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 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, Bricker D. *The ASQ User's Guide.* 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, demographic 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. *Battelle Developmental Inventory.* 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.harcourtassessment.com	Aylward GP. *Bayley Infant Neurodevelopmental Screener.* San Antonio, TX: Psychological Corp; 1995; Aylward GP, Verhulst SJ, Bell S. Predictive utility of the BSID-II Infant Neurodevelopmental Screener (BINS) risk status classifications: clinical interpretation and application. *Dev Med Child Neurol.* 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. *Technical Report for the Brigance Screens.* North Billerica, MA: Curriculum Associates Inc; 2005; Glascoe FP. The Brigance Infant-Toddler Screen (BITS): standardization and validation. *J Dev Behav Pediatr.* 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	Ireton H. *Child Development Inventory Manual.* Minneapolis, MN: Behavior Science Systems Inc; 1992; Doig KB, Macias MM, Saylor CF, Craver JR, Ingram PE. The Child Development Inventory: a developmental outcome measure for follow-up of the high risk infant. *J Pediatr.* 1999;135:358–362

TABLE 1 Continued

	Description	Age Range	No. of Items	Administration Time	Psychometric Properties[a]	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	Ireton H. *Child Development Review Manual.* 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. *Child Dev.* 1971;42:475–485; Glascoe FP, Byrne KE, Ashford LG, Johnson KL, Chang B, Strickland B. Accuracy of the Denver-II in developmental screening. *Pediatrics.* 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-mo-olds 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. *Can J Behav Sci.* 1988;20 (special issue):424–433
Parents' Evaluation of Developmental Status (PEDS)	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	Ellsworth & Vandermeer Press LLC: 888/729-1697; www.pedstest.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 1055 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 in high-risk populations (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, Fraley 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. *Clin Pediatr (Phila).* 2003;42: 427–432

Tool	Description	Age	No. of items	Time	Standardization/validity	Scoring	Language	Availability	Reference
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. Communication and Symbolic Behavior Scales: Developmental Profile. 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. Early Language Milestone Scale. Austin, TX: Pro-Ed Inc; 1993; Coplan J, Gleason JR. Test-retest and interobserver reliability of the Early Language Milestone Scale, second edition. J Pediatr Health Care. 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. Pediatrics. 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. Am J Dis Child. 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. J Am Acad Child Adolesc Psychiatry. 2000;39:694–702; Baron-Cohen S, Allen J, Gillberg C. Can autism be detected at 18 mo? The needle, the haystack, and the CHAT. Br J Psychiatry. 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. Ment Retard Dev Disabil Res Rev. 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. J Autism Dev Disord. 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. *Pervasive Developmental Disorders Screening Test-II (PDDST-II): Early Childhood Screener for Autistic Spectrum Disorders.* 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. *Pervasive Developmental Disorders Screening Test-II (PDDST-II): Early Childhood Screener for Autistic Spectrum Disorders.* 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	English version available	Wendy Stone, PhD, author: triad@vanderbilt.edu	Stone WL, Coonrod EE, Ousley OY. Brief report: Screening Tool for Autism in Two-Year-Olds (STAT): development and preliminary data. *J Autism Dev Disord.* 2000;30:607–612; Stone WL, Coonrod EE, Turner LM, Pozdol SL. Psychometric properties of the STAT for early autism screening. *J Autism Dev Disord.* 2004;34:691–701; Stone WL, Ousley OY. *STAT Manual: Screening Tool for Autism in Two-Year-Olds.* 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 chronologic 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. *The Social Communication Questionnaire (SCQ) Manual.* 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.