

PRACTICE

Early detection of autism spectrum disorders: Screening between 12 and 24 months of age

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Introduction

Children with autism spectrum disorders (ASDs) exhibit impaired social interaction, verbal and nonverbal communication deficits, and repetitive, restricted, and stereotyped patterns of behavior or interests (Filipek et al., 1999, p. 443). In the United States, the prevalence of ASD is between 4.5 and 9.9 per 1000 eight-year-old children, with approximately 560,000 persons between birth and age 21 diagnosed with an ASD (Centers for Disease Control and Prevention [CDC], 2007). The number of children with an ASD served by special education programs increased sixfold between 1993 and 2004 (CDC, 2006). ASDs constitute the second most common serious developmental disability after mental retardation/intellectual impairment.

The Consensus Panel of the Child Neurology Society and American Academy of Neurology (Filipek, Accardo, & Ashwal, 2000) recommend that all professionals who provide care for children should screen for the signs, symptoms, and behavioral indicators of autism at every well-child visit during infancy. In a study of pediatricians' use of autism-specific screening instruments, researchers found that 82%

Abstract

Purpose: The purpose of this article is to present nurse practitioners (NPs) with information on screening for autism spectrum disorders (ASDs) in children between 12 and 24 months of age. Recommendations are also provided for appropriate referrals and initiation of early intervention (EI).

Data sources: Review of published literature about ASD.

Conclusions: Children with ASD exhibit impaired social interaction, verbal and nonverbal communication deficits, and repetitive, restricted, and stereotyped patterns of behavior or interests. Studies show that these children benefit from beginning intensive EI as soon as possible.

Implications for practice: Early detection enables children with suspected ASD to be evaluated by specialists and entered into treatment programs at the earliest possible opportunity. Because of the importance of early diagnosis of ASD, it is critical that NPs use established screening instruments to maximize time and increase the reliability of the assessment.

of respondents routinely screened for general developmental delays but only 8% screened for ASD (Dosreis, Weiner, Johnson, & Newschaffer, 2006). Reasons cited for failure to screen for ASD included insufficient time, lack of familiarity with screening instruments, and reliance on referral to specialists such as developmental pediatricians. A review of the literature revealed no studies analyzing nurse practitioner (NP) screening practices for ASD.

The purpose of this article is to present NPs with information on screening for and diagnosis of ASD in children between 12 and 24 months of age. Early detection enables children with suspected ASD to be evaluated by specialists and entered into treatment programs at the earliest possible opportunity. Because many pediatric and family NPs are involved in developmental screening and assessment of infants and children, they are uniquely positioned to provide early screening for ASD.

Autism spectrum disorders

ASDs include autism, Asperger's syndrome, and pervasive developmental disorder (PDD)—not otherwise

specified. The diagnosis of autism requires qualitative impairments in communication and social interaction and “restricted repetitive and stereotyped patterns of behavior, interests and activities” (American Psychiatric Association [APA], 2000, p. 75); in addition, a delay or abnormal functioning in social interaction, language as social communication, or symbolic or imaginative play must begin before the age of 3. Asperger’s syndrome differs from autism in that there is no delay of language skills and there must be at least normal intelligence (Schnur, 2005). Children with PDD—not otherwise specified, which often functions as a catchall diagnosis, have fewer symptoms, less severe symptoms, or later age of onset than children with autism.

The *DSM-IV* (APA, 2000) sets forth strict guidelines for the three diagnoses (at least two items from a list of four social impairments and one from lists of four communicative and repetitive and stereotypic behaviors must be present). The *DSM-IV* criteria were developed for children 3 years and older and therefore may not be helpful in assessing younger children.

There is growing evidence that children with ASD benefit from beginning intensive early intervention (EI) as soon as possible. Preschool children with over 2 years of intervention for an ASD have shown significant increases in developmental progress and intellectual performance, and 75% have developed speech (Filipek et al., 1999). These improvements are significantly better than those made by children who begin the same interventions at older ages (Goin & Myers, 2004). EI requires timely diagnosis of an ASD by a healthcare provider and appropriate referral for therapy.

Furthermore, states must follow federal Public Law 94-142: the Individuals with Disabilities Education Act (IDEA) of 1975, reauthorized in 1997 as Public Law 105-17: the Individuals with Disabilities Education Act Amendments of 1997, which mandates immediate referral for a free appropriate public education in the least restrictive environment for eligible children with disabilities from the age of 36 months, and EI services for infants and toddlers with disabilities from birth through 35 months of age (IDEA, 2002). This law also mandates that schools must educate all students with disabilities and includes provisions for nondiscriminatory identification and evaluation, due process safeguards, parent and student participation, and shared decision making.

The diagnosis of ASD is usually not made until ages 3–4, even though 50% of parents suspect that their children have problems by age 1 and between 12% and 76% of parents report that their children had autistic symptoms in their first year (Filipek et al., 1999). Wetherby et al. (2004) stress that it is crucial to identify children with an ASD so that EI can begin as early as possible. In addition, early

detection can empower families by refocusing their stressful uncertainty about what is wrong with their children toward the active condition of finding out how to best care for their children (Filipek et al., 1999).

Early diagnosis

Because there is no pathognomonic sign or laboratory test to detect it, diagnosis of an ASD is challenging during a primary care visit. Early detection of ASD is even more difficult because symptoms during infancy may be more difficult to detect or may present differently from manifestations of the disorder at later stages (Baranek, 1999). For instance, repetitive activities and interests are not easily detectable until children are 2–3 years old (Wetherby et al., 2004).

The American Academy of Pediatrics (AAP): Committee on Children with Disabilities (2001) notes that because ASD is a phenomenological disorder, health providers must rely on clinical judgment and the ability to recognize the specific behaviors that define ASD. The observations and concerns of parents must be carefully considered in assessing young children. Studies reveal that parents who are concerned about their child’s development are usually correct that something is wrong, even if they are not always correct about the actual diagnosis.

Development of behavioral markers

Many of the critical behavioral markers helpful in diagnosing very young children are based on retrospective study of home videotapes of children later diagnosed with ASD. Retrospective video research usually involves subject groups of young children with ASD, a typical control group, and often a developmentally delayed (DD) or mentally retarded group. Raters, ideally blinded to the purposes of the research, code the tapes for behaviors and quantify the results so that they can be analyzed.

Baranek’s (1999) study of 9- to 12-month-old infants compared a group of 11 children with autism, 10 children with DD, and 11 typical children prior to substantial development of language. Baranek found that deficits in early markers for sensory–motor function and social responsibility correctly predicted 93.75% of the cases of ASD. These markers included looking at the camera, object play rating (amount of play with objects), mouthing objects, number of name prompts (number of times a child’s name is called before a response occurs), affect rating, abnormal posturing (including arm flapping, grimacing, abnormal gaits, odd posturing with the hands), social touch aversion, visual staring/fixation, and orientation to visual stimuli.

Osterling and Dawson (1994) examined videotapes of 11 children with autism and 11 typical children during their first birthday parties. They found that the best predictor of autism was how many times per minute a child looked at the face of others (an average of nine times for typical children vs. five times for children with ASD). By combining this behavior with failure in orienting to one's name being called, showing (showing something to an adult), and pointing, 91% of the cases were correctly classified. Two studies by Maestro et al. (2005a, 2005b) further examined prediction of ASD during the first year. Three clear markers were evident: poor social interaction, lack of initiative/hypoactivity, and mood difficulties.

Wetherby et al. (2004) examined behavioral videotapes of children between the ages of 18 and 24 months in order to determine indicators for ASD in the second year of life. Nine red flags were found to differentiate the children with ASD: (a) lack of appropriate gaze; (b) lack of warm, joyful expression with gaze; (c) lack of sharing enjoyment or interest; (d) lack of response to name; (e) lack of coordination of gaze, facial expression, gesture, and sound; (f) lack of showing (something of interest to someone); (g) unusual prosody (how one says something [i.e., intonation and tone of voice]—not what one says); (h) repetitive movements or posturing of body, arms, hands, or fingers; and (i) repetitive movements with objects.

Risk factors for ASD: Macrocephaly, family history

Although the brains of children later diagnosed with an ASD are of normal size at birth, head circumference, brain weight, and brain volume may increase significantly in the next few months. Twenty-five percent of children with an ASD are truly macrocephalic—the only distinguishing physical feature to aid in the health provider's diagnosis of autism (AAP: Committee on Children with Disabilities, 2001). Although not all children with ASD are macrocephalic, 90% of them have brain volumes averaging 10% larger than normal by age 2 (Courchesne, Redcay, Morgan, & Kennedy, 2005).

Magnetic resonance imaging (MRI), performed during the first 2 years of life in children with an ASD, reveals enlarged cerebral white and gray matter, frontal lobes, amygdala, and cerebellar white matter, along with underdevelopment of the cerebellar vermis (Belmonte et al., 2004; Courchesne et al., 2005). Belmonte et al. state that cerebellar, cerebral white matter, and cerebellar vermis size can distinguish 95% of autistic people. Use of MRI is considered a research tool at this time and is not yet recommended for general diagnostic purposes (Belmonte et al.; Courchesne et al.; Herbert, 2005).

Families at increased risk for having a child with an ASD include those with members on the autistic spectrum and those with members who have autistic characteristics, referred to as the Broader Autistic Phenotype, that do not fulfill criteria for an actual diagnosis. Siblings of children with ASD are especially at risk because approximately 6% of them also develop ASD, producing a risk over 100 times that of the general population (Ghaziuddin, 2005). A sibling may develop mild autistic symptoms, which the parents, already involved with caring for one autistic child, may fail to recognize (Filipek et al., 1999).

Recent studies suggest that families with significant histories of depression and other psychiatric disorders are also at increased risk for having a child with ASD (Ghaziuddin, 2005; Micali, Chakrabarti, & Fombonne, 2004; Piven & Palmer, 1999). The National Institute of Child Health and Human Development (2005) points to abnormalities on chromosome 7 (especially HOXA1), chromosome 15, and chromosome 17q21. Estimates of the genetic heritability of ASDs range from 91% to 93% (Dawson et al., 2005).

Early screening for ASD

Delaying detection has many implications, including practical, psychiatric, and genetic (Safran, 2005). Earlier and better detection is particularly needed for less severe cases of ASD, where the child's long-range potential may be greater. Delays in diagnosis postpone needed interventions for both the child and the parents who should receive timely genetic counseling before conception of additional children.

Children with risk factors require especially close developmental monitoring so that ASD can be diagnosed as early as possible. Infants with ASD have abnormal brain circuitry that leads to altered activity, which, when combined with experience, creates abnormal secondary brain development (Belmonte et al., 2004; Herbert, 2005). Enrollment in an EI program can make a significant impact because much secondary brain growth occurs through the interaction between experience and thought, which can positively alter the development of one's phenotype (Horowitz, 2000; Lerner, 2002). Some physicians believe that early detection for at-risk children can result in the muting of genetic expression of these problems using therapy that removes heavy metals and chemicals and changes food intake (Bock, 2005; Pangborn & Baker, 2005). Although discussion of these alternative therapies is beyond the focus of this article, the AAP: Committee on Children with Disabilities (2001) recommends that pediatricians become familiar with the most popular ones and "approach the issue objectively and compassionately."

Because symptoms of ASD during infancy can be quite different from the later manifestations of the disorder, as specified by the *DSM-IV* (APA, 2000), it is important to look for reliable early markers and risk factors to aid in early detection. Screening must be an ongoing process because there is evidence that a small but significant proportion of children develop ASD after age 3, although some of these children may have signs that were not detected earlier (Goin, 2004; Siperstein & Volkmar, 2004; Werner, 2003).

The Consensus Panel of the Child Neurology Society and American Academy of Neurology (Filipek et al., 1999) stress that further evaluation is absolutely indicated for a child who fails to meet any of the following developmental milestones:

1. No babbling by 12 months.
2. No gesturing (pointing, waving bye-bye, etc.) by 12 months.
3. No single words by 16 months.
4. No two-word spontaneous (not just *echolalic*) phrases by 24 months.
5. *Any* loss of *any* language or social skills *at any age*.

The panel further recommends that any concerns with speech, language, or hearing should prompt audiology screening. Lead screens should be performed periodically with any indication of pica. If either audiology or lead screening is positive, appropriate treatment and referral should be instituted.

Specific screening instruments for ASD

Screening in the primary care setting should be conducted using instruments specifically developed to detect ASD. There are two levels of screening for ASD: level 1 screening instruments are generally brief and used to find children at risk for ASD in the general population, while level 2 instruments are more complex and used to aid in the diagnosis of ASD (Robins & Dumont-Mathieu, 2006). Level 1 screening is generally performed in the primary care setting, while level 2 screening is carried out by specialists. Three level 1 instruments designed to screen for autism in the general population include the Checklist for Autism in Toddlers (CHAT), the Modified Checklist for Autism in Toddlers (M-CHAT), and the Pervasive Developmental Disorders Screening Test, Second Edition (PDDST-II) stage I. The CHAT and M-CHAT are public domain instruments, while the PDDST-II must be purchased from Harcourt Assessment; the purchase price may create a barrier for NPs in some practice sites.

The CHAT (Figure 1) is an extensively used instrument that was developed to screen 18-month-old children for autism (Baron-Cohen, Allen, & Gillberg, 1992). Although this British instrument has high specificity (0.98–1.0), it has been criticized by the AAP for its low sensitivity

(0.38–0.65) (AAP, 2006; AAP: Committee on Children with Disabilities, 2001).

The first part of the CHAT consists of nine items asked of the parents by a healthcare provider. In the second part, a health professional completes five items (eye gaze, following point, pretend play, pointing on request, constructional play) after a one-session behavioral observation of the child. A child is considered at risk for developing autism if he or she fails these items on the CHAT: A5 (pretend play), A7 (protodeclarative pointing), Bii (following a point), Biii (pretending), and Biv (producing a point). A child is considered to have medium risk of developing autism if he or she fails A7 (protodeclarative pointing) and Biv (producing a point). Any child who fails the CHAT should be rescreened 1 month later. If the child fails a second time, referral to a specialist and EI is indicated. Children can be referred to EI by their primary care provider while evaluation by the specialist is in progress.

More recently, the M-CHAT (Figure 2) was developed as an improved screening instrument for ASD for children aged 18–24 months and shows increased sensitivity and specificity (Robins, Fein, Barton, & Green, 2001). The M-CHAT is a 23-item checklist that parents can fill out in the waiting room. Children are considered at risk for ASD if they fail any 3 of the total 23 items or two of six critical items. If the score indicates increased risk, a follow-up interview provides further clarification and increased accuracy of the M-CHAT. A child who shows increased risk for ASD at 18 months of age should be referred to a specialist and for EI. The M-CHAT should be administered at 24 months to detect those children who either were not screened at 18 months or may have regressed after a negative screening at 18 months (Robins et al., 2001).

When the M-CHAT was tested on 1234 children, aged 18 or 24 months, it correctly classified 33 out of 38 children with autism/PDD and only misclassified 8 of the 1196 nonautistic children (Robins et al., 2001). Five of the eight false positives received diagnoses other than autism/PDD. If the follow-up telephone interview is considered part of the process, the sensitivity of the M-CHAT in this study was 0.97 and the specificity was 0.99. Cross-validation of the M-CHAT is ongoing (Robins & Dumont-Mathieu, 2006).

The PDDST-II stage I was tested on 681 children at risk for ASD and 256 children with mild-to-moderate other developmental disorders with a reported sensitivity ranging from 0.85 to 0.92 and specificity ranging from 0.71 to 0.91 (AAP, 2006; Dumont-Mathieu & Fein, 2005). There is no sensitivity or specificity data for this instrument based on a large-scale screening of an unselected sample, and the instrument must be purchased. For these reasons, the CHAT and M-CHAT are recommended for primary care screening purposes in the protocol developed for this article.

Checklist for Autism in Toddlers (CHAT)**Section A - Ask Parent:***Yes or No?*

- ___ 1) Does your child enjoy being swung, bounced on your knee, etc?
- ___ 2) Does your child take an interest in other children?
- ___ 3) Does your child like climbing on things, such as up stairs?
- ___ 4) Does your child enjoy playing peek-a-boo/hide-and-seek?
- ___ *5) Does your child ever pretend, for example, to make a cup of tea using a toy cup and teapot, or pretend other things?
- ___ 6) Does your child ever use his/her index finger to point, to ask for something?
- ___ *7) Does your child ever use his/her index finger to point, to indicate interest in something?
- ___ 8) Can your child play properly with small toys (e.g., cars or bricks) without just mouthing, fiddling, or dropping them?
- ___ 9) Does your child ever bring objects over to you, to show you something?

Section B – Health Care provider's observation*Yes or No?*

- ___ i) During the appointment, has the child made eye contact with you?
- ___ *ii) Get child's attention, then point across the room at an interesting object and say "Oh look! There's a (name a toy)!" Watch child's face. Does the child look across to see what you are pointing at?

NOTE - to record yes on this item, ensure the child has not simply looked at your hand, but has actually looked at the object you are pointing at.

- ___ *iii) Get the child's attention, then give child a miniature toy cup and teapot and say "Can you make a cup of tea?" Does the child pretend to pour out the tea, drink it etc?

NOTE - if you can elicit an example of pretending in some other game, score a yes on this item

- ___ *iv) Say to the child "Where's the light?" or "Show me the light". Does the child point with his/her index finger at the light?

NOTE - Repeat this with "Where's the teddy?" or some other unreachable object, if child does not understand the word "light". To record yes on this item, the child must have looked up at your face around the time of pointing.

- ___ v) Can the child build a tower of bricks? (If so, how many?) (Number of bricks)

* Indicates critical question most indicative of autistic characteristics

Scoring the CHAT: A child is considered at high risk for developing autism if he/she fails five key items: A5 (pretend play), A7 (protodeclarative pointing), Bii (following a point), Biii (pretending) and Biv (producing a point). A child is considered to have medium risk of developing autism if he/she fails A7 (protodeclarative pointing) and Biv (producing a point). Any child who fails the CHAT should be rescreened one month later (Wheelwright, n.d.; University of Illinois, n.d.). After failing the second time, level 2 screening (Wheelwright, n.d.; University of Illinois, n.d.) and appropriate referrals are indicated.

CHAT requires about 5 – 10 minutes to administer.

CHAT is a Public Domain instrument available on the web at:
<http://www.nas.org.uk/nas/jsp/polopoly.jsp?d=128&a=2226>

Figure 1 Checklist for Autism in Toddlers.

Behavioral and screening protocol for NPs

Figure 3 provides a protocol for screening children between ages 12 and 24 months based on specific behavioral red flags that indicate the need for further evaluation and/or referral. These markers alone cannot make the diagnosis of ASD, but they should prompt serious surveillance and referral when indicated. Head circumference should be monitored carefully at every well-child visit, especially when there is a positive family history of ASD

or risk factors based on family history. If parents express concern about their child's social or language development at any age, this is always an indication for prompt referral.

In Figure 3, there are several behavioral red flags marked "Absolute Concern" that are indicators for immediate referral. All children between 12 and 24 months with Red Flags of Absolute Concern (RFAC) should undergo lead screening and audiological assessment to determine if there is an organic cause for developmental delays.

Modified Checklist for Autism in Toddlers (M-CHAT)

Please fill out the following about how your child **usually** is. Please try to answer every question. If the behavior is rare (e.g., you've seen it once or twice), please answer as if the child does not do it.

1. Does your child enjoy being swung, bounced on your knee, etc.?	Yes	No
2. Does your child take an interest in other children?	Yes	No
3. Does your child like climbing on things, such as up stairs?	Yes	No
4. Does your child enjoy playing peek-a-boo/hide-and-seek?	Yes	No
5. Does your child ever pretend, for example, to talk on the phone or take care of a doll or pretend other things?	Yes	No
6. Does your child ever use his index finger to point, to ask for something?	Yes	No
7. Does your child ever use his/her index finger to point, to indicate interest in something?	Yes	No
8. Can your child play properly with toys (e.g., cars or bricks) without just mouthing, fiddling, or dropping them?	Yes	No
9. Does your child ever bring objects over to you (parent) to show you something?	Yes	No
10. Does your child look you in the eye for more than a second or two?	Yes	No
11. Does your child ever seem oversensitive to noise? (e.g., plugging ears)	Yes	No
12. Does your child smile in response to your face or your smile?	Yes	No
13. Does your child imitate you? (e.g., you make a face-will your child imitate it?)	Yes	No
14. Does your child respond to his/her name when you call?	Yes	No
15. If you point at a toy across the room, does your child look at it?	Yes	No
16. Does your child walk?	Yes	No
17. Does your child look at things you are looking at?	Yes	No
18. Does your child make unusual finger movements near his/her face?	Yes	No
19. Does your child try to attract your attention to his/her own activity?	Yes	No
20. Have you ever wondered if your child is deaf?	Yes	No
21. Does your child understand what people say?	Yes	No
22. Does your child sometimes stare at nothing or wander with no purpose?	Yes	No
23. Does your child look at your face to check your reaction when faced with something unfamiliar?	Yes	No
Have you ever filled out this form for this child before?	Yes	No

Scoring the M-CHAT: Either a) Any 3 items answered "no" or b) 2 out of 6 of the following items answered "no": 2 (interest in other children), 7 (proto-declarative pointing), 9 (bringing objects to show the parent), 13 (imitating), 14 (responding to name), and 15 (following a point) (Dumont-Mathieu & Fein, 2005).

M-CHAT requires about 5 – 10 minutes to administer.

M-CHAT is a Public Domain instrument and is available on the web at: <http://www.firstsigns.org/downloads/m-chat.PDF>

Figure 2 Modified Checklist for Autism in Toddlers.

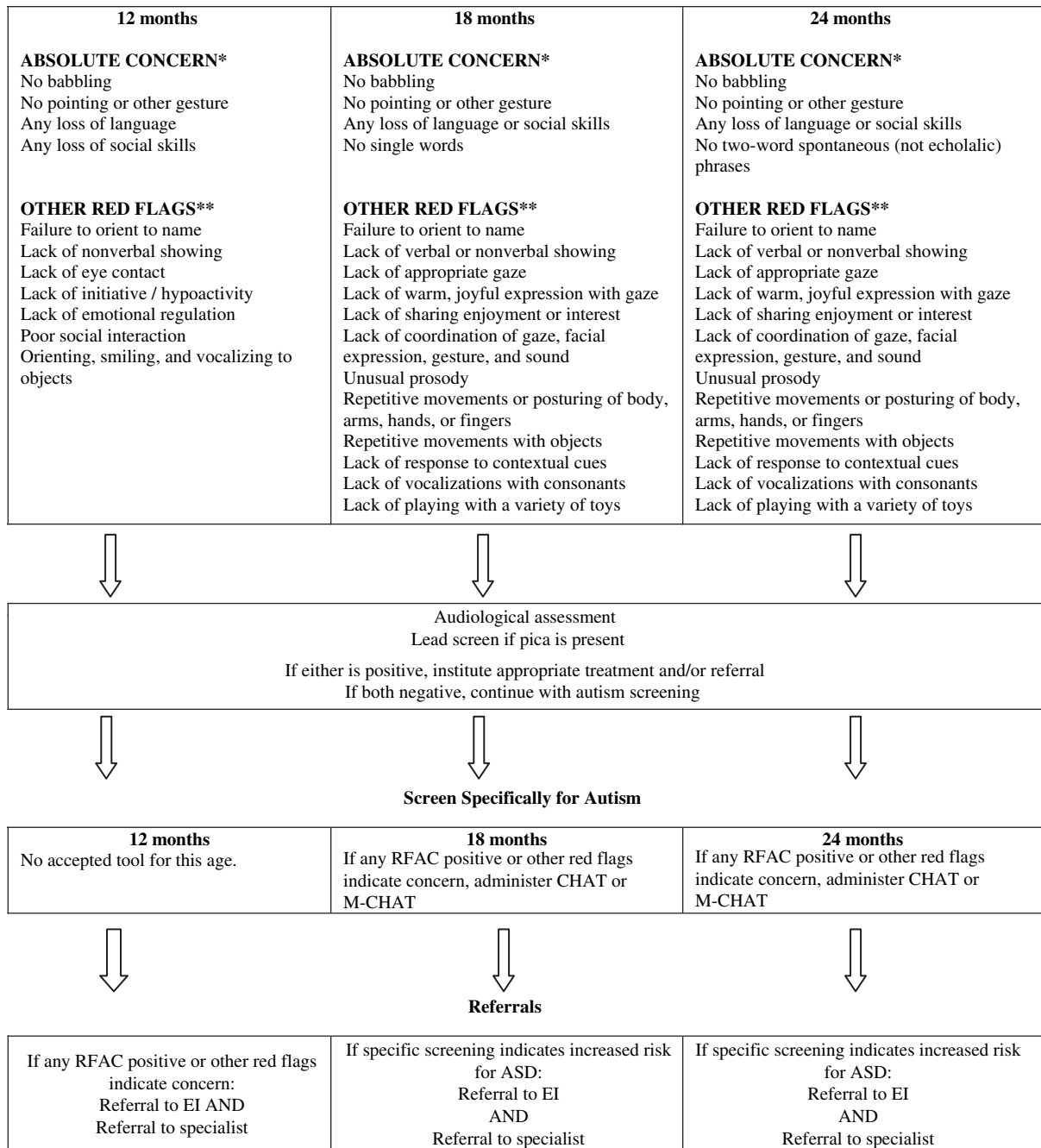
Because there are no specific additional screening instruments for children younger than 18 months, referral is indicated when they have any behavioral RFAC. Children between 18 and 24 months who have any RFAC should also be tested using the appropriate ASD screening instrument. If screening indicates increased risk of ASD, these children should be referred.

NPs can use the Other Red Flags in Figure 3 as indicators to help guide their evaluation of young children. If any of these red flags is present, the NP should assess the child in the context of other risk factors (e.g., head circumference, family history) and carefully question parents about any concerns they may have regarding their child's development. Based on the NP's clinical judgment, she or he may wish to reevaluate the child at a subsequent visit, request lead and audiological screening, conduct ASD screening

using the specific instruments (CHAT or M-CHAT), and/or refer the child for further evaluation.

Although the focus of this article is on screening between 12 and 24 months, NPs should continue to screen for ASD at each subsequent well-child visit. According to Filipek et al. (1999), screening should be performed at every well-child visit through the preschool years and "at any age thereafter if concerns are raised about social acceptance, learning and behavior" (p. 469).

When further evaluation is needed, NPs should refer children to a provider experienced in the diagnosis of ASD, for example, a neurodevelopmental pediatrician, child neurologist, developmental/behavioral pediatrician, or other ASD specialist. A simultaneous referral to initiate EI should be made to the community's service system for children aged 0–3 years. EI services are listed in every state



* Red Flag of Absolute Concern (RFAC); any one of these indicators should prompt additional testing and referral

** Other Red Flags – If any of these red flags is present, the NP should assess the child in the context of other risk factors (e.g., head circumference, family history) and carefully question parents about any concerns they may have regarding their child’s development. See text for full explanation.

EI = Early Intervention

Data from Filipek et al. (1999); Osterling & Dawson (1994); Maestro et al. (2005a & b); Wetherby et al. (2004)

Figure 3 Early detection of ASDs: Behavioral red flags.

by the National Early Childhood Technical Assistance Center Interagency Coordinating Council (<http://www.nectac.org/contact/iccchair.asp>). Information about EI can also be found through each state's Department of Health or Department of Education, the Special Education Administrator for every local school district, and national organizations such as the Autism Society of America.

Early intervention

Detection and referral from a health provider are required to begin the process of EI. NPs may wish initially to apply the more general term "developmentally delayed" for the purpose of providing referrals and communicating with anxious parents until a firm diagnosis can be established. The NP must also help to prepare the parents psychologically and educationally for their responsibilities as parents of a child with an ASD. Although a comprehensive discussion of EI methods is beyond the scope of this article, the authors provide several general recommendations as background information.

In order to form a good foundation for future interventions, the National Research Council (NRC, 2001) recommends that families be given information on ASD, including specific teaching methods, expectations about their child's behavior, finances, special education rights and duties, mental health support, and information about how services might vary for each individual child. The NRC also recommends that specific intervention services, covering at least 25 h per week, begin as soon as the child is suspected of having an ASD. The council supports daily individualized attention and ongoing interaction with typical children. In addition, children with ASD should learn play skills for interacting with peers, and functional, spontaneous communication should be taught through verbal and augmentative communication, including manual sign language and computer/voice output devices.

Parents play a key role in any EI strategies for children. Before age 3, the Individual Family Service Plan (IFSP) is developed and implemented by either local agencies or local school districts, which receive federal, state, and sometimes local school district funding. The IFSP relies on parents to manage intervention at their home, and studies have found that the quality of their involvement is the critical component for success (Dawson & Osterling, 1997). Not only do parents play the role of caretakers, but they also need to be trained for their new roles as teachers and advocates in their child's IFSP team. After age 3, the child is referred to the local school district, which is required to develop, in conjunction with the parents, an Individual Educational Plan tailored to the special needs of each individual child.

When their child is diagnosed with an ASD, most parents go through a grieving process because of the seriousness of the diagnosis and the loss of their expectation of a developmentally normal child. Kübler-Ross and Kessler (2005) state that this process consists of stages of shock, anger, bargaining, depression, and acceptance. In addition, family members of children with any disability may feel stigmatized. It is very common to lose old friendships and for mothers, especially, to be affected psychologically (Gray, 2002). The time involved with caring for and managing the behaviors of a child with an ASD can limit the feeling of being a family to fleeting moments (DeGrace, 2004). Therefore, psychological support can be crucial for parents.

Research suggests that building a social support network is invaluable because this enables parents to share resources and experiences. Social support directly affects one's personal health and well-being, which in turn affects family functioning, styles of parent-child interaction, and the child's behavior and development (Boyd, 2002; Dunst, Trivette, & Deal, 1988).

Dawson and Osterling (1997) have compiled a number of well-tested EI strategies for infants and toddlers with ASD. They recommend that the parent or educator imitate the child's behavior, similar to the way parents and infants communicate during the first year of life. Social skills can be taught through play with the child as the initiator of activities with the parent providing scaffolding. Social play can be taught through ritualized games, and strategies for self-regulation of arousal and communicative intent should be included. The main goal is a trusting, loving relationship between the child and parent. This child-centered method sharply contrasts with the operant conditioning approach of Applied Behavioral Analysis (ABA), the one educational intervention approved by the Surgeon General. Although excellent results are reported for children beginning this intense intervention after age 3 (Sallows & Graupner, 2005), it may not be developmentally appropriate for younger children.

Practice implications and conclusions

NPs are the primary source of well-child care and developmental screening for many children, and they can be leaders in early identification of children with ASD so that these children and their families receive maximum benefits from timely and appropriate interventions. Finding time to screen for ASD can be difficult in a busy primary care practice. Clinicians can maximize their time by using established instruments such as the CHAT and the M-CHAT to organize the screening process and increase the reliability of the assessment. Because a child's long-term prognosis may improve dramatically by detecting

ASD at an early age, NPs must employ validated assessment tools to ensure accurate screening outcomes for children between the ages of 12 and 24 months.

EI has been demonstrated to be very successful with children diagnosed with ASD. Rogers (1996) found that gains for young children with ASD were actually more rapid than for young children with other severe neurodevelopmental disorders. She states that the brain of the child with ASD shows "unique plasticity" (p. 245), which may indicate a critical time frame for intervention. Effective EIs, therefore, may actually help reshape the brain and help to prevent the development of the typical, autistic brain.

Early screening will always result in some false positives. Thus, interventions must not be detrimental to a child who is later found to be typical. An ideal EI program for children up to age 2 would, therefore, be child centered, developmentally appropriate, and apply methods that have been beneficial in many successful EI programs. ABA can be considered as an intervention for children after age 3.

NPs play a critical role in providing early screening for ASD and referrals to specialists and to the community EI system. NPs also offer resources and support for parents and families while children are undergoing evaluation and after the diagnosis of ASD is confirmed. Once a diagnosis is made, NPs can continue to provide comprehensive health-care services for the child and family and serve as the link among the various medical specialists, complementary and alternative providers, and dieticians who also care for children with ASD.

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