

TABLE 1 Developmental Screening Tools

	Description	Age Range	No. of Items	Administration Time	Psychometric Properties ^a	Scoring Method	Cultural Considerations	Purchase/Obtainment Information	Key References
General developmental screening tool Ages & Stages Questionnaires (ASQ)	Parent-completed questionnaire; series of 19 age-specific questionnaires screening communication, gross motor, fine motor, problem-solving, and personal adaptive skills; results in pass/fail score for domains	4–60 mo	30	10–15 min	Normed on 2008 children from diverse ethnic and socioeconomic backgrounds, including Spanish speaking; sensitivity: 0.70–0.90 (moderate to high); specificity: 0.76–0.91 (moderate to high)	Risk categorization: provides a cutoff score in 5 domains of development that indicates possible need for further evaluation	English, Spanish, French, and Korean versions available	Paul H. Brookes Publishing Co; 800/638-3775; www.brookespublishing.com	Squires J, Potter L, Bicker D. <i>The ASQ User's Guide</i> . 2nd ed. Baltimore, MD: Paul H. Brookes Publishing Co; 1999
Battelle Developmental Inventory Screening Tool, 2nd ed (BDI-ST)	Directly administered tool; designed to screen personal-social, adaptive, motor, communication, and cognitive development; results in pass/fail score and age equivalent; can be modified for children with special needs	Birth to 95 mo	100	10–15 min (<3 y old) or 20–30 min (≥3 y old)	Normed on 2500 children, demographically information matched 2000 US Census data; additional bias reviews performed to adjust for gender and ethnicity concerns; sensitivity: 0.72–0.93 (moderate to high); specificity: 0.79–0.88 (moderate)	Quantitative; scaled scores in all 5 domains are compared with cutoffs to determine need for referral	English and Spanish versions available	Riverside Publishing Co; 800/323-9540; www.riverpub.com	Newborg J. <i>Battelle Developmental Inventory</i> . 2nd ed. Itasca, IL: Riverside Publishing; 2004
Bayley Infant Neurodevelopmental Screen (BINS)	Directly administered tool; series of 6 item sets screening basic neurologic functions; receptive functions (visual, auditory, and tactile input); expressive functions (oral, fine, and gross motor skills); and cognitive processes; results in risk category (low, moderate, high risk)	3–24 mo	11–13	10 min	Normed on ~1700 children, stratified on age, to match the 2000 US Census; sensitivity: 0.75–0.86 (moderate); specificity: 0.75–0.86 (moderate)	Risk categorization; children are graded as low, moderate, or high risk in each of 4 conceptual domains by use of 2 cutoff scores	English and Spanish versions available	Psychological Corp; 800/211-8378; www.harcourassessment.com	Aylward GP. <i>Bayley Infant Neurodevelopmental Screener</i> . San Antonio, TX: Psychological Corp; 1995; Aylward GP, Verhulst SJ, Bell S. Predictive utility of the BINS-II Infant Neurodevelopmental Screener (BINS) risk status classification: clinical interpretation and application. <i>Dev Med Child Neurol</i> . 2000; 42:25–31
Brigance Screens-II	Directly administered tool; series of 9 forms screening articulation, expressive and receptive language, gross motor, fine motor, general knowledge and personal social skills and pre-academic skills (when appropriate); for 0–23 mo, can also use parent report	0–90 mo	8–10	10–15 min	Normed on 1156 children from 29 clinical sites in 21 states; sensitivity: 0.70–0.80 (moderate); specificity: 0.70–0.80 (moderate)	All results are criterion based; no normative data are presented	English and Spanish versions available	Curriculum Associates Inc; 800/225-0248; www.curriculumassociates.com	Glascoe FP. <i>Technical Report for the Brigance Screens</i> . North Billerica, MA: Curriculum Associates Inc; 2005; Glascoe FP. The Brigance Infant-Toddler Screen (BIT-5): standardization and validation. <i>J Dev Behav Pediatr</i> . 2002;23:145–150
Child Development Inventory (CDI)	Parent-completed questionnaire; measures social, self-help, motor, language, and general development skills; results in developmental quotients and age equivalents for different developmental domains; suitable for more in-depth evaluation	18 mo–6 y	300	30–50 min	Normative sample included 568 children from south St Paul, MN, a primarily white, working class community; Doig et al included 43 children from a high-risk follow-up program, which included 69% with high school education or less and 81% Medicaid; sensitivity: 0.80–1.0 (moderate to high); specificity: 0.94–0.96 (high)	Quantitative; provides age equivalents in each domain as well as SDs	English and Spanish versions available	Behavior Science Systems Inc; 612/850-8700; www.childdevrev.com	Irion H. <i>Child Development Inventory Manual</i> . Minneapolis, MN: Behavior Science Systems Inc; 1992; Doig KB, Macias JM, Saylor CF, Craver JR, Ingram PE. The Child Development Inventory: a measure for follow-up of the high risk infant. <i>J Pediatr</i> . 1999;135:358–362

TABLE 1 Continued

	Description	Age Range	No. of Items	Administration Time	Psychometric Properties*	Scoring Method	Cultural Considerations	Purchase/Obtainment Information	Key References
Child Development Review-Parent Questionnaire (CDR-PQ)	Parent-completed questionnaire; professional-completed child development chart measures social, self-help, motor, and language skills	18 mo to 5 y	6 open-ended questions and a 26-item possible-problems checklist to be completed by the parent, followed by 99 items crossing the 5 domains, which may be used by the professional as an observation guide or parent-interview guide	10–20 min	Standardized with 220 children aged 3–4 y from primarily white, working class families in south St Paul, MN; sensitivity: 0.68 (low); specificity: 0.88 (moderate)	Risk categorization; parents' responses to the 6 questions and problems checklist are classified as indicating (1) no problem; (2) a possible problem; or (3) a possible major problem	English and Spanish versions available	Behavior Science Systems Inc	Iretton H. <i>Child Development Review Manual</i> . Minneapolis, MN: Behavior Science Systems; 2004
Denver-II Developmental Screening Test	Directly administered tool; designed to screen expressive and receptive language, gross motor, fine motor, and personal-social skills; results in risk category (normal, questionable, abnormal)	0–6 y	125	10–20 min	Normed on 2096 term children in Colorado, diversified in terms of age, place of residence, ethnicity/cultural background, and maternal education; sensitivity: 0.56–0.83 (low to moderate); specificity: 0.43–0.80 (low to moderate)	Risk categorization; pass or fail for each question, and these responses are compared with age-based norms to classify children as in the normal range, suspect, or delayed	English and Spanish versions available	Denver Developmental Materials: 800/419-4729; www.denverii.com	Frankenburg WK, Camp BW, Van Natta PA. Validity of the Denver Developmental Screening Test. <i>Child Dev</i> . 1971;42:475–485; Glascoe FP, Byrne KE, Ashford LG, Johnson KL, Chang B, Strickland B. Accuracy of the Denver-II in developmental screening. <i>Pediatrics</i> . 1992; 89:1221–1225
Infant Development Inventory	Parent-completed questionnaire; measures social, self-help, motor, and language skills	0–18 mo	4 open-ended questions followed by 87 items crossing the 5 domains	5–10 min	Studied in 86 high-risk 8-months seen in a perinatal follow-up program and compared with the Bayley scales; sensitivity: 0.85 (moderate); specificity: 0.77 (moderate)	Risk categorization; delayed or not delayed	English and Spanish versions available	Behavior Science Systems Inc	Creighton DE, Sauve RS. The Minnesota Infant Development Inventory in the developmental screening of high-risk infants at 8 mo. <i>Can J Behav Sci</i> . 1988;20 (special issue):424–433
Parents' Evaluation of Developmental Status (PEDI)	Parent-interview form; designed to screen for developmental and behavioral problems needing further evaluation; single response form used for all ages; may be useful as a surveillance tool	0–8 y	10	2–10 min	Standardized with 771 children from diverse ethnic and socioeconomic backgrounds, including Spanish speaking; sensitivity: 0.74–0.79 (moderate); specificity: 0.70–0.80 (moderate)	Risk categorization; provides algorithm to guide need for referral, additional screening, or continued surveillance	English, Spanish, Vietnamese, Arabic, Swahili, Indonesian, Chinese, Taiwanese, French, Somali, Portuguese, Malaysian, Thai, and Laotian versions available	Elisworth & Vandermeer Press LLC: 888/729-1697; www.pedtest.com	
Language and cognitive screening tools Capute Scales (also known as Cognitive Adaptive Test/Clinical Linguistic Auditory Milestone Scale [CAT/CLAMS])	Directly administered tool; measures visual-motor/problem solving (CAT), and expressive and receptive language (CLAMS); results in developmental quotient and age equivalent	3–36 mo	100	15–20 min	Standardized on 1065 North American children aged 2–36 mo; correlations high with Bayley Scales of Infant Development; sensitivity: 0.21–0.67 in low-risk population (low) and 0.05–0.88 (low to high); specificity: 0.95–1.00 in low-risk population (high) and 0.82–0.98 in high-risk populations (moderate to high)	Quantitative (developmental age levels and quotient)	English, Spanish, and Russian versions available	Paul H Brookes Publishing Co	Voigt RG, Brown FR III, Faley JK, et al. Concurrent and predictive validity of the cognitive adaptive test/clinical linguistic and auditory milestone scale (CAT/CLAMS) and the Mental Developmental Index of the Bayley Scales of Infant Development. <i>Clin Pediatr (Phila)</i> . 2003;42: 427–432

Communication and Symbolic Behavior Scales-Developmental Profile (CSBS-DP); Infant Toddler Checklist	Standardized tool for screening of communication and symbolic abilities up to the 24-mo level; the Infant Toddler Checklist is a 1-page parent-completed screening tool	6–24 mo	24	5–10 min	Standardized on 2188 North American children aged 6–24 mo; correlations: 0.39–0.75 with Mullen Scales at 2 y of age; sensitivity: 0.76–0.88 in low- and at-risk children at 2 y of age (moderate); specificity: 0.82–0.87 in low- and at-risk children at 2 y of age (moderate)	Risk categorization (concern/no concern)	English version available	Paul H. Brookes Publishing Co	Wetherby AM, Prizant BM. <i>Communication and Symbolic Behavior Scales-Developmental Profile</i> . Baltimore, MD: Paul H. Brookes Publishing Co; 2002
Early Language Milestone Scale (ELM Scale-2)	Assesses speech and language development from birth to 36 mo	0–36 mo	43	1–10 min	Small cross-sectional standardization sample of 191 children; 235 children for speech intelligibility item; sensitivity: 0.83–1.00 in low- and high-risk populations (moderate to high); specificity: 0.68–1.00 in low- and high-risk populations (low to high)	Quantitative (age equivalent, percentile, standard score)	English version available	Pro-Ed Inc: 800/897-3202; www.proedinc.com	Coplan J. <i>Early Language Milestone Scale</i> . Austin, TX: Pro-Ed Inc; 1993; Coplan J, Gleason JR. Test-retest and interobserver reliability of the Early Language Milestone Scale, second edition. <i>J Pediatr Health Care</i> . 1993;7:212–219
Motor screening tools Early Motor Pattern Profile (EMPP)	Physician-administered standard examination of movement, tone, and reflex development; simple 3-point scoring system	6–12 mo	15	5–10 min	Single published report of 1247 high-risk infants; sensitivity: 0.87–0.92 (moderate to high); specificity: 0.98 (high)	Risk categorization (normal/suspect/abnormal)	English version available	See key references	Morgan AM, Aldag JC. Early identification of cerebral palsy using a profile of abnormal motor patterns. <i>Pediatrics</i> . 1996;98:692–697
Motor Quotient (MQ)	Uses simple ratio quotient with gross motor milestones for detecting delayed motor development	8–18 mo	11 total milestones; 1 per visit	1–3 min	Single published report of 144 referred children; sensitivity: 0.87 (moderate); specificity: 0.89 (moderate)	Quantitative (developmental age levels and quotient)	English version available	See key references	Capute AJ, Shapiro BK. The motor quotient: a method for the early detection of motor delay. <i>Am J Dis Child</i> . 1985;139:940–942
Autism screening tools Checklist for Autism in Toddlers (CHAT)	Parent-completed questionnaire or interview and directly administered items designed to identify children at risk of autism from the general population	18–24 mo	14 (No. of questions/items [averaged])	5 min	Original standardization sample included 41 siblings of children with autism and 50 controls 18 mo of age in Great Britain; 6-y follow-up on 16 235 children validated using ADI-R and ICD-10 criteria resulted in low sensitivity; high specificity; revised version in process of being normed (“Q-CHAT”); sensitivity: 0.38–0.65 (low); specificity: 0.98–1.0 (high)	Risk categorization (pass/fail)	English version available	Public domain: www.nas.org.uk/profess/chat	Baird G, Charman T, Baron-Cohen S, et al. A screening instrument for autism at 18 mo of age: a 6-y follow-up study. <i>J Am Acad Child Adolesc Psychiatry</i> . 2000;39:694–702; Baron-Cohen S, Allen J, Gillberg C, Kan Allen J. Gillberg C. Can autism be detected at 18 mo? The needle, the haystack, and the CHAT. <i>Br J Psychiatry</i> . 1992;161:839–843
Modified Checklist for Autism in Toddlers (M-CHAT)	Parent-completed questionnaire designed to identify children at risk of autism from the general population	16–48 mo	23 (No. of questions/items [averaged])	5–10 min	Standardization sample included 1293 children screened; 58 evaluated, and 39 diagnosed with an autistic spectrum disorder; validated using ADI-R, ADOS-G, CARS, DSM-IV; sensitivity: 0.85–0.87 (moderate); specificity: 0.93–0.99 (high)	Risk categorization (pass/fail)	English, Spanish, Turkish, Chinese, and Japanese versions available	Public domain: www.firstsigns.com	Dumont-Mathieu T, Fein D. Screening for autism in young children: the Modified Checklist for Autism in Toddlers (M-CHAT) and other measures. <i>Ment Retard Dev Disabil Res Rev</i> . 2005;11:253–262; Robins DL, Fein D, Barton ML, Green JA. The Modified Checklist for Autism in Toddlers: an initial study investigating the early detection of autism and pervasive developmental disorders. <i>J Autism Dev Disord</i> . 2001;31:131–144

TABLE 1 Continued

	Description	Age Range	No. of Items	Administration Time	Psychometric Properties ^a	Scoring Method	Cultural Considerations	Purchase/Obtainment Information	Key References
Pervasive Developmental Disorders Screening Test-II (PDDST-II), Stage 1-Primary Care Screener	Parent-completed questionnaire designed to identify children at risk of autism from the general population	12-48 mo	22 (No. of questions/items [averaged])	10-15 min to complete; 5 min to score	Validated using extensive multimethod diagnostic evaluations on 681 children at risk of autistic spectrum disorders and 256 children with mild-to-moderate other developmental disorders; no sensitivity/specificity data reported for screening of an unselected sample; sensitivity: 0.85-0.92 (moderate to high); specificity: 0.71-0.91 (moderate to high)	Risk categorization (pass/fail)	English version available	Psychological Corp	Siegel B. <i>Pervasive Developmental Disorders Screening Test-II (PDDST-II): Early Childhood Screener for Autistic Spectrum Disorders</i> . San Antonio, TX: Harcourt Assessment Inc; 2004
Pervasive Developmental Disorders Screening Test-II (PDDST-II), Stage 2-Developmental Clinic Screener	Parent-completed questionnaire designed to detect children at risk of autism from other developmental disorders	12-48 mo	14 (No. of questions/items [averaged])	10-15 min to complete; 5 min to score	Validated using extensive multimethod diagnostic evaluations on 490 children with confirmed autistic spectrum disorder (autism, pervasive developmental disorder-not otherwise specified, or Asperger syndrome) and 194 children who were evaluated for autistic spectrum disorder but who did not receive a diagnosis on the autistic spectrum; no sensitivity/specificity data reported for screening of an unselected sample; sensitivity: 0.69-0.73 (moderate); specificity: 0.49-0.63 (low)	Risk categorization (pass/fail)	English version available	Psychological Corp	Siegel B. <i>Pervasive Developmental Disorders Screening Test-II (PDDST-II): Early Childhood Screener for Autistic Spectrum Disorders</i> . San Antonio, TX: Harcourt Assessment Inc; 2004
Screening Tool for Autism in Two-Year-Olds (STAT)	Directly administered tool; designed as second-level screen to detect children with autism from other developmental disorders; assesses behaviors in 4 social-communicative domains: play, requesting, directing attention, and motor imitation	24-35 mo	12 (No. of questions/items [averaged])	20 min	Two samples were used for development phase, 3 children with autism, 33 without autism; for validation sample, 12 children with autism, 21 without autism; validated using CARS, ADOS-G, and DSM-IV criteria; second-level screen; requires training workshop before administration; sensitivity: 0.83-0.92 (moderate to high); specificity: 0.85-0.86 (moderate)	Risk categorization (pass/fail)	English version available	Wendy Stone, PhD, author: trrad@vanderbilt.edu	Stone WL, Coonrod EE, Ousley OY. Brief report: Screening Tool for Autism in Two-Year-Olds (STAT): development and preliminary data. <i>J Autism Dev Disord</i> . 2000;30:607-612; Turner LM, Pozdol SL. Psychometric properties of the STAT for early autism screening. <i>J Autism Dev Disord</i> . 2004;34:691-701; Stone WL, Ousley OY. <i>STAT Manual: Screening Tool for Autism in Two-Year-Olds</i> . unpublished manuscript, Vanderbilt University; 1997
Social Communication Questionnaire (SCQ) (formerly Autism Screening Questionnaire-ASQ)	Parent-completed questionnaire designed to identify children at risk of autistic spectrum disorders from the general population; based on items in the ADI-R	≥4 y	40 (No. of questions/items [averaged])	5-10 min	Validated using the ADI-R and DSM-IV on 200 subjects (160 with pervasive developmental disorder, 40 without pervasive developmental disorder); for use in children with mental age of at least 2 y and chronological age ≥4 y; available in 2 forms: lifetime and current; sensitivity: 0.85 (moderate); specificity: 0.75 (moderate)	Risk categorization (pass/fail)	English and Spanish versions available	Western Psychological Corp: www.wpspublish.com	Rutter M, Bailey A, Lord C. <i>The Social Communication Questionnaire (SCQ) Manual</i> . Los Angeles, CA: Western Psychological Services; 2003

The AAP does not approve/endorse any specific tool for screening purposes. This list is not exhaustive, and other tests may be available. ADI-R indicates Autism Diagnostic Interview-R; ICD-10, *International Classification of Diseases, 10th revision*; ADOS-G, Autism Diagnostic Observation Schedule-Generic; CARS, Childhood Autism Rating Scale; DSM-IV, *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition*.

^a Sensitivity and specificity were categorized as follows: low = 69 or below; moderate = 70 to 89; high = 90 or above.