Infant and Toddler Development

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All growth depends upon activity. There is no development physically or intellectually without effort, and effort means work.

—Calvin Coolidge

Learning Objectives:
1. Recognize the normal progression of development across various domains within the context of health supervision
2. Provide guidance to parents regarding normal development across various ages in early childhood
3. Identify and evaluate aberrations from normal development early in order to make appropriate interventions and referrals

Primary References:

Editor’s Note: This module provides an overview of developmental assessment and common problems. More extensive discussion on topics pertinent to growth and development (such as literacy, hearing, vision, and temperament) is provided in dedicated chapters elsewhere in the curriculum.

CASE ONE:

Mr. Ment brings his 9-month-old, Dev, in for a well-child visit. He is surprised to learn that there are no vaccinations due, and asks you “why’d I have to interrupt my day to pick Dev up from day care for this visit when he’s not even sick?”

1. What can you explain to Mr. Ment regarding the benefits of developmental surveillance and screening? What is the difference between surveillance and screening?

Developmental and behavioral disorders are common in children. It is estimated that 12-15% of children and adolescents in the US have a developmental disability and approximately 20% meet diagnostic criteria for a mental health disorder. Early identification of developmental and behavioral disorders is critical so that appropriate interventions can be put into place. Performing ongoing developmental and behavioral monitoring is an important component of pediatric preventive care in the medical home.

Moderators should guide the discussion by using the algorithm in Figure 1 of the 2006 AAP policy statement on developmental surveillance and screening in well-child care (primary reference). Developmental surveillance is defined as a “flexible, longitudinal, cumulative and continuous process whereby knowledgeable healthcare professionals identify children who may have developmental problems.” The 5 components of surveillance are described as follows:
1. Eliciting and Attending to the Parents’ Concerns: Asking parents about their concerns emphasizes that developmental and behavioral issues are an important part of the child’s overall health. Furthermore, parents are experts on their children and studies have shown that parental concerns accurately predict the presence of a developmental problem.
2. **Maintaining a Developmental History:** The child’s developmental progress should be monitored at each well-child visit. The use of open-ended questions is ideal (e.g., “What changes have you seen in your child’s development since our last visit?” “How does your child communicate with you?” “How does your child play?”), and questions regarding specific milestones can be included as needed.

3. **Making Accurate and Informed Observations of the Child:** Throughout the visit, the child’s development and behavior should be carefully observed. Valuable information about current developmental skills, the child’s temperament, and the parent-child relationship can be obtained, even during a brief encounter.

4. **Identifying the Presence of Risk and Protective Factors:** The child’s history should be reviewed so that important environmental, genetic, biologic, and social risk factors can be determined. It is equally important to identify the unique strengths of the child and family that may promote healthy development.

5. **Documenting the Process and Findings:** Relevant history and observations related to the child’s development should be carefully documented in the medical record so that information can be effectively shared among providers and progress can be monitored over time.

Developmental surveillance should occur at every well-child visit. If a child is identified to be at risk for developmental problems based on surveillance, or if the visit is a 9-, 18-, or 24- (or alternatively, 30-) month visit, the AAP recommends formal screening. Screening is defined as the use of standardized tools to identify and refine the risk recognized by surveillance, and involves specific assessments to identify delays at a point in time when intervention would most likely be of benefit to a child. The AAP recommends additional specific screening for autism at the 18- and the 24-month visits, and for motor delays at the 48-month visit.

While developmental screening is integral to well-child care, more data in support of its effectiveness are needed. The US Preventive Services Task Force gives Grade I recommendations (“current evidence is insufficient”) to screening for autism spectrum disorder (2016), and screening for speech and language delay in children aged 5 years or younger (2015). However, once delays are identified, several studies have shown benefit to treating language delays and problems with speech and fluency.

A variety of validated, parent-completed, instruments are available for use including the Parents’ Evaluation of Developmental Status, Ages and Stages Questionnaires, and the Modified Checklist for Autism in Toddlers, Revised (see Resources section). It is important to remember that screening does not result in a diagnosis but rather identifies areas of concern that merit further investigation. This may include additional testing and referral to the state early intervention program as well as to medical and child development specialists (e.g., developmental-behavioral pediatricians, child neurologists, child psychiatrists, pediatric physiatrists, audiologists, rehabilitation therapists). Recently, attention has turned to improving screening for behavioral and emotional problems in children and adolescents. This is critical, as developmental screening tools may not reliably identify all young children with these problems, and as the 2006 AAP screening algorithm only provides specific recommendations for the first 5 years of life while problems may develop after this time period. A clinical report published by the AAP in 2015 reviews the epidemiology of behavioral and emotional disorders in children and adolescents, and offers guidance for pediatricians regarding how to implement a successful screening program. The report includes suggestions regarding selecting screening tools, establishing effective office routines, obtaining reimbursement, and fostering collaborations with existing mental health programs.

2. **What domains should be considered during assessment of development?**

Infant and toddler development is commonly separated into fine and gross motor, language and communication, cognitive, and social-emotional domains. These domains can be further sub-divided; for instance, one can evaluate for both receptive and expressive language. Children may present with an isolated delay in one domain or with delays in multiple areas. One specific delay may affect other area of development, such as when a language delay affects social interactions or a motor delay impairs a child from performing tasks that may otherwise contribute to cognitive development. Regardless, it is important to determine whether global delays are present, as these are more likely to be associated with underlying medical conditions.
CASE continued:

Dev passes all areas on the developmental screen with flying colors, and Mr. Ment beams with pride at his son’s progress. He asks what else he can be doing to further support his son’s development.

3. How can parents best promote their child’s development?

Primary care providers play an important role in teaching parents how they can promote healthy development in their child. Studies have consistently shown the profound effects early childhood experiences have on brain development, developmental outcomes, and long term health, both positive and negative ones. There is a growing focus on understanding the early and late effects of “toxic stress” in children and using this data to shape national policy and education. The importance of experiencing loving and consistent relationships in early childhood should be emphasized. See the Resources section and the dedicated chapter on Early Childhood Toxic Stress for further information about toxic stress and promoting resiliency in children exposed to adverse childhood experiences.

Parents should be educated on the benefits of play with regard to all aspects of a child’s development and be encouraged to engage with their child in daily play as a means to further nurture the parent-child bond. Anticipatory guidance around decision-making regarding media exposure at all stages of childhood should be provided. Speaking to families about shared book reading, incorporating books into the well-child visit, and participating in programs such as Reach Out and Read are all ways in which to promote early literacy in the pediatric medical home. The Reach Out and Read program is an excellent example of how the pediatric primary care setting can play a meaningful role in improving long-term developmental outcomes. Over the past several years, a number of evidence-based interventions for the primary care setting have been developed to help decrease rates of developmental delay, promote positive parent-child interactions, and reduce challenging behaviors in children. These include programs such as Healthy Steps, Video Interaction Project, Incredible Years, Triple P, and Parent Child Interaction Therapy.

CASE TWO:

You are seeing a new patient, Miles, for his 18-month well-child visit. You review the developmental screening form just completed by his mother, Mrs. Stone, and note that he received failing scores for the motor, communication, and cognitive domains and a borderline score for the social-emotional domain. Mrs. Stone is concerned as Miles is not yet walking. Upon further questioning, you learn that he has recently started cruising and just started saying mama. You note that he uses an immature pincer grasp to pick up his cereal.

4. What are your initial thoughts about Miles? What else do you want to know about his history? What should you look for on exam?

Based on the vignette, Miles appears to be presenting with delays in multiple domains, including language, fine motor and gross motor abilities. Moderators can remind learners about Table 3 in Scharf, et al. which outlines specific early-childhood milestones.

It is important to review the child’s past history to identify possible risk factors for the delays. Questions about the pregnancy and birth may reveal information such as in-utero teratogen exposures or premature birth. Premature birth is a leading cause of neurodevelopmental disability in children. Children born prematurely should be monitored closely for developmental delays and may automatically qualify for early intervention services (criteria vary by state). In general, development should be assessed according to the child’s “corrected age” (age based on original due date) and this correction is typically applied until the age of 2 years. Asking questions about previous illnesses and obtaining a complete review of systems are necessary to investigate for the possibility of an associated medical disorder. Inquiring about the family history may reveal important information, as developmental disorders often run in families. Taking a good psychosocial history is vital as social
stressors such as neglect, parental depression, and domestic violence can negatively impact child development.

When evaluating delays, the parent should be asked whether the child has ever lost any developmental skills. Developmental regression is an important red flag and should not be missed. Direct learners to Table 5 in the Primary Reference by Scharf, et al. for an extended list of developmental red flags.

When evaluating a child with global delays, it is helpful to assess general growth parameters. Associated failure to thrive may suggest an underlying medical condition or possibly neglect. The head circumference should be carefully measured and compared to previous points. Both macrocephaly and microcephaly may be associated with neurologic or genetic disorders. Decelerating head growth in a girl should raise suspicion for Rett’s disorder. A thorough exam should then be performed to assess for any abnormal findings. The presence of any dysmorphic features should be noted. A complete neurological exam should be performed to assess the child’s tone, strength, and reflexes, and to exclude any atypical findings (e.g., asymmetries, clonus). Skin should be inspected for any unusual pigmentation (e.g., café-au-lait spots, ash leaf macules, axillary freckling) that may suggest a neurocutaneous disorder. The use of a wood’s lamp may be helpful, particularly in children with light colored skin in whom subtle neurocutaneous lesions may be harder to see with ambient lighting alone.

5. What are the next steps you should take?

Any child of appropriate age who presents with delays in their development should promptly be referred to the state early intervention program so that further evaluation can be performed and appropriate treatments can be initiated. In cases of global developmental delay, further assessment may be warranted to evaluate for an associated or underlying medical condition. Further evaluations should be guided by the findings in the history and exam. An audiologic evaluation is essential in all cases of speech and language delay, whether it is an isolated delay or not. Referral to a neurologist may be indicated in a child who presents with additional neurological signs. Brain imaging may be included in the work-up of a child with global delays, particularly when associated neurological findings are present (e.g., seizures, macro/microcephaly). Consultation with a geneticist should be pursued when dysmorphic features are present or when the history is suggestive of a genetic disorder. Chromosomal microarray and DNA testing for Fragile X syndrome are generally the first line genetic tests that are performed in children with global developmental delay and autism spectrum disorder, though there is considerable variability in utilization of these tests in children with these diagnoses.

Under legislation included in Part C of the federal Individual’s with Disabilities Education Act (IDEA), all children between birth and age 3 with developmental disabilities are entitled to receive early intervention services. Children with suspected developmental delays can be referred to their state’s program and will receive a multi-disciplinary evaluation at no cost to them (although their insurance may be billed). If the presence of developmental delay is confirmed, the child is eligible to receive early intervention services and an Individualized Family Service Plan (IFSP) will be created. Early intervention programs are very family-centered, and parental education is often an important component of the service plan. Prior to the child’s third birthday a re-assessment is usually conducted by the child’s home school district to determine the need for ongoing services. If continued services are necessary, a plan to transition the child to the appropriate preschool program is put into place.

If a child over three presents to the office with previously undiagnosed developmental delay, consider referral to the school system for further evaluation as well as a medical referral to an appropriate clinician for diagnostic work-up. A developmental-behavioral pediatrician can be an invaluable asset for diagnosis and guidance of therapies. While the school referral and evaluation process is underway, it may also be of benefit to refer the child to receive private developmental therapies in the interim.

CASE THREE:

Mrs. Peach brings her 2-year-old daughter Deelai S. for a visit because the child’s daycare teacher is concerned that she is behind in her speech. The mother states that she is not worried, but did not want to ignore the teacher’s concerns. She estimates she says about
20 words and that about twenty-five percent of her speech is understood by strangers. Her development across other domains is normal.

6. How concerned should you be about this history? What are some important questions to ask the mother?

By the second birthday, a child should say at least fifty words, and should demonstrate at least some word combinations. About fifty percent of speech should be intelligible to non-family members. Receptively, a child should be able to follow a 2-step command, point to 5-10 pictures when named, and understand simple pronouns such as me and you. By this account, this patient’s intelligibility or her overall speech may be delayed.

When concerns for language development emerge, first consider the overall nature of the concern. Is there a paucity of words, poor clarity of speech, dysfluency, or a lack of communicative intent? Ask about and assess the child’s receptive language, as delay here would more likely indicate a serious problem. Depending on the child’s age, questions about following commands, identifying pictures in a book, and pointing to body parts when named may be appropriate. Ask about other ways the child communicates his needs. Does he use gestures such as pointing? Delayed language should be differentiated from atypical language development, which may be suggestive of a possible autism spectrum disorder. Does the child often repeat what he has just heard (echolalia) or frequently recite phrases from a favorite TV show (scripting)? While these behaviors can certainly be seen in the context of normal language development, they are of greater concern if they make up the majority of the child’s speech.

It is also important to inquire about what languages are spoken in the home. Children raised in bilingual homes may present with some language differences that may be misinterpreted as delays. For instance, they may exhibit smaller vocabularies in each respective language and may confuse grammatical forms between languages. It is important to recognize that bilingualism does not cause language impairments. The evaluation of a bilingual child with evidence of delayed language milestones (e.g., decreased combined vocabulary, delay in making word combinations) should be approached in the same way as for a monolingual child. When concerns are present, referral for a bilingual language evaluation is warranted to differentiate between language differences related to typical patterns of dual language development and a language disorder that impairs acquisition of any language. It could also be helpful to ask the parents about their own speech development or that of the child’s siblings. However, there can be significant variation between siblings and between parents and children, so be careful not to either overreact or ignore a problem based on this data.

7. What are potential causes of language delay? What should be done next?

Certain children, “late talkers,” will have a developmental language delay, but ultimately will not have speech problems. About 7% of children have a specific language impairment and will continue to have language problems if there is no intervention. These children are also at higher risk for learning problems in school. Some language delay will be due to problems with hearing, thus a hearing test should be included when investigating language delays.

Language delay can be part of global developmental delay or other developmental disorders (e.g., autism spectrum disorder). Accordingly, development across other domains must be evaluated when a delay is identified in one domain.

Based on the concerns about Deelai’s speech, a referral to the early intervention program should be made so that further assessment can occur. She should also undergo an audiologic evaluation to rule-out the possibility of hearing impairment. Follow-up should be scheduled in 1 month’s time to ensure that the evaluation process has begun, and then close monitoring of her progress should be performed.

CASE FOUR:

Mr. and Mrs. Rish bring their 15-month-old boy Jib to your office for a routine visit. You ask about his speech and they tell you that Jib is “making all sorts of sounds” and appears to respond when they hold him and talk to him. He has said both “mama and dada” and is
able to follow simple commands. He is interactive and social and frequently points and
gestures. The parents do say that his teachers at daycare are concerned that Jib’s
expressive language is not progressing. He has no physical abnormalities and passed his
newborn otoacoustic emissions (OAE) hearing screening.

8. Should you pursue further investigations? If so, why and what are they?

Babies can fool us because of the natural progression of vocalizations that occurs regardless of the
ability to hear. Even babies who are hearing impaired will babble and at a young age. Moreover,
“mama and dada” are simple sounds that a baby is able to make and may not be specific to the
parents. Toddlers are often able to make their needs known through gestures and jargon. In addition,
they can easily learn to interpret others’ gestures and sometimes to read lips.

If Jib is hearing impaired, he may respond when his parents talk to him because he has no other
impairments and is able to react to the associated actions of touch and facial expression that go along
with verbal communication. However, it is important for the parents to know what to expect in the
months and years ahead, and for the family to have proper support and services to enhance his
development. Early identification of hearing problems is crucial. Interventions such as hearing aids,
speech therapy, sign language, and cochlear implants can improve communication tremendously,
preventing the child from falling further behind and requiring even more services in the future.

Even with a normal newborn screen, it is important to reevaluate any child’s hearing in the presence of
language delay. The newborn hearing screen (otoacoustic emissions test) can miss some infants with
true congenital hearing loss. In addition, some forms of sensorineural hearing loss can be acquired
over time (e.g., genetic causes, CMV infection, medications). You should arrange for a repeat hearing
test and reevaluation by an audiologist. All testing should be done by a professional who has
experience with young children.

Additional References:
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12. Wallace IF, et al. Screening for Speech and Language Delay in Children 5 Years Old and Younger: A


**Resources:**

1. Information from CDC for parents on childhood development. [http://www.cdc.gov/ncbddd/childdevelopment/index.html](http://www.cdc.gov/ncbddd/childdevelopment/index.html)


4. Information from Zero to Three, a non-profit organization devoted to early childhood health. [http://www.zerothethree.org/site/PageServer](http://www.zerothethree.org/site/PageServer)

5. Information from AAP on development. [http://www2.aap.org/sections/dbpeds/](http://www2.aap.org/sections/dbpeds/)


9. Information on toxic stress and resiliency (includes extensive list of resources to share with families). [http://aap.org/theresilienceproject](http://aap.org/theresilienceproject)

10. Evidence-based interventions for the primary care setting
    - Healthy Steps: [https://www.healthysteps.org/](https://www.healthysteps.org/)
    - Video Interaction Project: [https://www.videointeractionproject.org/](https://www.videointeractionproject.org/)
    - Incredible Years: [http://www.incredibleyears.com/](http://www.incredibleyears.com/)