36% of parents had concerns about child's behavior 21% of children who failed the ECBI (had conduct problems) Accuracy of PEDS for significant behavior problems: Sensitivity = .70 Specificity = .73 Positive predictive value = .41 Negative predictive value = .90</p>
<p>Glascoc 1991</p>	<p>To determine the relationship between parents' concerns about speech and language and true communication problems</p>	<p>CV N = 157</p>	<p>Setting: Pediatric office Parent concerns were compared with results of speech and language screening Measures: PEDS; Batelle Developmental Inventory; Articulation Screening Test Age range: 2-6.5 y</p>	<p>14% of parents were concerned about their child's language Accuracy of PEDS for identifying communication problems: Sensitivity = .72 Specificity = .83</p>

Authors	Description/Purpose	Design	Methods	Outcomes/Comments
<p>Glascoc 1994</p>	<p>To determine the relationship between global developmental delay in children and their parents' concerns about their behavior and development</p>	<p>CV N = 95</p>	<p>Setting: day care centers Parent concerns were compared with results of psychometric testing Global delay was defined as having mental retardation, functional developmental delay, or as being a slow learner Measures: PEDS; Bayley Scales, Kaufman ABC, or Stanford-Binet and the Vineland Scales Age range: 6m-6.5 y</p>	<p>Behavior and speech-language concerns were most sensitive Receptive language and global development concerns were most specific Accuracy of PEDS for individual types of concerns: Sensitivity = .05 -.78 Specificity = .47 -.99 Positive predictive value = .14 -.80</p>
<p>Glascoc & VanDervoort 1985</p>	<p>To examine the developmental screening and referral patterns of physicians</p>	<p>CSS N = 130</p>	<p>Family practitioners, general practitioners, and pediatricians completed surveys regarding their developmental screening and referral patterns Age range: 0-15 y</p>	<p>Physician screening practices: 47% use formal screening tests 53% use informal screening methods 96% use the Denver Developmental Screening Test 29% screen every patient 43% screen with observed or reported problems 34% screen on the basis of significant illness When screening results suggested a problem: 45% observe the patient across visits 64% inform parents of a developmental diagnosis Referral made most often: to medical specialists (80%) to school systems (43%) to private programs (49%) for developmental evaluations (73%)</p>

Authors	Description/Purpose	Design	Methods	Outcomes/Comments
Palfrey et al. 1987	To examine how children with special education needs were identified and the role of the medical system in the diagnosis	CSS N = 1726	Parents of children in special education programs in 5 urban school systems were interviewed to determine when and how children were identified with special education needs	4.5% were identified at birth 28.7% were identified before 5 y Physicians were most likely to identify high severity, low incidence problems in the first 3 years (including severe MR, cerebral palsy, sensory impairments) Authors recommend longer and more comprehensive visits for children ages 3–5 y in this population
Drillien et al. 1988	To examine the association between screening results during infancy and early childhood and later school problems	LS Study 1: N = 417 Study 2: N = 570	Children were screened at 8w, 20w, 39w, 15m, 2y, and 3y. Educational and behavioral status at ages 6.5 to 7.5 years were examined in two samples: Study 1: Retrospective analysis of children with significant school problems compared with age-matched controls Study 2: Prospective analysis of children suspect on screening and with normal screening results	Study 1: Screening was most predictive at 39w, 2y, and 3y Study 2: Tests of adaptive and neurological function were most predictive of later school and behavior problems Given the need for enough time to complete the screening procedure, the authors recommend two times for screening at 9m and 2y with a review for suspect children at 3y

Authors	Description/Purpose	Design	Methods	Outcomes/Comments
<p>Glascoc et al. 1997</p>	<p>To evaluate the cost-benefits of 4 approaches to the detection of developmental disabilities</p>	<p>CBA N = 408</p>	<p>Setting: Day care centers and pediatric offices</p> <p>Four screening approaches were evaluated:</p> <ol style="list-style-type: none"> 1. Parents' concerns only 2. Direct screening with standardized test only 3. 2-stage positive screening: children receive direct screening only if parents' raise significant concerns 4. 2-stage negative screening: direct screening if parents do not raise concerns <p>Measures: PEDS, Denver-II, and Batelle Developmental Inventory; psychometric measures of intelligence, achievement, and language</p> <p>Age range: 0-6 y</p>	<p>Regarding the long-term costs/benefits of early detection and intervention: no approach was superior</p> <p>Regarding short-term costs to physicians:</p> <ol style="list-style-type: none"> A. 2-stage negative approach: most costly B. Parents' concerns only: least costly <p>If health insurance organizations and physicians hold some financial responsibility for diagnostic work-ups:</p> <ol style="list-style-type: none"> A. 2-stage negative approach is even more costly B. 2-stage positive approach is least costly C. Parents' concerns only falls somewhere in between <p>If health care provider is not financially responsible for diagnostic work-ups, then parents' concerns approach is the least costly</p>
<p>Wissov et al. 1992</p>	<p>To examine the prevalence of intra-familial violence, maternal psychosocial distress, the ability of pediatricians to identify these problems, and the association with reported child behavioral or emotional problems</p>	<p>CSS N = 243</p>	<p>Setting: Pediatric office</p> <p>Measures: A modified version of the Conflict Tactics Scale, the General Health Questionnaire, and a Temperament Scale for children 6-24 m</p> <p>Age range: .5-14 y</p>	<p>Prevalence of violence in the home: 40%</p> <p>Prevalence of maternal psychosocial distress: 23%</p> <p>Physician predictions</p> <p>Intrafamilial violence: sensitivity 27%; specificity 81%</p> <p>Psychosocial distress: sensitivity 11%; specificity 95%</p> <p>Behavioral problems in children < 3 y:</p> <p>With intrafamilial violence: 54%</p> <p>Without intrafamilial violence: 36%</p>

Authors	Description/Purpose	Design	Methods	Outcomes/Comments
Kemper 1992	To evaluate the performance of a questionnaire for identifying parenting risk factors in a primary care setting	CV N = 114	Setting: Pediatric office A self-administered questionnaire was given to mothers in an urban pediatric clinic. Identification of psychosocial risk factors using the questionnaire was compared to the medical record. Measures: A questionnaire was derived in part from other standardized instruments for alcohol abuse, substance abuse, depression, self-esteem, social support, domestic violence, and parental abuse as a child Age range: not specified	The use of a questionnaire identified substantially more children with psychosocial risk factors for poor parenting than was noted in the medical record in all categories except for domestic violence and low social support
Kemper, Babonis 1992	To evaluate the frequency of and risk factors for maternal depression during routine pediatric health supervision	CSS N = 667	Setting: Pediatric office Measures: The RAND 8-item and 3-item screening instruments for depressive disorders as part of a self-administered psychosocial questionnaire were given to mothers before well child care visits Age range: 0–6 y	Surveys positive for depression: 19% Mothers reporting depression were more likely to be younger, less educated, poorer, single, and nonwhite Mothers with drug use were most likely to report depression 3-item depression test compared with the 8-item test: Sensitivity: 100% Specificity: 88% Positive predictive value: 66% Negative predictive value: 100%

Authors	Description/Purpose	Design	Methods	Outcomes/Comments
Kemper et al. 1993	To evaluate the performance of a screening questionnaire for maternal alcohol and drug abuse	CV N = 507	Setting: Pediatric office Measures: Six screening questions for alcohol and drug abuse as part of a self-administered psychosocial questionnaire were compared with the Michigan Alcohol Screening Test (MAST) and the Drug Abuse Screening Test (DAST) Age range: 0–6 y	Psychosocial questionnaire compared with the MAST Sensitivity: 91% Psychosocial questionnaire compared with the DAST Sensitivity: 88%
Kemper et al. 1994	To evaluate the performance of a screening questionnaire for a maternal history of physical abuse during childhood	CV N = 284	Setting: Pediatric office Measures: Four screening questions were incorporated into a psychosocial questionnaire. Answers were compared to the physical abuse subscale of the Emotional and Physical Abuse (EPAB) questionnaire.	Psychosocial questionnaire compared with the EPAB: Sensitivity: 92–95% Specificity: 87–92% Positive predictive value: 78–93% Negative predictive value: 90–97%
Frankenburg, Coons 1986	To create an adaptation of the HOME Inventory for use in primary care and to examine its validity	CV N = 911	Setting: Pediatric office Measures: The HOME Inventory was modified into two forms of the HOME Screening Questionnaire (HSQ) for children 0 to 3, and 3 to 6 years. Form for children 0 to 3 y is 30 questions (15–20 minutes) at a 3rd to 6th grade reading level. Age range: 0–6 y	Results for the birth to 3 y scales of the HSQ: Internal reliability coefficient: .74 Test-retest reliability coefficient: .62 Co-positivity: 81.2% Co-negativity: 65.7% Positive predictive value: 77.3%

Authors	Description/Purpose	Design	Methods	Outcomes/Comments
Casey et al. 1988	To examine the validity of the Pediatric Review and Observation of Children's Environmental Support and Stimulation (PROCESS) for assessing the home environment	CV N = 76	Setting: Pediatric office Measures: The PROCESS is a 24-item questionnaire addressing the organization of the physical environment and the quality of developmental stimulation provided by the environment coupled with a 20-item inventory of items rated by the clinician based upon observations of the parent-child interaction. The results were compared to HOME Inventory. Age range: 0-18 m	PROCESS psychometrics K = total scale .92 (total scale) α = .61-.76 (subscales) Correlations with the HOME, parent-child interaction measure, and family income were all significant (p < .001) Correlations were stronger for the lower income subgroup Low PROCESS scores identified 77% of low HOME scores High PROCESS scores identified 95% of high HOME scores
Casey et al. 1993	To evaluate the validity of a standardized assessment of mother-child interaction during health supervision visits	CV N = 46	Setting: Pediatric office Measures: The observation component of the PROCESS was administered to consecutive mother-infant pairs at the 8-month health supervision visit. Results were compared with measures of the home environment, infant development, intelligence, and child behavior. Age range: 0-3 y	Significant correlations were found between the PROCESS at 8 months and the HOME at 12 and 36 months, laboratory ratings of mother-child interaction at 30 months, the BSID, Stanford-Binet, PPVT, and CBCL In multiple regression analyses, the PROCESS independently predicted IQ and behavior at 36 months

Codes:

RCT: Randomized Controlled Trial

CCCT: Controlled Clinical Trial

CSS: Cross Sectional Survey

CV: Cross Validation

DS: Descriptive Study

CBA: Cost Benefit Analysis

CA: Cost Analysis

TABLE 3. DEVELOPMENTAL EDUCATION

Authors	Description/Purpose	Design	Methods	Outcomes/Results
Chamberlin et al. 1979	To evaluate the effectiveness of pediatricians' efforts to teach first-time mothers about child behavior and development	LS N = 371	<p>Setting: Pediatric office</p> <p>Procedure: First-time mothers were recruited from the private practices of 35 full-time pediatricians. Physicians teaching effort and quality were observed and rated.</p> <p>Outcome measures: Mother: knowledge of child development, attitudes, and child rearing style Child: behavior patterns, behavior problems, and development status</p> <p>Age range: 0–18 m</p>	<p>Mothers whose pediatricians taught more reported more use of positive contact with their children and more feeling of being helped in the child-rearing role from practices that make at least a moderate effort to teach</p> <p>Only mothers' use of positive contact predicted developmental outcome</p> <p>Most of the variance in mothers' use of positive contact was explained by maternal and child characteristics at birth. Physician teaching contributed a small but significant amount to the total variance.</p>
Chamberlin, Szumowski 1980	To examine the effect of continued physician teaching input on mothers' knowledge of child development, attitudes and child rearing style, and on children's development	LS N = 371	<p>Setting and methods same as in Chamberlin et al. 1979</p> <p>Age range: 0–30 m</p>	<p>Positive contact with the mother was the strongest predictor of child development at 30 months</p> <p>Physician teaching effort was associated with mothers' use of positive contact, but the effect was not strong enough to show up as a direct relationship with child development status</p> <p>Content analyses of pediatric visits showed that physicians spend little effort directly focused on teaching mothers to interact in more affectionate and cognitively stimulating ways</p>

Authors	Description/Purpose	Design	Methods	Outcomes/Results
Dworkin et al. 1987	To evaluate the effectiveness of discussing developmental stages with mothers while providing anticipatory guidance during health supervision visits	CCCT N = 83	Setting: Pediatric office Procedure: Mother–infant pairs were seen by the same pediatrician for WCC visits at 2w, 2m, 4m, and 6m. Experimental group mothers received anticipatory guidance explained on the basis of age-specific discussions of affective, cognitive, and physical development. Outcome measures: measures of mother–infant interaction, maternal perceptions of infant temperament, family adaptation and adjustment, and maternal satisfaction with baby’s behavior/development and pediatric services Age range: 2 w–6 m	Discussing the developmental basis for anticipatory guidance did not enhance the effectiveness of the intervention in terms of any outcome measure
Casey, Whitt 1980	To evaluate the effect of pediatric anticipatory guidance on mother–infant relationship	RCT N = 32	Setting: Pediatric office Procedure: Mothers in the intervention group received guidance to enhance mother–infant interaction and to stimulate infant cognitive development Outcome measures: mother–infant interaction and infant development Age range: 0–6 m	Mother–infant interaction: Experimental group mothers rated significantly higher on sensitivity, cooperation, appropriateness of interaction, and appropriateness of play Infant development: Experimental infants were advanced on vocal imitation

Authors	Description/Purpose	Design	Methods	Outcomes/Results
Bristor et al. 1984	To examine the effectiveness of perinatal coaching for enhancing parent–infant interaction	CCT N = 42	Setting: Postpartum ward Procedure: Individualized training for new parents on days 1, 2, and 7 of life designed to inform them of newborn capabilities and how to achieve optimal mother–infant interaction Outcome measures: Mother–infant interaction, infant care practices were videotaped at 1 m; parenting stress questionnaire Age range: 0–1 m	Mothers receiving the intervention showed more effective vocal interactions and were more social during feeding interactions There were no significant differences in parental stress
Black, Teti 1997	To evaluate the effectiveness of a videotaped intervention in altering mealtime communication and attitudes among African–American adolescent mothers	RCT N = 59	Setting: not stated Procedure: Experimental group mothers were shown and given a videotape modeling feeding interactions of mothers with their infants Outcome measures: measures of mother–infant interaction and maternal attitudes toward mealtime behavior Age range: 4–13 m	Experimental group mothers reported more favorable attitudes about their children, were more communicative during meals, reported positive attitudes toward the mealtime, and were observed to be more involved with their children during feeding

Authors	Description/Purpose	Design	Methods	Outcomes/Results
Little 1983	To evaluate parents' perceptions of anticipatory guidance addressing infant temperament	CSS N = 79	Setting: Pediatric office Measures: Infant temperament questionnaires were completed by parents prior to the 8 m WCC visit when the results were discussed. Parents were questioned regarding the usefulness of the exercise. Age range: 6–8 m	90% felt they gained a better understanding of their child 57% felt that discussion of infant temperament changed their approach to parenting 87% felt that discussion of temperament was worthwhile
Cameron & Rice 1986	To evaluate the discriminant predictability of early patterns of temperament for different types of behavioral problems in later infancy and the differential utility of a temperament-based anticipatory guidance system	RCT N = 602	Procedure: Six behavioral issues, corresponding ages of likely occurrence and descriptions of associated temperament patterns were developed. Written anticipatory guidance addressing behavioral issues was mailed to parents based upon the temperament profiles of their children at 4 m. A follow-up questionnaire at 12 m asked parents to rate behavioral issues on their occurrence and degree of problem, and the effectiveness of the anticipatory guidance Age range: 4–12 m	Different temperament patterns raised different behavioral issues and problems. Behavioral issue selection for anticipatory guidance possessed a high degree of predictive accuracy. Parents reporting the most problems also reported greater satisfaction with the help received from completing the temperament questionnaire and from the anticipatory guidance suggestions for handling infants Parents reported greater understanding of why issues occurred, greater understanding of their feelings, and reduced anxiety levels as first-time parents

Authors	Description/Purpose	Design	Methods	Outcomes/Results
Wolfson et al. 1992	To examine the effectiveness of behavioral training and informational handouts for promoting healthy sleep patterns in infants	RCT N = 60	Setting: Prenatal child birth class Procedure: The experimental group received 3 training sessions, 1 prenatal and 2 post-natal. Parents were taught strategies for promoting healthy, self-sufficient sleep patterns in their infants. Outcome measures: infant sleep, parent behavior, parents' stress, and parents' sense of efficacy Age range: 0–2 m	Experimental group infants had better sleeping patterns than control group infants by 9 weeks Parents in the experimental group also reported less stress
Adair et al. 1992	To examine the effectiveness of a brief anticipatory guidance intervention to reduce night waking during infancy	CCT N = 292	Setting: Pediatric office Procedure: The experimental group received written information about sleep with advice to put babies to sleep when partially awake at the 4 m health visit Outcome measures: parental presence with the child at the time the child fell asleep and frequency of night waking at 9 months Age range: 4–9 m	Experimental group infants experienced significantly less night waking than the controls. Frequent night waking was twice as common in the control group. Parental presence at bedtime was significantly less common in the experimental group Experimental group infants settled more easily for naps and at bedtime

Authors	Description/Purpose	Design	Methods	Outcomes/Results
Pimilla & Birch 1993	To determine whether exclusively breast-fed infants could be taught to sleep through the night	RCT N = 26	Setting: not stated Procedure: Subjects were first time mothers and their healthy full term newborns. The experimental group received verbal and written instructions on how to teach their infants to sleep through the night. Measures: Sleep habits, feeding habits, and differences in temperament were assessed before and after the intervention Age range: 0–8 w	By 8 weeks, total nighttime sleep, average sleep bout duration, and longest sleep episodes were longer in the experimental group Experimental group infants slept through the night sooner than controls 38% vs. 7% at 4 weeks 100% vs. 23% at 8 weeks Total daily sleep and volume of feeding were similar between the two groups Control parents rated their infants less predictable
Sege et al. 1997	To develop, implement, and evaluate anticipatory guidance materials to reduce children's risk behaviors for violence	CCT N = 559	Setting: Pediatric office Procedure: Discussion and informational handouts were used to encourage parents to use time outs in place of corporal punishment and to reduce the exposure of children to television violence. The control group received anticipatory guidance without written materials. Outcome measures: parents' recall of anticipatory guidance, parents' use of time outs, and reduction in television viewing 2–3 weeks after the visit Age range: 14 m–6 y	Significantly more experimental group parents who had never used time outs did so for the first time compared to controls There were no significant changes in reported television viewing habits

Authors	Description/Purpose	Design	Methods	Outcomes/Results
Needlman et al. 1991	To evaluate the short-term effect on parental literacy orientation of a pediatric clinic-based program encouraging parent-child book sharing	CCT N = 79	Setting: Pediatric office Procedure: A book sharing program had 3 components: 1) volunteers who read to children in the waiting room, 2) counseling by the pediatrician about literacy development, and 3) book distribution Outcome measures: Parents were interviewed about their use of books and number of books in the home Age range: .5-5 y	Parents receiving books were 4 times more likely to report literacy orientation than parents not receiving books There was a significant association between literacy orientation and receiving a book in favor of parents on welfare
High et al. 1998	To evaluate the effectiveness of a pediatric clinic program to promote book sharing and bedtime routines	CCT N = 151	Setting: Pediatric office Procedure: An experimental group received 2 books and materials that promoted book sharing and bedtime routines at each health visit between 6 and 36 m Outcome measures: family literacy orientation; sleep problems Age range: 1-3 y	The intervention was significantly associated with book sharing at bedtime. Higher odds ratios were seen with parents having less education and Hispanics. No group differences were found for sleep problems and there was no relationship between sleep problems and the intervention The intervention was associated with receipt of more anticipatory guidance about safety, sleep behavior, and how to share books with children

Authors	Description/Purpose	Design	Methods	Outcomes/Results
Golova et al. 1999	To evaluate the effectiveness of a pediatric clinic program to promote literacy orientation in Hispanic families	RCT N = 135	Setting: Pediatric office Procedure: An experimental group received a bilingual children's book, handout explaining how to enjoy books with children, and literacy-related anticipatory guidance at enrollment and 2 consecutive health visits Outcomes: family literacy orientation, children's language development Age range: .5-2 y	Parents in the experimental group were more likely to report: reading to their children at least 3 days/wk reading books with their child was a favored activity having at least 5 children's books in the home Language scores were equivalent in the two groups
Osborn & Woolley 1981	To examine the use of groups for health supervision in the office setting	CCT N = 78	Setting: Pediatric office Procedure: Experimental groups received 45-minute group (3-5 participants each) discussions followed by physical examinations Measures: efficiency, effectiveness, content of visits and patient satisfaction Age range: 0-6 m	Experimental and control groups were equally efficient. There were no differences between time spent per infant. Experimental mothers attended significantly more health visits in first 6 months than controls. There was no difference in utilization of health services but experimental mothers sought advice less between visits. Content of visits was markedly different with group visits focusing less on physical care and more on personal issues
Dodds et al. 1993	To compare individual versus group health supervision formats in the extent to which pediatricians covered recommended topics during health visits	CCT N = 31	Setting: Pediatric office Procedure: Physicians were recruited into two groups. One group conducted only individual health visits; the other used group and individual formats. Measures: pediatric visit content of the 2 and 12 m visits Age range: 2-12 m	For each category of safety, nutrition, behavior, and sleep, significantly more content was covered in groups There was a large difference in the discussion of parenting issues in favor of groups that was not statistically significant Parents initiated more topic discussion in the group format for behavior and parenting issues

Authors	Description/Purpose	Design	Methods	Outcomes/Results
Rice & Slater 1997	To examine the effectiveness of group health supervision in conveying knowledge of child health and development, increasing perceived maternal support, and mitigating maternal depression	CCCT N = 50	Setting: Pediatric office Procedure: Experimental group sessions lasted 1 hour and included a 10–15 minute video addressing immunization, illness, safety, and behavior. Control group visits lasted 15 minutes. Measures: measures of child health care and child development knowledge, social support, and depression Age range: 0–10 m	There were no significant group differences in any of the outcome measures
Taylor et al. 1997	To determine if group health visits for high risk infants affects mother–child interaction and child development	RCT N = 114	Setting: Pediatric office Procedure: Infants were classified as high risk based upon mothers' psychosocial characteristics. Group health supervision visit discussions covered child rearing issues. Outcome measures: infant development, mother–child interaction, quality of the home environment Age range: 4–15 m	Infants receiving group health supervision did not differ from those receiving individual health supervision on any outcome measure

Authors	Description/Purpose	Design	Methods	Outcomes/Results
Taylor, Kemper 1998	To determine if participation in group health visits improves maternal outcomes compared with individual visits for high risk infants	RCT N = 213	<p>Setting: Pediatric office</p> <p>Procedure: Subjects were mothers with at least 1 social risk factor. Nurse practitioners provided a curriculum of topics for discussion. Group sessions lasted 30–60 min for intervention mothers.</p> <p>Outcome measures: maternal sense of competence, social isolation, and social support</p> <p>Age range: 4–15 m</p>	No significant differences were noted in any of the outcome measure. In fact, mothers in both groups tended to feel less competent and more socially isolated at the end of the intervention.

Codes:

- RCT: Randomized Controlled Trial
- CCCT: Controlled Clinical Trial
- CSS: Cross Sectional Survey
- CV: Cross Validation
- DS: Descriptive Study
- CBA: Cost Benefit Analysis
- CA: Cost Analysis

TABLE 4. DEVELOPMENTAL INTERVENTIONS

Authors	Description/Purpose	Design	Methods	Outcomes/Results
Taubman 1984	To evaluate the effectiveness of counseling for reducing infant crying	CCT N = 60	<p>Setting: Pediatric office</p> <p>Procedure: 30 normal colicky infants were matched with 30 control infants for age in weeks, sex, and the presence of siblings. The intervention employed counseling of mothers to decrease excessive stimulation.</p> <p>Measures: Infant diaries were used to document the extent of infant crying</p> <p>Age range: 0–3 m</p>	<p>Colicky infants cried twice as much as control infants before the intervention. Crying decreased 70% with counseling.</p> <p>There was no effect on sleep</p>
Taubman 1988	To test two hypotheses of colic: that crying in colic is an attempt by infants to signal their needs and desires that is misinterpreted versus the hypothesis that colic is a reaction to cow or soy milk protein	RCT N = 20	<p>Setting: Pediatric office</p> <p>Procedure: Subjects were randomized to a counseling group or a diet intervention group for phase 1. For phase 2, the diet group returned to their original diet and received counseling.</p> <p>Measures: Infant diaries were used to document the extent of infant crying</p> <p>Age range: 0–3 m</p>	<p>Both groups had a significant decrease in crying time by the end of phase 1. The degree and rate of crying decrease was greater in the counseling intervention group compared to the diet intervention group.</p> <p>Within the first 3 days of counseling for the diet intervention group in phase 2, their crying (which was still greater than 2h/day) decreased significantly</p>

Authors	Description/Purpose	Design	Methods	Outcomes/Results
MacKenzie 1991	To test the hypothesis that overstimulation by caregivers is an underlying cause of colic and to examine the effectiveness of counseling for reducing infant crying	CCT N = 42	Setting: Pediatric office Procedure: The experimental group received counseling to reduce the stimulation of babies. The control group received an empathic interview. Outcome measure: infant crying behavior, maternal distress Age range: 3 w–3 m	Subjects given advice showed a significant reduction of infant crying and maternal distress compared to empathy alone
Parkin et al. 1993	To evaluate the relative effectiveness of counseling regarding management strategies, use of a car-ride simulation device, and reassurance in the management of infant colic	RCT N = 38	Mother–infant pairs were assigned to the 3 groups Measures: infant crying over a 2-week time period; maternal anxiety Age range: 1–10 w	There were no significant differences between groups in the amount of crying nor in degree of maternal anxiety
Wolke et al. 1994	To evaluate the effectiveness of structured behavioral management versus emotional support alone in the treatment of excessively crying infants	CCT N = 92	Procedure: Mother–infant pairs were recruited into the 3 treatment conditions: behavior management, emotional support, and no treatment. Trained lay counselors provided telephone counseling for each treatment condition. Parents recorded infants' behaviors in a 24-h diary. Outcome measures: duration and frequency of crying; mother's satisfaction with help received Age range: 1–5 m	Treatment using behavioral management carried out by trained lay counselors significantly reduced fussing and crying duration, especially in the evenings, and was more effective than empathy alone and no treatment at all Counselors using this technique were rated as more helpful in assisting the mother in coping with the problem and in improving the mother–child relationship

Authors	Description/Purpose	Design	Methods	Outcomes/Results
Richman 1985	To evaluate the effectiveness of trimeprazine tartrate as a hypnotic in a group of children with severe sleep problems	RCT N = 22	<p>Procedure: Children with severe sleep problems were identified using a questionnaire survey. Children were assigned to a diary treatment or drug treatment group. A double-blind trial of drug vs. placebo for 2 weeks each was conducted.</p> <p>Drug dosage: 30 mg at bedtime increased to 60 mg if no improvement after 3 nights</p> <p>Outcome: a weekly composite sleep score was computed from the sleep diaries</p> <p>Age range: 1–2 y</p>	<p>Compared to placebo, parents considered the drug to be helpful, falling asleep improved, night waking improved, and appetite improved; parents stated they would use it again. There was no difference between drug and placebo on parents' perception of child's mood.</p> <p>Composite sleep scores were lower with the drug. There was no evidence of rebound effect</p> <p>Improvement in sleep composite scores was limited. Composite sleep scores were no different from baseline for the drug group 6 months after the trial.</p>
Simonoff & Stores 1987	To evaluate the efficacy of trimeprazine tartrate in children with persistent and severe night waking	RCT N = 20	<p>Procedure: Subjects were recruited by referral. Trimeprazine dose: 6 mg/kg (45–90 mg) was administered according to the following time frame in a double-blind crossover design:</p> <p>2 week baseline—4 weeks of drug or placebo—1 week washout—4 weeks of other medication; Follow-up 1 month</p> <p>Sleep assessment: sleep diaries</p> <p>Age range: 1–3 y</p>	<p>While on trimeprazine, children slept longer at night, had fewer night wakings, and spent less time awake at night. No differences in daytime sleep were found.</p> <p>At follow up, there were significantly fewer night wakings, and less time awake at night</p> <p>Limitations to generalizability: This sample is not representative of night waking problems in the general population. A fairly high dose of trimeprazine was used in this study.</p>

Authors	Description/Purpose	Design	Methods	Outcomes/Results
France et al. 1991	To examine the use of a sedative medication that has short-term effects to reduce children's reaction to the onset of extinction	RCT N = 35	<p>Procedure: Subjects were recruited from referrals to the Canterbury Sleep Project</p> <p>Subject groups: extinction, extinction plus placebo, extinction plus trimeprazine</p> <p>Trimeprazine doses: 30 mg–24 mg–18 mg–12 mg–6 mg–0 mg tapered every other day</p> <p>Measures: sleep diary; questionnaires addressing infant's sleep and parents' anxiety after the intervention</p> <p>Ages 7–27 m</p>	<p>The medication group improved immediately and more rapidly than the others in the first intervention phase (first 10 days)</p> <p>There were no group differences in night waking duration</p> <p>Fewer children in the medication group showed post-extinction response bursts (reaction to extinction) and showed a greater reduction in their intensity and incidence</p> <p>There were no group differences in infant security</p> <p>Maternal anxiety correlated with total duration of night waking at baseline. The placebo group showed less anxiety reduction over time.</p>
Rickert & Johnson 1988	To evaluate the relative effectiveness of systematic ignoring of crying and scheduled awakenings in the management of night waking in infants and young children	RCT N = 33	<p>Procedure: Infants and children with night waking were assigned to 3 groups</p> <p>Control group: no intervention</p> <p>Experimental groups: systematic ignoring of child's crying and scheduled awakenings of the child before an anticipated spontaneous awakening</p> <p>Measures: number of awakenings and crying episodes</p> <p>Age range: .5–4.5 y</p>	<p>Systematic ignoring of crying and scheduled awakenings were effective in reducing spontaneous night waking</p> <p>Systematic ignoring of crying led to the quickest reduction of night waking</p>

Authors	Description/Purpose	Design	Methods	Outcomes/Results
Weir & Dinnick 1988	To evaluate the effectiveness of behavioral modification in the treatment of sleep problems by health visitors	CCT N = 51	<p>Procedure: Health visitors were taught behavioral modification techniques and were supervised in their use with children having sleep problems. A second group of health visitors for the control group performed the same home visiting procedures without the use of behavioral modification techniques.</p> <p>Measures: sleep disturbance questionnaire; health visitor rating of severity</p> <p>Ages: .5–4.5 y</p>	<p>There were no group differences in improvement of sleep problems or associated behavior problems over the course of treatment</p> <p>Both groups improved over the 6 month period</p> <p>An average of 5.5 visits were made by health visitors to deal with sleep problems (range 1–13)</p> <p>Health visitor training effectiveness was not documented. No measure was made of the extent to which the experimental group actually employed behavioral techniques at the visits.</p> <p>There was a high spontaneous remission rate, higher than other reports</p>
Adams & Rickert 1989	To evaluate the effectiveness of graduated extinction versus the use of positive bedtime routines in the management of bedtime temper tantrums	RCT N = 36	<p>Procedure: Children with bedtime tantrums were assigned to 1 of 3 groups—2 experimental groups (graduated extinction and positive routines) and a control (no treatment group). Treatment lasted 6 weeks with 3- and 6-week follow-up visits.</p> <p>Measures: Number and length of bedtime tantrums</p> <p>Ages range: 18–48 m</p>	<p>Both graduated extinction and the use of positive routines resulted in reduced tantrum activity at bedtime compared to the control group</p> <p>Improvements were seen in the parents' marital relationship for both experimental conditions</p>

Authors	Description/Purpose	Design	Methods	Outcomes/Results
Seymour et al. 1989	To evaluate the effectiveness of a standardized sleep program versus a written guide for parents for children with sleep problems	RCT N = 45	Setting: Family counseling program Procedure: Subjects were allocated to an experimental group that received the sleep program (2–3 h total), a second experimental group that received the written parent guide only, and a third group that received no intervention for 4 weeks Measures: Mothers' reports—interview and sleep diaries Age range: 9 m–5 y	The sleep program experimental group had significant improvement compared to the control group on time spent awake at night, number of night wakings, and bedtime settling to sleep The written information group had significant improvement compared to the control for number of night wakings, and bedtime settling to sleep
Scott & Richards 1990	To evaluate the effectiveness of providing advice, support, and written information versus no treatment to parents of infants with night waking	RCT N = 120	Procedure: Infants with night waking problems were assigned to the 3 groups. A 4th cohort of infants without night waking problems was recruited as an additional comparison. Treatment lasted 3 m. Measures: degree of night waking Age range: 1–18 m	While there was an overall decline in the frequency and duration of night waking over time, there were no significant differences between groups

Authors	Description/Purpose	Design	Methods	Outcomes/Results
Reid et al. 1999	To evaluate the effects of standard and graduated ignoring procedures in the treatment of children's sleep problems	RCT N = 49	<p>Procedure: Subjects were recruited through advertisements in the community. Sleep problems were manifested by at least 4 difficult bedtimes and/or at least 4 difficult nighttimes per week.</p> <p>Measures: Parents' expectations and satisfaction with treatment, compliance to the protocol, discipline style, and parenting stress; bedtime and nighttime stress, good bedtimes and nighttimes, child behavior problems (CBCL), maternal depression, marital adjustment</p> <p>Ages 1.5–4 y</p>	<p>Compliance in both experimental groups was high</p> <p>There were no significant group differences in maternal stress at bedtime</p> <p>In both experimental groups, there were better bedtimes and nighttimes compared with the control group during the treatment period. The experimental groups did not differ from each other and both experimental groups improved throughout the trial.</p> <p>At post-assessment, both experimental groups scored lower on the CBCL sleep problems subscale than control group</p> <p>Mothers' satisfaction ratings did not differ between groups</p> <p>Graduated ignoring was easier to implement, especially at nighttime</p>

Codes:

- RCT: Randomized Controlled Trial
- CCT: Controlled Clinical Trial
- CSS: Cross Sectional Survey
- CV: Cross Validation
- DS: Descriptive Study
- CBA: Cost Benefit Analysis
- CA: Cost Analysis

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#489 *Early Effects of the Healthy Steps for Young Children Program* (April 2001). Cynthia S. Minkovitz et al. *Archives of Pediatrics & Adolescent Medicine*, vol. 155, no. 4. In this initial examination of the effects of the Healthy Steps program, the authors note that intervention families received more developmental services during the first two to four months of their child’s life and were happier with care received than were control families.

Growth, Development, and Behavior in Early Childhood Following Prenatal Cocaine Exposure: A Systematic Review (March 28, 2001). Deborah A. Frank et al. *Journal of the American Medical Association*, vol. 285, no. 12. Copies are available from Deborah A. Frank, Boston Medical Center, Growth and Development Programs, 820 Harrison Avenue, FGH Bldg, 3rd Fl., Boston, MA 02118-2393, E-mail: dafrank@bu.edu.

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New Roles for Developmental Specialists in Pediatric Primary Care (October/November 2000). Margot Kaplan-Sanoff, Claire Lerner, and Andrea Bernard. *Zero To Three*, vol. 21, no. 2. Copies are available from Zero To Three: National Center for Infants, Toddlers and Families, 2000 M Street, NW, Suite 200, Washington, DC 20036, Tel: 800-899-4301. Available online at <http://www.zerotothree.org/vol21-2sb.pdf>.

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Child Development Services in Medicaid Managed Care Organizations: What Does It Take? (July 2000). Carolyn Berry, Pamela Butler, Linda Perloff, and Peter Budetti. *Pediatrics*, vol. 106, no. 7. Copies are available from American Academy of Pediatrics, 141 Northwest Point Blvd., Elk Grove Village, IL 60007-1098, Phone: 888-227-1773, Fax: 847-434-8000, E-mail: journals@aap.org.

Assessing the Impact of Pediatric-Based Developmental Services on Infants, Families, and Clinicians: Challenges to Evaluating the Healthy Steps Program (March 2000). Bernard Guyer et al. and the Healthy Steps Evaluation Team. *Pediatrics*, vol. 105, no. 3. Available online at www.pediatrics.org/cgi/content/full/105/3/e33.

#367 *Assuring the Healthy Development of Young Children: Opportunities for States* (February 2000). Peter Budetti, Carolyn Berry, Pamela Butler, Karen Scott Collins, and Melinda Abrams. This issue brief examines opportunities for states to enhance the provision of health-related developmental services to children in low-income families, particularly by emphasizing the importance of preventive developmental services in primary, pediatric practices.

#355 *Sponsor-a-Scholar: Long-Term Impacts of a Youth Mentoring Program on Student Performance* (December 1999). Amy W. Johnson, Mathematica Policy Research, Inc. This recent evaluation of the Fund-supported Sponsor-a-Scholar Program finds that the mentoring initiative for at-risk high school students is having a positive impact on academic performance and is boosting students' chances of attending college after graduation.

Innovative Programs for Young Children, Age 0–3 (November 1999). Betsy Carrier and Sheila J. Madhani, National Public Health and Hospital Institute. In this survey report of 57 public hospitals and health systems that provide a high volume of pediatric services, the authors highlight model pediatric programs that adopt a comprehensive approach toward child development, including case management and home visits. Copies are available from the National Public Health and Hospital Institute, 1301 Pennsylvania Avenue, NW, Suite 950, Washington, DC 20004, Tel: 202-585-0135, Fax: 202-585-0101.

