

Preschool Development 1: Communicative and Motor Aspects

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IMPORTANT POINTS

1. It currently is recommended that the development of children be monitored during health supervision visits by the process of developmental surveillance.
2. Language abilities develop rapidly during the preschool years, are important indicators of developmental progress, and are critical to further learning and behavioral development.
3. Developmental monitoring not only should be aimed at identifying children who have low function, but at directing the focus of anticipatory guidance to help promote normal development.
4. Direct interviewing of the preschool child, such as through the "drawing interview," can provide information about the child's developmental and emotional status, establish rapport, and serve as a model for parents.
5. When reviewing the child's development, the parent's reaction to the child's course of development may be as important as the child's developmental status.

Introduction

Preschool children are very special to pediatricians. We have the opportunity to observe the baby become a person with his or her own dynamic personality, complex abilities, and enlarging relationships. However, pediatricians generally only schedule annual visits with healthy preschool-aged patients to monitor health and development and to provide guidance to parents. Given the developmental richness of children from 2 to 5 years of age and the enormous transformations occurring from one birthday to the next, the best way for such health supervision visits to be of maximal use in monitoring development is if the parent, who knows the child intimately,

provides relevant information.

The pediatrician then can address parental concerns and elicit information likely to reveal the strengths and weaknesses that should be addressed. In this article, we will provide information about normal developmental milestones of preschoolers organized to facilitate developmental surveillance during health supervision visits.

The rationale for developmental monitoring by child health clinicians appears to be shifting with advances in research and technology as well as new public awareness and support. Traditionally, developmental monitoring was advocated to detect treatable diseases that had developmental manifestations, such as phenylketonuria, hypothyroidism, or deafness. With increasing batteries of metabolic and electrophysiologic neonatal screening tests available, this rationale seems less compelling. Recently, public demand has led to laws in the United States and elsewhere that mandate identification and intervention for infants and young children who have developmental deviations and even for those only "at risk" without cost to families. Failure to attempt to identify these children no longer can be rationalized by the lack of available intervention services.

Furthermore, new research findings make it evident that early developmental guidance should not focus exclusively on those children who have a low intelligence quotient (IQ) and other definable developmental disabilities, but it should be used to optimize functional outcomes of *all* children. Several researchers have noted the existence of "multiple intelligences" that independently predict a variety of "success" outcomes rather than only one skill represented by one IQ score. In addition to the standard academic verbal and mathematical abilities, there are the spatial abilities required to be a dancer; musical giftedness; interpersonal intelligence needed to understand others, which would facilitate success in interpersonal work such as politics or sales; and an "intrapsychic" capacity facilitating insight into one's personal feelings and motivations important to inner contentment. Helping parents identify and foster specific strengths may be valuable in preventing emotional disorders and social deviance. For example, consider the potential value to self-esteem of enhancing a natural musical ability identified in a mildly retarded child. Coaching and reinforcing specific athletic abilities also has been shown to prevent psychiatric disorders in children from disadvantaged backgrounds who might otherwise have little opportunity to excel.

To be effective, developmental guidance must take into account the child's temperament and the caretakers' parenting style, not just offer information about normal developmental stages. For example, Arcus and Kagan have shown that overly inhibited and reactive children within a sample of developmentally "normal" infants had significantly better outcomes when their "normal" parents' styles provided some "doses" of frustration rather than only immediate rescuing from moments of upset. Encounters eliciting the parent's impressions are more likely to detect and foster

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advice about this type of interaction between parent and child.

The new understandings of child development call for a different approach to developmental monitoring. This approach addresses a wider range of developmental capacities and patterns and provides developmental guidance tailored to the individual characteristics of each child, not just for those believed to be delayed and not limited to generic advice aimed at a theoretically average child. Furthermore, if developmental monitoring through child health supervision represents a reliable means of identifying developmentally disabled children, the new societal commitment to early identification could be fulfilled without the creation of new agencies.

One recent response to the challenge for a new approach to developmental monitoring is the guidelines for child health supervision entitled *Bright Futures*, based on opinions of a large expert panel. These guidelines suggest the use of a process called developmental surveillance through which "health professionals and families observe the emergence of abilities in children over time. The process is longitudinal and collaborative, as the family and the health professional both note the progress of the child and share concerns. The status of infants and young children can generally be assessed from the developmentally appropriate trigger questions, developmental questionnaires completed by the parent, and observations throughout the visit, including those that occur during the physical examination." *Bright Futures* provides the specific "trigger questions," with notes regarding "possible responses" for each health supervision visit and a list of developmental milestones as a further guide to interpretation of parental reports and the clinician's observations. This article provides further elaboration and discussion using the framework of trigger questions and milestones suggested in *Bright Futures*. We especially hope this article will help clinicians interpret parental concerns elicited by the most important trigger question: "Do you have any specific concerns about ___'s development or behavior?"

It is not known whether agencies responsible for the identification process can depend on developmental surveillance to be sensitive to the types of problems that have been mandated for case identification. Data regarding the sensitivity and specificity of developmental surveillance as described by *Bright Futures* are not available. Furthermore, the broad nature of the guidelines makes the process more dependent on the clinical skill of the individual than a screening test that has clear cutoff scores. However, its general approach of obtaining a parental report of current functioning rather than past milestones is sound because parental recall of earlier milestones has been shown to be unreliable. Also, the interviewing approach that begins with general concerns about development before moving to specifics has been shown to be productive. Nevertheless, there may be inherent limitations to parental report for purposes of developmental screening. For example, our studies have shown consistently that for the ages of 4 and 5 years, neither specific parental reports nor their global concerns are sensitive for detecting children who have language impairments. We have found similar difficulties with prediction of general readiness for school from parental report.

In addition to the interview of the parent, the developmental surveillance recommended by *Bright Futures* calls for the clinician to make "opportunistic observations" during the course of the routine health supervision examination and observations from other encounters with the child. However, no guidelines for specific observations are provided, so again the validity of the process depends on the skill and knowledge of the individual clinician. However, past research has shown that the informal observations made by pediatricians are not adequate to identify mildly retarded children and did not improve with longer experience in pediatrics.

Information from this article will augment the outline provided by the *Bright Futures* manual, sharpen the clinician's ability to conduct parent interviews, and increase sensitivity to opportunities for developmental

observation. However, this additional information does not provide scores and cut points, such as those used by screening tests, which could assess the validity of the screening process more objectively. Clinicians may wish to conduct formal screening tests in addition to the developmental surveillance process, at least for children believed to be at risk, or to assess school readiness and language at the prekindergarten age, when informal methods are most likely to be unreliable.

Even if a perfect screening test for developmental delay were available, the types of conversations with parents and the observations suggested by *Bright Futures* would be very valuable. The parents' perception of the child's development and behavior and their reaction to it is one of the most powerful environmental influences on the child during this period. Only by interviewing the parent and making observations will the clinician be in a position to provide specific anticipatory guidance and support or interpret any screening information in a way that is meaningful and acceptable to the parent. Such a dialogue with the parent is not possible if the clinician is not well grounded in normal child development.

Another reason to be optimistic about developmental surveillance is that research is providing valid techniques to enhance this process. For example, a standardized approach to presenting vision test materials and observing the child's reaction to them (the START test) is as predictive of standard concurrent developmental testing as time-consuming screening tests devoted exclusively to development. It has been shown to be more predictive of school outcomes than is IQ testing on the same cohort of children, thus constituting an adequate school readiness screen. This approach of combined vision and developmental screening also was shown to be more cost-efficient than standard vision screening, due to a 50% reduction in the proportion of untestable children. It also has advantages for vision measurement because the specific method used to test the child (letters, pictures, or

illiterate E) is adjusted based on the child's response to a standard presentation of these test materials. It is the standard observations of a child's response to these vision testing materials and procedures that comprise the developmental or readiness component of the test. Standard observations of the child during pure tone hearing screening also have been shown to predict standard developmental testing. These data suggest that the power of "opportunistic observation" can be enhanced when the health supervision routine is organized to highlight behaviors sensitive to developmental differences and to refine the procedure further using a data-based method. Computer applications should enhance this approach even more. For example, we have developed an interactive system that simultaneously screens for speech, language, and hearing impairment in the preschool child. However, no screening test will replace an informed conversation.

Conducting Developmental Surveillance

DEVELOPMENTAL TRAJECTORY

Given the limited time available for the health supervision visit, the parent and clinician together must decide quickly which topics to pursue. Asking both the parent and child at the beginning of the visit

"What would you like to be sure we cover during this visit?" can help assure that their priorities are addressed. By synthesizing knowledge of the child and family, notes in the chart from colleagues who may have seen them, and direct observations and information revealed during the visit, the clinician should generate a "developmental trajectory" before the visit concludes. The developmental trajectory is a clinical hypothesis about the dynamic formed by the transaction among child, parent, and environmental factors that is most likely to affect the child's developmental outcome. An example of a developmental trajectory might be how a former preterm baby who is completely normal developmentally is becoming oppositional and having excessive tantrums at the age of 3 because of maternal overprotectiveness and is at risk for oppositional defiant disorder. The focus for the conclusion of this particular visit should be on efforts to normalize parent-child interactions and avoid development of oppositionality. The clinician would stress the normality of the child, the developmentally appropriate increasing need for independence, how parental fears and expectations are affecting their ability to provide this independence, and what they could do differently. Identifying the developmental trajectory helps in selecting the focus for further assessment, anticipatory

guidance, or intervention and recommending any needed follow-up for concerns. The myriad other potential topics for guidance should be offered either through handouts, suggested readings, videotapes, or discussion with nursing staff or deferred.

TRIGGER QUESTIONS

Trigger questions address all of the major areas of developmental functioning: speech and language, cognition, gross and fine motor skills, personal-social skills, and adaptive skills. These areas are not completely distinct from one another, however, especially in young children, in terms of which functional abilities they affect. Parents also think about their children in terms of how they function, rather than in distinct developmental lines. Thus, it is the pediatrician's task to extract needed information from the parent's answers and other data to determine the status of the child's development in each of the major areas.

The traditional developmental abilities likely to be elicited by each trigger question are outlined in Table 1. Observation of spontaneous or elicited behaviors or past information already known to the clinician can verify answers to trigger questions (eg, language skills); contradict them, showing a need for further investigation (eg, out-of-control aggressive behavior in the room when the parents state no

TABLE 1. Traditional Developmental Abilities Elicited by the Trigger Questions

TRIGGER QUESTIONS	LE	LR	Ar	Co	Ad	FM	PS	SR	GM
1. How does he communicate what he wants?	X		X				X	X	
2. What do you think he understands?		X		X					
3. How does he act around others?	X	X		X			X	X	
4. Does he show an ability to understand the feelings of others?				X			X		
5. To what extent has he developed independence in eating, dressing, and toileting?				X	X	X	X		
6. Tell me about his typical play.	X	X		X	X	X	X		X
7. How does he get from one place to another?									X

LE = language, expressive; LR = language, receptive; Ar = articulation; Co = cognitive; Ad = adaptive; FM = fine motor; PS = personal-social; SR = state regulation; GM = gross motor.

concerns over socialization); or make questions about some areas of functioning unnecessary (eg, questions about ambulation when the child is trying to bolt out the door). The very important family and community context of the child and his or her development also need to be assessed during health supervision visits, but space does not allow for their discussion in this article.

OVERVIEW OF MILESTONES

A number of factors affect the choice of representative milestones to guide developmental surveillance during health supervision. The pediatrician may see the child for a “3-year-old health supervision visit” several months before or after age 3. Child development proceeds in spurts and has ranges of ages for attainment of all the milestones associated with normal outcome. The various standardized developmental tests from which milestones have been extracted differ in specific instructions for item administration, equipment or stimulus items, and standardization populations. Generally, administration of a range of items that tap each skill from the base to the ceiling is necessary to calculate a score for a given child that can be compared with norms. To provide items representing “normal” abilities for each age from 2 to 5 years in a readable and usable form, we used the following strategies: 1) The 2-, 3-, 4-, and 5-year visits are assumed to be conducted on children within a few months (eg, 3 months) of that birthday; 2) When the information is available, tasks are listed that at least 50% of children within 6 months of the visit age (assumed to be X years, 0 months) could complete; 3) When less specific information is available, listed tasks are considered “typical” of “that age” (which the authors usually give as a range from 2 to 2.5, 3 to 3.5, 4 to 4.5, and 5 to 5.5 years). Thus, collecting information about a child’s ability to perform all of the items included in the tables and discussion for a specific age do not constitute a valid screening test. Instead, selection of specific items is intended to provide the pediatrician with a picture of what

is typical for children of that age and how parent descriptions of functioning relate to abilities for which normative data have been collected. Most of the standardized tests used as sources and their age-appropriateness are listed in the references.

Accompanying each trigger question is a discussion of aspects of development likely to be elicited by the question and age norms for attainment noted in *Bright Futures* as “possible responses.” Most sections also have summary tables for ready reference. Additionally, there are notes of clinically useful related observations (evidence during the visit) that can verify, place in doubt, supplement, or supplant the trigger questions.

Specific Concerns

Trigger question: “Do you have any specific concerns about ___’s development or behavior?” *Evidence during the visit:* The parent may appear worried throughout or during specific parts of the visit, ask the same question repeatedly, or talk about problems of children of relatives or friends.

Ideally, parents would be aware of their child’s developmental progress, have a general idea of normal behavior and development at different ages, be concerned when the child’s status is abnormal, and

be able to verbalize their concern to the pediatrician. Glascoe found that when parents had global concerns or concerns about specific areas of development, it was more likely than not that the child had an abnormality. This was not true of emotional or behavioral problems for which the degree of impact on the family but not the severity of the problem is the primary indicator of acceptance of mental health referral. Both parents and pediatricians have been found to overlook a large proportion of diagnosable mental health problems, especially if the difficulties are of the internalizing type, such as anxiety or depression. Certainly, families are more likely to undertake emotional, physical, and financial burdens that may be associated with recommendations for a child’s problem if they also view it as a problem. The other reason for asking about parental concerns is to help alleviate unwarranted concerns and prevent them from affecting the parent-child relationship. Any concerns should be clarified along the parameters discussed below for each area of dysfunction.

There are no formal screening instruments to detect early signs of talent or strengths. However, we have found that a simple adjective checklist developed by Provence (Fig. 1) provides a “snapshot” of

Directions: Please check all of the words below that seem to describe your child:			
Energetic	78%	Demanding	17%
Playful	96%	Fearful	13%
Calm	35%	Moody or sad	8%
Spoiled	45%	Clinging	16%
Shy	41%	Likes to please	69%
Sense of humor	69%	Curious	67%
Reckless	11%	Usually generous	71%
Feelings easily hurt (unusually sensitive)	49%	Usually selfish	7%
Stubborn	42%	Hot temper	16%
Babyish	23%	Overactive	25%
Good disposition	65%	Underactive	0%
Jealous	26%	Often provokes or teases	6%
Likes to fight	13%	Helpful	82%
Easily excited	27%	Other (add your own):	
Difficult to handle	4%		

FIGURE 1. Adjective checklist. Percentages are from a random sample of 4-year-olds.

how the parent views the child, including positive traits. It is gratifying to note the high degree of positive regard parents generally have for their children. For example, in a random sample of 4-year-old children, we found that *all* descriptors endorsed by the majority of parents were strengths. The most common descriptor was “playful,” followed by “helpful,” “energetic,” “usually generous,” “likes to please,” “sense of humor,” “curious,” and “good disposition.” Collecting this type of data can help fill out the picture of the child and aid with family rapport.

Communication

Trigger Question: How does ___ communicate what he or she wants? *Bright Futures* additionally suggests the trigger question: **“Do family members understand his/her speech?”** *Evidence during the visit:* How much of the child’s speech is intelligible? What is the mean length of utterance (MLU) heard during the visit? How well does the child tell a story about the picture he or she has been asked to draw?

Changes in speech and language are the most dramatic transformation during the preschool period (Table 2). The young child proceeds from largely unintelligible bullets of speech to language that allows him or her to ask complex questions, describe events, share feelings, and enter into independent relationships and learning. Children master most of the rules of grammar (syntax) by age 6, largely without direct instruction or correction.

The 2-year-old child is a committed user of words for communication. Although such speech usually is not very intelligible to a stranger, it does consist of words rather than jargon. The child still is acquiring language rapidly and has a vocabulary of approximately 150 to 500 words. The child would be expected to be speaking in two-word utterances consisting initially of primarily the simplest noun phrases (eg, noun plus modifier such as “my Mommy” or “more milk”) or verb phrases (eg, “Mommy go” or “baby sleep”). Sentence structure typically becomes more complicated by 2.5 years of age, with nouns moving to the object position (eg, “in that box”), emergence of

the present progressive (“ing”), and appearance of the earliest “helper” verbs (eg, “I gonna play”). They use rising inflection in asking questions and can express negation, one of the specialties of 2-year-olds! They often mimic what others say exactly in whole or in part (echolalia) up to age 2.5 years. Thus, even by that early point in the preschool period, expected sentence complexity is too elaborate for parents to report reliably. A simple, but efficient criterion for referral at 2 years of age has been shown to be less than a 50-word vocabulary or not putting two words together. Sentence length refers to words that are put together spontaneously, not in rote repetition of a cliché such as “thank you.” Children who have expressive language disorders often exhibit a very restricted set of speech sounds in their early words. Those 2-year-olds who have an expressive language delay but normal comprehension (see next section) have a significantly better prognosis for future language development. However, these children are prone to temper tantrums because of frustration in trying to communicate. It is helpful for parents to be able

TABLE 2. How does ___ communicate what she wants?

	2-YEAR VISIT	3-YEAR VISIT	4-YEAR VISIT	5-YEAR VISIT
Vocabulary	No jargon; 150 to 500 words			Definitions
Sentence length/ MLU*	2 words/1.5 to 2.5	3 to 4 words/2.5 to 5.0	4 to 5 words/3.5 to 6.5 in paragraphs	
Intelligibility to stranger	25%	75%	100%	
Grammatical forms	Verbs, some adjectives and adverbs	Plurals, pronouns	Past tense	Future tense
Typical examples	Talks about current action, no jargon, names pictures [†]	Tells own age and sex , counts to 3, metacognitive language (eg, “He said”; “I know”)	Describes recent experiences, can sing songs, gives first and last names, counts to 4, identifies gender of self and others	Counts to 10 or more, recognizes most letters of the alphabet, knows telephone number and address
Fluency	Dysfluency is common	Dysfluency is common	Some dysfluency	Dysfluencies not expected

*MLU = mean length of utterance measured by the number of meaningful units or morphemes rather than words.

[†]Boldface type indicates “milestone” cited in *Bright Futures*.

to view this as a communicative difficulty rather than simple willfulness and bad behavior.

The typical 3-year-old speaks in well-formed, simple sentences of three or four words. A child of this age who produces few spontaneous utterances of three words or more in length should raise concern. Sentence length increases by one or two words annually throughout the preschool period, with at least the same number of words that the child is old. It also is helpful to remember that the typical 3-year-old can enumerate three items and a 4-year-old can count four items, although they often can recite more of the numbers. A 4-year-old who cannot converse at some length with familiar people about "here and now" topics with sentences averaging three words or who uses word reversals or a telegraphic style (which is not dialectic) should be evaluated further.

A 5-year-old can be expected to use complete sentences tending to contain about five words. However, the parallel with counting ability ends at this stage; the 5-year-old can count as many as ten objects or more. At this point, children should have mastered past and future tenses; irregular verbs; understanding of "before," "after," and "until"; and conditional sentences that include "if, then." They still may have trouble with sentences that use "would," "should," "must," or "might." However, they can discuss emotions and tell jokes. Preschool children who have expressive language disorders tend to speak less often and convey less information than their peers. Their speech generally consists of short simple sentences, and they have a tendency to omit small, soft-sounding, grammatically important words such as "the," "is," and "of."

The 2-year-old's speech is tied to the action of the moment. Because they live in the pressure and impulse of the moment, there is no need for any past or future tenses in their speech. As language and cognitive structures mature, the child begins to be freed from immediate needs and open to new possibilities for imagination, reflection, and future planning. The 3-year-old's speech

begins to show a new metacognitive capacity to think beyond actions and objects to discussion about language and thought itself (eg, "He said..." and "I know..."). These children also have a new-found capacity for imagination. The 3-year-old may be said to be bound to fantasy as the 2-year-old is tied up with moment-to-moment reality. The increasing linguistic capacity to distinguish and express occurrences that are not part of the child's current reality, as in the expression of past tense and description of past experiences at the age of 4 and expression of the future at age 5, parallels an increasing ability to distinguish between reality and fantasy.

Beginning at the 3-year health supervision visit, the *Bright Futures* manual requests the examiner to note use of a few grammatic forms that deserve comment to avoid confusion. The acquisition of grammatic word endings follows a rather predictable order. There appears to be a steady increase in the use of suffixes to designate plurals and other grammatic meaning (eg, possessive [-s], progressive [-ing], and past tense [-ed]) between 16 and 30 months of age. At 16 months, few children are reported to use these forms by their parents, but by 30 months, most children are using all four of them. Use of pronouns follows a similar pattern: The commonly used pronouns "I," "me," and "you" are expected at the 2-year visit, but the child may not refer to him- or herself as "I" or "me" for another 6 months, and reference to a few others (eg, "their," "these," "those") is not expected until 30 months. Therefore, the "possible response" at 3 years for "use of plurals, pronouns" is an expectation that these forms are fully in place, not just used rarely.

There are no screening tests for articulation available for children younger than 3 years of age, probably because poor articulation is so common during that period. The expectation is for strangers to be able to understand only 25% to 50% of what the 2-year-old child says. They are more likely to make consonant sounds correctly when these sounds are in the beginning of the word. However, by 3 years of

age, strangers should be able to understand the child 75% of the time, and the child should be producing all vowel sounds and many consonant sounds in the final position correctly. Some sounds are physiologically easier than others to produce. For example, two or more consonants together or "consonant clusters" require more coordinated mouth movements than consonant-vowel combinations, so they often are dropped (eg, "for" for "floor") or substituted for sounds formed by the same part of the mouth (eg, "dep" for "step"), especially if contrasting parts of the mouth are involved (eg, "tote" for "coat"). By the age of 4, strangers usually can understand the child nearly 100% of the time, although some errors in producing later developing sounds such as "r," "s," "l," "sh," and "th" are not uncommon and may continue until age 7.

During the 4- to 5-year age range, parents generally are quite accurate in their concerns about articulation, such as in response to a general question as to whether they have any doubt about the clearness of their child's speech. Their impressions are confirmed about 50% of the time when compared with results of standard diagnostic tests, but surprisingly, most children found by testing to have articulation problems are not identified by their parents. The relatively low sensitivity of the parents may be because they are used to the child's speech and always can understand him or her, even though strangers may have difficulty in understanding. Kindergarten teachers can identify most of these children, but not at a higher rate than can be attained by a brief screening test 6 months earlier. Accordingly, a global estimate of percent comprehensibility either by parental report or clinical impression is a useful screen for the 3 years and younger group, but for ages 4 and older, parental concern must be taken seriously, although it may not be sufficient to identify children who can benefit from speech therapy directed at articulation. Clinicians will want to have a formal articulation screening test available either to screen all 4- and 5-year-old children or to

use when parental or clinical judgment is equivocal.

Dysfluency (aberration of speech rate and rhythm) occurs transiently between about 2.5 and 4 years of age. Persistent and worsening stuttering beyond the age of 4 should be taken seriously. Other signs of the need for referral include: grimacing with blocking of speech, self-consciousness, delayed language forms, or stuttering that persists for more than 6 months. The family history is often positive for stuttering. Families should be counseled to make eye contact, speak more slowly in the child's presence, and allow adequate time for the child to speak, but otherwise not point out the stuttering to the child. One percent of prepubertal children are diagnosed with stuttering.

There is great variation in the development of language. Recent evidence suggests several different patterns of normal progression for language acquisition. As a group, girls are more advanced than boys in language acquisition. Ethnic differences are considered parallel language forms rather than deficits, although school systems evaluate children based on standard English. Three to five percent of children may be affected by the developmental type of expressive language disorder.

The pediatrician finding superior language skills in a child can congratulate the parents and encourage them about its important advantages. Children who have superior language skills have fewer behavior problems (especially with aggression), are more amenable to parental discipline, can negotiate better with peers, are more resilient to stress, and are less likely to have reading-related academic problems.

The Clinician's Interview of the Child

It never is appropriate in clinical practice to rely solely on history or laboratory tests (ie, screening test results obtained from someone other than the examining clinician). Similarly, direct observation and examination of the system of concern by the clinician always is indicated for developmental surveillance, although

these may not produce the most telling pieces of data. The physician always should attempt to communicate meaningfully with the child to obtain his or her own history and impressions or at least to establish rapport and a basis for later communication and to model respect for the child as an individual. Unfortunately, such direct verbal dialogue with the child is rare. A typical physician-preschool child encounter includes a question such as, "How old are you now?" to which the 4-year-old holds up his or her fingers to answer. The clinician should expect to achieve some verbal dialogue with the 3-year-old child and gain an impression of his or her competency as a verbal communicator. The most common errors we have observed in conversing with preschool children have been reliance on closed-ended questions that the child could answer with a simple "yes" or "no" and failure to orient the interview to the child's current interest and perspective. The clinician might notice, for example, that the preschool child has brought a stuffed animal and begin talking about that to obtain a clue to his or her interests.

Other questions that children 3 through 5 years of age can answer that provide a perspective on their perceptions include: Who is your best friend? What do you like to do together? Who lives at your house? What do you like to do with ___? What does he do that you don't like? What happens at your house when a kid does something bad? What jobs do you do at your house? The child should have specific answers to each of these questions. Inability to name a friend, a pleasurable activity, a standard for behavior, or a chore could be clues to potential dysfunction (if language skills and engagement are adequate). Parents may roll their eyes at some of the child's answers and should be asked for their perspectives, but only after the child's portion of the interview to avoid breaking the flow of communication.

DRAWING INTERVIEW

To make best use of the limited time with the child, not only to build rapport, but as part of the

clinical evaluation, the approach should allow comparison with children of the same developmental age, ideally with clear standards for clinically important deviance. Unfortunately, no child health clinical interview for preschool children currently is completely standardized. However, we suggest a model that has promising efficacy data. The "drawing interview" creates a conversation piece that has the child's interest and attention—his or her own drawing of a person. This procedure also provides an opportunity to observe the child's perceptual motor performance and to elicit standard cognitive and emotional indicators in the drawing. The child is asked to draw a human figure while the clinician is interviewing the parents and then is asked a series of standard questions about the drawing (Table 3; Fig. 2). This procedure has been as successful at eliciting speech from preschoolers as established standard language elicitation probes in both normal children and children whose language is impaired. For example, in a sample of 4-year-olds, when the examiner praised the child for his or her effort in addition to asking for a story, the response rate was 100%, with an average 18-word overall response. Asking children whether the picture is of a boy or a girl helps them commit to the act of speaking. In addition to pauses, the most successful prompts for more speech were repeating the last thing the child says and adding nonspecific encouragement such as "tell me more." Using this procedure, we have found that preschool children who have mild language impairment produce the same number of sentences as other children, but each of their sentences contains fewer words. Impaired preschoolers produce responses that tend to lack organization related to the story being requested. Unlike the children who have normal language ability, the sentences produced by children who have language impairment are not linked in their sequence of events, even when the standard examiner prompts are used, such as "What (else) is he doing?", "What (else) happens to him/her?", and "How does it end?"

The clinician can use this language sample and any other source of conversation with the child to obtain an overall impression of his or her intelligibility, success as a communicator, and grammatic usage. Another advantage of this

interview format is that the request to make the story “make-believe” seems to give children permission to talk about themes that are most important to them at the time, even though what they say may not be what they had in mind while com-

pleting the drawing task. Often the significance of the content is self-evident, such as talk and drawing about genitals (a potential indicator of sexual abuse), looking for their family (in abandoned children), and commonplace sibling rivalry and conflicts with parents. When the preschool child brings up such issues, the topic for further discussion during the visit becomes obvious. Specific coding of the content of these narratives (eg, if the central figure of the story met a violent end that was not reversed when asked for an ending) and drawings (eg, shading of body, presence of genitals) have predicted independent teacher ratings of behavior in kindergarteners surprisingly well, but such studies require replication in preschoolers. Although the drawing interview cannot be considered an adequate screen for speech/language or other aspects of psychologic development, it can facilitate an often-neglected part of the routine child health examination—the “mental status” examination that classically includes an estimate of intelligence (eg, Harris Goodenough scoring), an observation of neuro-motor performance (the drawing), and a language sample.

TABLE 3. Drawing Interview

1. Elicit drawing: “Here is a piece of paper and a pencil. Please draw something like a picture of a boy or girl.”
2. If no response, draw a simple stick figure for the child.
3. Compliment the child’s effort on the picture, if completed, and record any spontaneous comments.
4. “Do you think it is a picture of a boy or a girl?”
5. “Please tell me a make-believe story about this boy (or girl depending on previous response).”
6. If no response, restate the above, ie, “Just tell me something about the boy/girl.”
7. If response, repeat what the child says and add, “Ah Ha or Humm,” followed by an expectant pause.
8. If no response or stops, add, “What else is he/she doing?”
9. When the child stops, repeat what he/she said or the essence of it. Add, “What else happens to him/her?”
10. “Tell me more.”
11. When the child finishes, ask, “How does it end?”

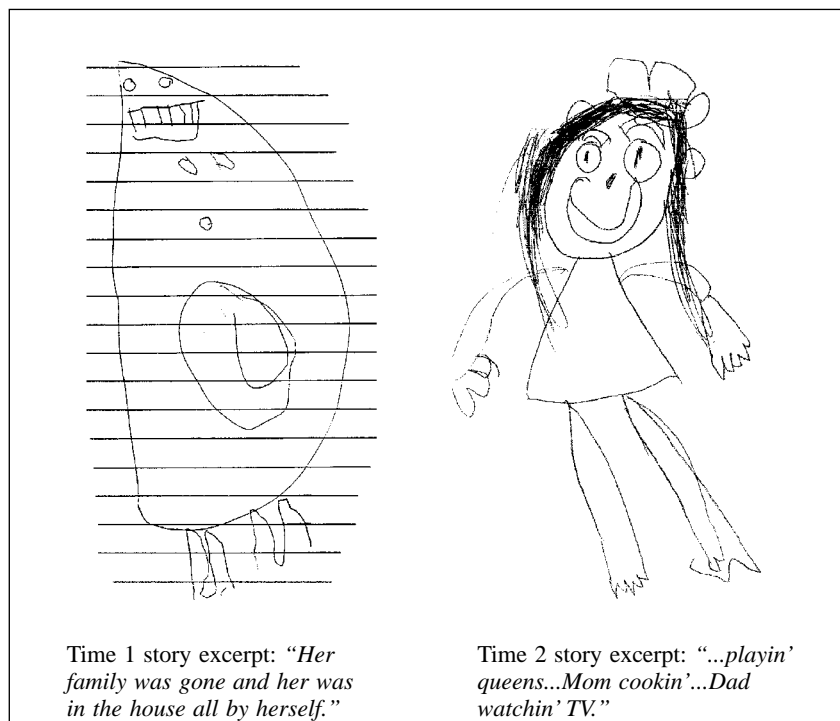


FIGURE 2. Clinical examples of the drawing/interview from child health supervision visits 8 months apart in the same 6-year-old child initially examined soon after leaving a depriving circumstance and being taken in by a warm, committed family where she remained during the interval.

Comprehension

Trigger Question: What do you think ___ understands? *Evidence during the visit:* How well can the child understand the clinician’s and the parent’s questions and instructions during the visit, including those involved in the START test? What is the child’s general level of understanding about the visit to the doctor and any general questions asked?

To assess comprehension through the second year of life, the clinician must consider how the child responds to parental commands (Table 4) and distinguish “simple requests,” the possible response at the 1-year visit, from “simple instructions without gestured cues” for the 15-, 18-, and 24-month visits. An example of the 1-year “simple request” would be to ask the child for the toy or tongue depressor he or she is holding and prompt him or her by holding out a hand for it or accept a parental

TABLE 4. What do you think __ understands?

	2-YEAR VISIT	3-YEAR VISIT	4-YEAR VISIT	5-YEAR VISIT
Number step command	100% for 1 without gesture	2	3	
Number of body parts	names 1, identifies 7			
Number of colors		2 named	4 named	
Gender		self	self and others	
Own names	refers to self by name	first and last		
Numbers counted	says "2" (not counted)	counts to 3		10, knows number
Relationships		which is bigger, on, under	which is longer, 2 opposites	

report of a similar response. Expectations for following verbal-only instructions range from the child ever having been noted to follow an instruction at home (at the 15-month visit) to being able to demonstrate it rather consistently (by the 24-month visit). As with the gestured request at 1 year, the physician could ask for the object being held, then ask that the child "put it on the table, chair, etc," with an expectation that compliance would be at about 50% at the 18-month visit and 100% at the 2-year visit. It is important to note that although use of gestures shifts expectations to a lower level, slipping into a two-step (expected at age 3) or a three-step (expected at age 4) instruction creates a task not expected until later. It is particularly useful to be aware of this sequence when suspecting or anticipating that the parent may have inappropriate expectations for the child regarding compliance because inconsistent compliance may lead some parents to conclude that the child is being stubborn when the response pattern is developmentally normal. Of course, the responses of which 2-year-olds may be capable also depend on high degrees of interest and attention, which are not consistent.

The comprehension ability of "naming body parts" is a "possible response" for the 15-, 18-, and 24-month visits. However, "identifies body parts" would be a better marker to look for at the 15-month and probably 18-month visit because

naming a body part (usually parts of the face initially) emerges as an expected item at 18 months, while identifying by correctly pointing on themselves (or a doll) can be expected by 15 months of age. These "body parts" responses would be considered a lag if not in place by the 18-month visit. This involves the experiences of being taught these names, of course, as well as language processing and general cognitive level. Understanding the "names of seven body parts," as shown by the ability to point to them, probably is a good 2-year visit comprehension item.

Comprehension of different prepositions has a developmental progression related to both language development and what is considered to be cognitive development. At age 3, the child should be able to understand at least three commands involving "in," "on," "under," "in back of," "in front of," or "beside" as well as demonstrate "up," "down," "loud," and "soft." Not until laterality is well established can they follow instructions that include "to the right or left of." Children can pick the "longer" of two lines at 3 years, but they cannot make comparisons reliably of "same" versus "different" until age 4. Strength in comprehension reassures parents about the child's intelligence, even when expressive language is delayed.

Parental report appears to be more reliable for infants and younger

preschoolers than for 4- and 5-year-olds, probably because language becomes much more complex and harder to report simply in the older age group and because diagnostic testing in the younger age group often relies on parental report. When concerns are raised at the 2- and 3-year visits, a recently standardized extensive parental inventory can be used to clarify concerns further. The MacArthur Communicative Development Inventory is a well-researched and -documented instrument that covers the 8- to 30-month range, with one form for 8- to 16-month-olds and another for 16- to 30-month-olds. It consists of an eight-page checklist of specific utterances and gestures that the parents may have observed. Because prediction of language impairment by parental report alone has not been reliable in the 4- to 5-year level, the clinician's interview of the child at this age should be another source of screening data. An additional screening procedure should be used if the child health supervision visit is to be a community resource for detection of problems in this area.

A review of preschool speech and language screening tests indicates that a sentence repetition procedure has the best validation data available for the age group and is the most efficient. This 3-minute procedure (Sentence Repetition Screening Test) is based on the concept that when asked to repeat a sentence, preschool

children tend to omit those grammatic forms that are not in their “inner grammar software.” Although much controversy surrounds the diagnostic utility of repetition responses, the approach seems to be a useful screening strategy. Even shy children who may not respond well to an interview are likely to comply with a simple request to repeat what was just said.

School Readiness

Communication skills are often of concern because of their importance to schooling. *Bright Futures* offers additional trigger questions related to school, including “What does ___’s teacher say about her/him? (If applicable)” and at age 5 “How are you feeling about having ___ go to school? When you were ___’s age did you enjoy school? How does ___ feel about going to school? How did

___ do in preschool? Is there anything you would like checked before ___ goes to school? Will you visit the school with ___ before school starts? Is there anything the school or teacher should know?”

Evidence during the visit may include: data from the START test on knowledge of pictures, letters, and ability to answer questions asked by the clinician during the visit, such as name, age, colors, numbers, alphabet, general information; a failure score on the START test; problems noted on the pure tone hearing test; or immature responses to the drawing and conversation about the drawing or other aspects of the interview with the child.

The years from 3 to 6 historically are called “preschool,” in part because of their importance for preparing the child for the tasks of school soon to come. Even though

most children in the United States attend some structured group learning prior to entering elementary school at age 6, qualitative changes in cognitive development still must occur with age to allow mastery of academics. From sensorimotor schemas at age 2, children progress through what Piaget called preoperational thinking to concrete operational thought around 6 years of age, which is governed by orderly rules regarding concepts of causality, transformations, and numbers. Preoperational thought is prelogical. Fantasy is indistinguishable from reality, coincidence is confused with causation, and only one aspect of two things can be compared at once or used to classify objects (eg, judging amount by either height or width of a container but not by both). Children progress from being nearly totally egocentric in their thinking of how to solve problems

TABLE 5. How does ___ get from one place to another?

	2-YEAR VISIT	3-YEAR VISIT	4-YEAR VISIT	5-YEAR VISIT
Walks forward	slightly bent	swings arms	tandem walks	
Walks backward	10 ft			tandem
Runs	changing direction	alternating arms		
Climbs	out of crib (2.5 y)	high equipment		
Jumps	both feet off floor	26 to 30 in from both feet, 6 in from one foot	32 in, one foot leads	over 10 in string
Jumps down	step with both feet	16 in, lands on one foot first	18 in, lands on both feet	
Stairs-up	1, one step at a time*	4, without rail alternating		
Stairs-down	4, one step at a time	alternating, no rail	4, alternating	
Stands on one foot	tries	1 sec on 1 foot	5 to 6 sec on each foot	10 sec
Kicks	kicks ball 6 ft			
Hops		3 hops in place	5 forward	20 ft forward 10 times
Throws	throws 5 ft	bounce, overhand	10 ft, 1 or 2 arms	
Catches		straight arms	bent arm	bounce pass
Skips				skips
Pedals		10 ft, tricycle		

**Boldface type indicates “milestones” cited in Bright Futures.*

to being able to take another person's point of view.

Parents are eager and often anxious about their preschooler's school readiness, especially for the ultimate skill of reading. Although reading is not expected before age 6, prereading skills can be present, such as knowledge of letters, words, and symbols such as signs and awareness of letters and syllables as sub-components of words. Many can recognize and even print letters and numbers and pretend to read. They often enjoy rhyming games to the point of silliness. Learning sound-symbol relationships and the relationship between the spoken and written word is not expected until 6 to 7 years. Some of the best predictors of reading readiness are incorporated into the START test and include letter recognition, naming, and visual matching. "Phonemic awareness" or the capacity to discriminate among words that sound alike has been shown to be a good predictor of reading ability, but a simple test is not yet available to assess this area.

Gross Motor Skills

Trigger question: "How does ___ get from one place to another?"

Evidence during the visit: How does the child ambulate into the examination room? How does he or she get

up on the examination table? How does she or he perform any gross motor tasks the clinician requests, such as standing on tiptoe, standing on one foot, walking backward, walking in a line, skipping, and running? Can he or she perform tasks requested without a model?

Gross motor skills are a joy to the preschooler, who endlessly practices and shows them off. By age 2, children generally can walk, run, and balance at least a little, but refinements continue in balance, coordination, speed, and strength (Table 5). The slightly bent-over stance of the 2-year-old while running with changing speed and direction gives way to the more upright 3-year-old who swings arms in time with the strides. Movement forward and upstairs precedes the more difficult tasks of proceeding backwards or downstairs, which require slightly longer use of support. Mastery of a task with one leg is followed fairly soon by mastery with the other leg. Using both legs to jump simultaneously or both arms to bounce pass is more difficult than using one successfully. Improvements should progress over the preschool years and even into the school-age years in terms of the length of time, number of repetitions, or distance each task can be sustained and the ability to complete more complex motor tasks, including multiple tasks

simultaneously such as running and throwing a ball or pedaling and steering. Because bicycle riding requires both a knack and practice, lack of performance does not necessarily indicate a neuromotor weakness. Problems with motor planning or apraxia also may interfere with functioning, even when strength and coordination are normal. Good gross motor coordination can provide important status with peers and a source of self-esteem through athletics, which should be encouraged, but it is least predictive of school achievement compared with other areas of development.

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PIR QUIZ

- In assessing the developmental status of a "normal" 3-year-old boy, which of the following questions to the parents is likely to be *most* helpful?
 - Can he draw a person?
 - Do you have a specific concern about his development or behavior?
 - Does he ride a tricycle?
 - How does he get along with his little sister?
- Among the following, which developmental feature of a 4-year-old child will *best* predict future intellectual performance?
 - Classic neurologic examination.
 - Gross motor skills.
 - Language level.
 - Soft motor sign.
 - Temperament.
- A useful guideline for a 2-year-old child needing referral for language evaluation is:
 - Less than 50-word vocabulary or no two-word phrases.
 - Less than 100-word vocabulary.
 - No use of plurals or pronouns.
 - Stuttering.
- The earliest age at which most children can be expected to use plurals, possessives, progressives (-ing), and the past tense in expressive language is:
 - 18 months.
 - 24 months.
 - 30 months.
 - 36 months.
 - 48 months.