Pennsylvania Autism Assessment and Diagnosis

Expert Work Group

Supporting quality diagnostic practices for persons with suspected

Autism Spectrum Disorder

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PREFACE

In response to growing difficulties in meeting the needs of individuals with autism in Pennsylvania, Estelle B. Richman, Secretary of the Pennsylvania Department of Public Welfare, created the Autism Task Force in 2003. This Task Force, which included more than 250 individuals with autism, family members of people living with autism, service providers, educators, administrators and researchers, was charged with developing plans for new systems for individuals living with autism and their families that would make Pennsylvania a national leader in the care of people with autism. The Task Force was divided into twelve subcommittees, each of which focused on current practices, problems and potential solutions in different areas. An executive summary (and the twelve subcommittee reports) with specific recommendations may be found on-line at http://www.dpw.state.pa.us/General/AboutDPW/SecretaryPublicWelfare/AutismTaskForce/. Eight broad themes and related solutions emerged from the reports. Perhaps most prominent among them is the dearth of qualified, trained professionals to evaluate, treat and educate people with autism.

This report is a direct response to these concerns and reflects collaboration between the Department of Public Welfare and the Department of Education of the Commonwealth of Pennsylvania to establish consistent and practical standards for evaluation and diagnosis of children with Autism Spectrum Disorders. These standards will form the basis of an educational curriculum for professional caregivers. The Department of Public Welfare, under the leadership

of Secretary Richman and Nina Wall-Cote, MSS, LSW, Director of Autism Affairs, provided funding for the diverse workgroup that was charged with developing these standards. (http://www.dpw.state.pa.us/Disable/AutismAffairs/AutismNews/003675278.htm).

The mission of the *Pennsylvania Autism Evaluation and Diagnosis Expert Work Group* is:

To improve quality of care for individuals with autism spectrum disorders and their families in the Commonwealth of Pennsylvania by providing standards for diagnosis and evaluation.

The workgroup was led by Susan E. Levy, M.D. (Chairperson), David S. Mandell, Sc.D. (Co-Chairperson) and Jennifer Sands (project coordinator). The workgroup included 28 members from across the Commonwealth of Pennsylvania who provide clinical care, teaching, educational services and therapy to individuals of autism and their families. Members of the workgroup included parents of children with autism and professionals in multiple disciplines and subspecialties including audiology, epidemiology, neurology, nursing, occupational therapy, psychiatry, psychology, social work, special education and speech/language pathology. Please see Table 1 for the list of participants and their affiliations. Prior to their first meeting, members were provided with comprehensive reference materials regarding diagnosis and evaluation. The workgroup met July 13-14, 2006 at The Children's Hospital of Philadelphia. During this meeting members reviewed the current state of the art of evaluation

and diagnosis and identified barriers to improving services. The group divided into subcommittees to address the specific issues confronting individuals of different ages, levels of functioning and associated problems. Each subcommittee presented a summary report to the group for discussion. The reports of the subcommittees were collated into an overall report, and this report was discussed and edited by the group at large. Nationally recognized experts in the field of autism evaluation have been solicited to review the final draft of the document.

The results of the consensus agreement of this work group will establish standards for evaluation and diagnosis of children with autism. The guidelines will not be prescriptive, but will provide structure and guidance for clinical teams to implement high quality evaluations. Furthermore, it is hoped that this report will provide the basis for the development of a common intake or general information form for all children who are undergoing an evaluation for possible autism and for formulation of sets of common protocols and procedures for the evaluation of children in Pennsylvania with autism. Perhaps this may be the groundwork for establishing regional centers throughout the Commonwealth, with professionals who are well-trained in evaluation and diagnosis providing consistent high quality of care to individuals with autism directly and through training of families and other professionals.

In some children it may be difficult to make a diagnosis of autism given the heterogeneity and range of severity of core symptoms and associated (co-morbid) problems. Due to these difficulties, children may not be diagnosed, have

a delayed diagnosis or may be misdiagnosed, which can have significant impact on their treatment and ultimate outcome. This document will serve as a foundation for developing curricula to train professionals in the process of evaluation and diagnosis of children and youth who are suspected of having autism or are at risk for autism while providing support to the families. The document proposes a general evaluation framework organized into three stages within which we propose flexibility with respect to which measures and procedures are used.

Executive Summary

In response to growing difficulties in meeting the needs of individuals with Autism in Pennsylvania, Estelle B. Richman, Secretary of the Pennsylvania Department of Public Welfare, created the Autism Task Force in 2003. In response to the concerns expressed by the Task Force about the dearth of qualified, trained professionals to evaluate, treat and educate people with autism in Pennsylvania, The Department of Public Welfare and the Department of Education of the Commonwealth of Pennsylvania established The *Pennsylvania Autism Assessment and Diagnosis Expert Work Group,* in July 2006. The purpose of this collaborative effort was to establish consistent and practical standards for evaluation and diagnosis of children with Autism Spectrum Disorders. These standards will form the basis of an educational curriculum for professional caregivers. The Department of Public Welfare, under the leadership of Secretary Richman, and Nina Wall-Cote, MSS, LSW, Director of Autism Affairs, provided funding for this diverse workgroup that was charged with developing these standards.

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The results of the consensus agreement of this workgroup will establish standards for evaluation and diagnosis and provide structure and guidance for clinical teams to implement high quality evaluations of children with autism. Furthermore, it is hoped that this report will provide the basis for the development of a common general information form and sets of common protocols and procedures for the evaluation. Perhaps this may be the groundwork for establishing regional centers throughout the state with professionals who are well-trained in evaluation and diagnosis, have close communication and consistency with each other and can provide improved quality of care for children in Pennsylvania with autism.

Recommendations of the workgroup are:

1. Appropriate evaluation requires a multidisciplinary team approach that examines multiple domains of functioning and provides a profile of the child's strengths and weaknesses.
2. The standard of care for autism evaluation should include three stages: conducting a medical and developmental history; completing a comprehensive developmental evaluation that addresses cognitive, language, adaptive, play, affective, sensory, behavioral and motor skills; and for uncertain cases, a specialized diagnostic evaluation, completed by a highly skilled clinician, using gold standard tools. Information from all stages of evaluation must be integrated into recommendations for intervention or educational programming.

1. The standard of care must include providing results to parents in a cohesive, concise summary with supportive, ongoing counseling provided immediately following.
3. In order to increase the capacity within Pennsylvania to provide appropriate diagnosis and assessment of children with autism, the protocol described in this report should be integrated into an *interdisciplinary* curriculum to train clinicians and educators. Training should occur at different levels of professional training, from undergraduate through continuing education. This training should also be integrated with training offered to professionals within the Department of Education.
4. Implementation of this protocol should include a system to monitor and maintain quality of assessments through ongoing evaluations and training.

5. All efforts should be overseen by an advisory board that includes diverse representation from different disciplines and families of children with autism.

2. In order to ensure that this protocol is implemented in an efficient and effective manner, collaboration between the mental health/mental retardation and education systems and coordination of their resources must be improved and should include developing a shared standard for diagnosis and assessment.
6. In order to create clinician incentives for appropriate diagnosis and assessment, insurers must be required to reimburse for an interdisciplinary team conducting this protocol as part of the assessment process.

Introduction

Children with an Autism Spectrum Disorder have primary symptoms in three domains, including deficits in social interaction, deficits in communication and/or restricted, repetitive and stereotyped behavior and activities. The *Diagnostic and Statistical Manual, 4th Edition, Text Revised* (DSM-IV-TR, 2000) (see Table 2) lists diagnostic criteria for each disorder within the spectrum, including Autism, Asperger's Disorder Pervasive Developmental Disorder – Not Otherwise Specified (PDD-NOS), Childhood Disintegrative Disorder and Rett's Disorder. For the purposes of this document, we will use autism to refer to Autism, Asperger's Disorder and/or Pervasive Developmental Disorder – Not Otherwise Specified, unless noted otherwise. Discussion of the evaluation and diagnosis of children with Childhood Disintegrative Disorder and Rett's Disorder is outside of the scope of this document.

Recent epidemiologic studies have confirmed an increased prevalence of children diagnosed with autism (3-6 per 1,000 children) creating a need for more diagnostic, assessment and intervention supports (Fombonne 2005). Although there is some disagreement in the field about whether it is autism identification or autism prevalence that is actually increasing (Yeargin-Allsopp, Rice et al. 2003; Chakrabarti and Fombonne 2005; Fombonne 2005; Newschaffer, Falb et al. 2005; Bhasin, Brocksen et al. 2006; Williams, Higgins et al. 2006) there is agreement that early identification and referral for high quality, intensive interventions are crucial for improving outcomes with these children. Therefore,

it is important that these individuals be identified as soon as possible to expedite appropriate intervention and other supports (Lord and McGee 2001).

Early Detection

Early identification provides for earlier educational planning and intervention, family support and delivery of appropriate medical care to the child (Filipek, Accardo et al. 1999). Research on the effects of early intervention and treatment has shown that it results in improvements in developmental progress, language production, and amelioration of negative behaviors (Eaves and Ho 2004; Howlin 2005; Lord, Wagner et al. 2005; Sallows and Graupner 2005; Adams, Lloyd et al. 2006; Matson 2006). Despite the importance of early identification and intervention, a number of studies have suggested that many children are not diagnosed until school age (Howlin and Asgharian 1999) despite the fact that many parents report they noticed difficulties before age 3 years. A recent report described significant disparity in age of diagnosis according to race, where poor white children received a diagnosis at average 6.3 years and poor black children at 7.9 years (Mandell, Listerud et al. 2002). While studies of newer tools for early identification hold promise for the potential of very early identification, (Eaves and Ho 2004) much work needs to be done to ensure that appropriate strategies are implemented in community settings.

In recognition of the potentially profoundly impairing nature of autism and the importance of its early detection, federal law (The Individuals with Disabilities Education Act, Amendments of 1990 and 1997) mandates that states provide for a comprehensive, multidisciplinary evaluation to determine the appropriate

services. The legislation does not specify, however, how exactly these activities are to be carried out, with states taking very different approaches and having different levels of specificity in their guidelines for the identification of children with autism (Stahmer and Mandell 2006).

In order to improve early identification and timely referral to appropriate treatment services in Pennsylvania, families must have access to qualified professionals to accurately determine the diagnosis of autism. In Pennsylvania only licensed psychologists, certified school psychologists and physicians may provide a diagnosis of autism that qualifies children for specialized educational services or Medicaid reimbursement. A recent survey of 1000 families in Pennsylvania with a child with autism revealed that the most common diagnosing professionals are psychologists, developmental pediatricians and psychiatrists (Mandell, 2006, personal communication). The diagnosis of autism is not required for eligibility for early intervention services. The diagnosis does, however, assist educators and developmental therapists in to design appropriate and relevant interventions and families to obtain behavioral health services (as appropriate).

Pennsylvania's Evaluation & Service System for Individuals with Autism

In Pennsylvania families may access evaluation services for children with suspected developmental delays or disabilities (including autism) through different and disparate systems. The primary means of early identification through the education system is Child Find. Child Find is a state funded system to identify, locate and evaluate children residing in Pennsylvania who are

suspected of having disabilities and determine the child's need for special education and related services. Children may be referred by their primary care pediatrician (COCWD 2006) or by families.

Children and youth with autism are often involved in multiple service systems concurrently, including physical health, behavioral health, mental retardation, child welfare, education and juvenile justice systems. This often results in duplication of evaluations and other services and poorly coordinated care. In each of these systems there is little quality control regarding evaluations and lack of prescribed treatments and interventions.

To illustrate this multisystem conundrum consider the following: evaluations may be pursued through the education system, medical system, mental health system or private individual practitioners. In the *education system*, early intervention evaluations and services for children ages birth to three are financed through county MH/MR Early Intervention programs. For children ages 3-5, early intervention services are administered through the education system, mainly through Intermediate Units and some school districts. Once children reach kindergarten age, they are evaluated and served by their school districts until they are 21 years old. In the Birth to Three system evaluations must be completed in no more than 45 days. In the education system (3-21 years of age) the time from parental consent to the completion of the evaluation must be no more than 60 days. The content and structure of these evaluations varies depending on the system in which they are conducted. The evaluation team includes some or all of the following: school psychology, special education,

speech/language therapy and occupational therapy. The *physical and behavioral health* systems provide evaluation resources through specialized clinics or programs centered in tertiary care medical centers (often associated with a University) or private practitioners, including developmental and behavioral pediatricians and/or child neurologists. However, in many subspecialty interdisciplinary programs located in tertiary medical centers there may be a 6-12 month waitlist for appointments. Behavioral health professionals, including pediatric psychologists and child psychiatrists, may also be sources of evaluation. Psychologists or psychiatrists may be members of an interdisciplinary team or individual practitioners.

The provision of comprehensive and accurate diagnostic assessments for autism in the health system are complicated because reimbursement rates do not take into account the fact that appropriate assessment requires a multidisciplinary team that collects information from multiple sources. Another challenge is that third party payers often do not recognize autism as a covered diagnosis. It is a challenge to obtain an accurate diagnosis of autism within the typical reimbursement structure of insurance carriers for initial evaluations for children and adolescents in mental health clinics. Extended evaluations which are often necessary to identify co-morbid medical, behavioral and emotional difficulties may not be reimbursed. These two issues affect the quality of the evaluations and the accuracy of the diagnosis. Currently, some insurance carriers identify “preferred providers” because they meet insurance companies’ standards of care for assessments; however, there are no *consistent*

standardized assessment instruments or standards recommended across insurance carriers.

These challenges and disparities reinforce the critical need for more qualified and accessible diagnostic teams and professionals in Pennsylvania as well as cross system coordination. With that in mind, the report of this workgroup is meant to provide recommendations for effective, evidence-based evaluation and diagnostic procedures so children are identified and families' concerns are addressed in a timely and effective manner.

Core Concepts Guiding Evaluation

Assessment of children with ASD is multifaceted, with a number of stages (see figure 1). The vital components include early identification of children with suspected autism, developmental evaluation and diagnostic evaluation. Input from parents and family to the evaluation process is absolutely critical. Parents know their children's symptoms and functioning, including their strengths, challenges and the activities the child and family enjoy or avoid.

Identification of children who are at risk or suspected of having developmental delay should be conducted using standardized screening tools. A positive screen should result in referral of children for further evaluation. School personnel of infant and preschool programs and primary care medical providers at well child check-ups are well situated for screening and early identification. If screening procedures result in concerns in social, behavioral or communication domains, an autism-specific screening should be a logical next step. If autism specific screening indicates risk for autism, a formal evaluation as described in Stage 1 (see figure 1) should be initiated. Children who are particularly at risk for autism, such as siblings of children with a diagnosis of autism, should receive regular and careful assessments, even if they do not presently manifest symptoms of autism.

Stage 1 of the evaluation process, involves review of the child's records, interviews with the parents, observations of the child and administration of various evaluation measures. To inform the evaluation team about the child's

past history, parents should complete questionnaires to provide medical and developmental information about their child.

Stage 2 comprises a thorough developmental diagnostic evaluation, which provides an overview of the child's developmental strengths and weaknesses. Evaluations and observations may support whether the child meets criteria for an ASD. Results of the evaluation guide the team in recommendation and selection of appropriate treatment(s) and appropriate medical investigation for etiology and co-morbid conditions. Evaluations also can be used to monitor high-risk children (e.g., children with genetic disorders which are frequently associated with autism or siblings of children with autism). To this end, the workgroup emphasizes the need to enhance ability of caregivers to provide a means of timely early identification and screening.

A major challenge in training clinicians to complete these tasks is to help them to recognize the crucial importance of differential diagnosis. Examiners must be knowledgeable about developmental progress in typical children and the range of developmental disabilities in order to make an accurate differential diagnosis. Children with other developmental or medical conditions may manifest some of the symptoms of autism. For example, examiners should differentiate children with autism from children with specific language impairment, mental retardation/intellectual disability and attention-deficit/ hyperactivity disorder and other psychiatric and developmental conditions. In Pennsylvania there is a significant lack of skilled, experienced clinicians who can make an

accurate diagnosis of autism in situations in which other clinical complexities exist.

Evaluation of children with autism may be complex. It typically requires synthesizing information from multiple informants, including parents, caregivers, pediatricians, therapists and teachers. The team must have a leader who can summarize the results of the discipline-specific evaluations in to a comprehensive report for parents. It also requires careful observation of the child in a variety of contexts using a variety of procedures. The need for multiple sources of information must be balanced against the urgency associated with the assessment of children with autism. An extended delay in obtaining an evaluation prolongs anxiety for the family and delays intervention. Parents who are concerned that their child may have autism want to understand their child and are understandably eager to obtain a definitive diagnosis as soon as possible. In addition, since research suggests that the earlier and more intensive the intervention is carried out, the better the outcome, it is important to complete assessments in as timely and efficient a way as possible

To make an accurate diagnosis the team must view children in the context of their functional developmental level, including cognitive, language, adaptive, social and emotional skills. Other factors to take in to consideration include the context in which the child is observed - with his family, in his home setting, at school, in a clinic setting and who is providing the information. It is vital that examiners use valid and reliable tools to supplement their skilled clinical observations and clinical judgment. Formal questionnaires and interviews can be

used as a guide in obtaining information, but must be interpreted with regard to their diagnostic reliability and validity with respect to the age of the child. Interview data gathered should be specific to the age of the child, which highlights the need for experienced and knowledgeable clinicians. A number of factors need to be evaluated when choosing an assessment tool. The level of the diagnostic evaluation being completed helps to determine how important each factor is and the level of training that is required for the administrator. Please see Table 3 for factors to consider.

At the July 2006 meeting members of the workgroup divided into the following 4 groups to discuss issues of evaluation and diagnosis for children in different age groups and level of functioning: 1) 0-3 years old, 2) 3-5 years old, 3) 6 years or older with high verbal abilities (average or better on formal assessment scores) and 4) 6 years or older with lower verbal abilities or cognitive delays. Each group described specific issues to be taken into account during the evaluation, but there were common themes for all the children.

The workgroup then conceptualized the assessment process (as outlined above) as transpiring in three stages. Please see figure 1 for the Algorithm and Table 4 for suggested tools by stage. A central aspect of the proposed procedures is that information from the preceding stage is carried forward in a systematic fashion to the subsequent stage, so that redundancy is minimized.

Evaluation Procedures

The recommended evaluation procedure has three stages: Stage 1 – collection of pertinent historical information, Stage 2 – a comprehensive developmental assessment and Stage 3 – *Autism specific* diagnostic evaluation. As noted, at each stage the workgroup suggests specific practices or procedures, which are listed in Table 4. This listing of tools is not exhaustive, and is not meant to exclude the use of other assessment tools as well. Over time, new tools will be developed, evaluated and may be appropriate for use. A description of each tool is found in the index in Table 5. Please see figure 1 for an overview of the proposed evaluation process.

Characteristics of Evaluation Tools

There is no biologically based test that unequivocally makes an autism diagnosis because there are no biological markers or other physical signs that are consistently associated with the disorder. Since the autism spectrum is characterized by heterogeneity, an autism diagnosis is made based on clinical judgment of behavioral symptoms. These symptoms are described in the DSM-IV-TR (see table 2). While the DSM-IV-TR describes disorders based on their symptoms, it does not take into account developmental, cultural or medical conditions that may have an impact on clinical presentation. Furthermore, DSM diagnoses are not based on norms, and diagnostic thresholds or cut points have not typically been empirically tested.

When the DSM was prepared in 1952 by a large contingent of clinicians and researchers from many disciplines the goal was to promote agreement among clinicians with varying backgrounds and experience by establishing diagnostic criteria for disorders. Few data are available about diagnostic reliability of use of the DSM-IV criteria by clinicians with varying experience and training, however (Klin, Lang et al. 2000). Some field trials have compared the reliability of DSM-IV or DSM-III based diagnosis against a clinician experienced in autism diagnosis. Klin and colleagues (Klin, Lang et al. 2000) reported significant improvement in diagnostic reliability when inexperienced raters used the DSM-IV criteria. To date the DSM has not been tested in any systematic fashion against “gold standard” diagnostic tools such as the ADI-R or ADOS. This may be a circular argument, as the true “gold standard” for diagnosis is considered to be an experienced clinician applying DSM-IV-TR criteria.

To evaluate how well a measure predicts a diagnosis, it is necessary to compare results of the measure with the results of some “gold standard” that is presumably more definitive. For example, to test how well Scale ”X” (such as a screening tool) identifies children with an autism, it is necessary to have another measure of autism (Measure ”Y”), that is treated as the “gold standard” for the diagnosis. In the case of autism, there is no single definitive gold standard, rather there are several procedures, each prone to different types of error, whereby clinicians make diagnoses. For example, some clinicians may make a diagnostic decision about a child based on the ADI-R (Autism Diagnostic Interview-Revised) and the ADOS (Autism Diagnostic Observation Schedule),

whereas another group of clinicians may make a diagnostic decision about the same child using DSM criteria- based rating scales, a clinical interview with the parents, administration of various tests and/or informal play procedures. Which of these procedures should serve as the "gold standard" is a judgment call. It is not evident which procedure is "better," because, as noted above, there is no absolute standard against which to compare either of them.

Despite the fact that there is no absolute gold standard tool for diagnosis of autism, researchers often compare diagnostic measures with one another to determine how similarly the two measures classify the children. Classification decisions for groups of children on the two measures are typically compared using six statistics typically obtained from 2x2 cross-tabulations. *Sensitivity* is the percentage of children diagnosed on the "gold standard" who were also diagnosed on the screening or evaluation measure(s). *Specificity* is the percentage of children not diagnosed using the "gold standard" who also were not diagnosed using the screening or evaluation measure(s). *Positive Predictive Value* is the percentage of children who were diagnosed (positively) using the screening or evaluation measure and who were also diagnosed as having the disorder using the "gold standard." *Negative Predictive Value* is the percentage of children who were not diagnosed as having the disorder on the screening or evaluation measure and who also were diagnosed as not having the disorder using the "gold standard." *Consistent Classification* is the percentage of all the children classified who had the same status on both measures. *Kappa* is the chance-corrected correlation coefficient between two dichotomous measures.

Process at Each Stage Of Evaluation

Stage 1 begins with a trained intake worker who will collect demographic information and referral concerns from the caregiver. For school age children of whom there is a question of an autism diagnosis, a member of the Child Study Team might complete the intake. If there are no concerns regarding a possible diagnosis of autism, red flags or high risk status, the intake coordinator should assist in referral to other evaluation resources. If the early intervention or education system is not involved, the intake coordinator should provide the family with the contact information and support them in the process of entry into that system. If red flags or high-risk status are identified and the family is already involved in the early intervention or education system, then the intake worker should ensure coordination. In some localities, it may be that the early intervention team would conduct the Stage 1 evaluation. If not, the intake worker should forward this information to a trained intake coordinator who should start the process of Stage 1.

In Stage 1, referral concerns and background history information should be obtained by a trained intake coordinator and recorded in an intake form. The parental interview should focus on questions necessary to decide if developmental concerns give any indication of autism. The Stage 1 interdisciplinary evaluation team should include social workers, intake coordinators, family service managers, members of the child study team and other people with expertise and understanding about treatment of children with disabilities, in particular autism. The intake coordinator should provide the family

with a parent history form, on which the family should record information about the child's medical history, birth history, hearing status, developmental status and other issues. Please see Table 4 for suggested historical information which should be collected. If the referral source or the family indicates that completion of the written questionnaire is a problem, the team should provide support to complete this, which might include completion of the form by telephone interview or enlisting the assistance of the child's family physician. The family should be requested to forward copies of any previous evaluations or concerns expressed by previous caregivers. If needed, the Intake Coordinator will assist the family with procuring the records. The Intake Coordinator will also provide the family with copies of one or more general developmental questionnaires (to be completed by parents and teachers if available) which will assist the team in the next stage of evaluation. See Table 4 for possible tools.

Once all data are received, the Intake coordinator should review the information. She should score the developmental questionnaire(s) and include scores in the file. The intake coordinator should check for completeness and complete a summary form**.** The packet of information, including the summary, parent history form and previous records should be forwarded to the care manager or team leader of the evaluation group or child study team, who will review the information with the intake coordinator and determine if the profile is consistent with a diagnosis of autism or if other developmental or behavioral disorders should be considered. At this phase, a care manager or team leader of the evaluation group may recommend additional (brief) autism-specific

questionnaires (e.g., M-CHAT, Social Communication Questionnaire, or others). Based on the information from Stage 1, the evaluation team will determine what type of Comprehensive Developmental Evaluation is appropriate.

Stage 2

Children with or at risk of a diagnosis of autism must be evaluated using a developmental perspective (Ozonoff, Goodlin-Jones et al. 2005) and by examining their strengths and weaknesses. This will assist the team in developing a differential diagnosis, and, if the diagnosis is confirmed, determining what associated cognitive or developmental issues may affect treatment decisions. A lead clinician, educator or case manager with training and experience working with children with autism should be responsible for reviewing and integrating available information to guide the focus of the evaluation. The team should include professionals with extensive experience, training and skill in conducting functional, cognitive, educational, communication, behavioral and sensory-motor evaluations. The team should be led by or in close consultation with a licensed professional who may make a diagnosis of autism. Credentials for the leader of Stage 2 evaluations should include extensive experience and certification/licensure in a relevant specialty such as speech-language pathology, clinical psychology, occupational therapy, clinical social work, behavioral analysis, developmental and/or behavioral pediatrics, child psychiatry, special education and others.

If necessary, the clinical team will select appropriate tools for developmental evaluation including cognition, communication, adaptive skills,

play, social, sensory, behavior and motor domains (see Table 4). Team members will complete their observations of the child and compare their observations to DSM-IV-TR criteria. One method of doing this might be to apply a Likert scale to each DSM-IV-TR item, signifying the team members' impression of the frequency of symptoms (e.g., 0=not at all, 1= infrequent, 2= often, 3= very often), see table 6 for a possible format. If not done in Stage 1, Autism-specific questionnaires may be administered to assist the team in the determination. See table 4 for suggested instruments.

Depending on the chronological and developmental age of the child, portions of the evaluation should occur in the home, clinic, school and classroom. Skilled clinical observations should occur across varying environments. Instruments will vary according to the age of the child, and some may be more naturalistic whereas others will be standardized tests. Please see table 4 for a listing of instruments according to age. Regardless of the instruments used, the following domains should be assessed and the child's status in each domain summarized in the evaluation report: a) cognitive skills, (b) language skills, (c) adaptive behavior skills, (d) developmental/ academic skills, (e) play skills, (f) social interaction skills, (g) sensory-motor skills and (h) behavioral/emotional adjustment. Each examiner who works with the child should independently complete a checklist that corresponds with DSM-IV-TR criteria (APA, 2000), with descriptions of characteristics the child has that are consistent with each level of criteria (see sample in Table 5). Examiners may also wish to independently complete an observation tool such as the CARS (Childhood Autism Rating

Scale). The output of Stage 2 should include at least two components: (1) an explicitly stated diagnostic judgment based on all the data collected as to the presence or absence of an autistic condition or recommendations to clarify the diagnosis (e.g., move on to Stage 3) and (2) a description and summary of scores to provide a profile of the child's skills in each of the domains assessed.

Stage 3

A Stage 3 evaluation is only necessary for children whose diagnostic status is still unclear at the end of Stage 2 or when the treatment team would like further clarification of the child's strengths and weaknesses to help guide treatment. In Stage 3, a diagnostic evaluation for autism may be conducted by a single clinician who has specialized training in formal diagnostic evaluations (e.g., a licensed psychologist, developmental/ behavioral pediatrician or child psychiatrist) and extensive clinical experience. The team of clinicians should be led by or supervised by a physician or psychologist licensed in Pennsylvania to make a diagnosis of autism. The evaluation team expertise may include clinical psychology, clinical social work, developmental and behavioral pediatrics, child psychiatry, special education and/or speech/language therapy. The primary credential should be strong clinical experience in evaluation and diagnosis of children with autism. Not every program or facility may have the resources, personnel or expertise to complete a Stage 3 evaluation. A system should be established which includes collaboration with other teams that can provide the evaluation or referral to other locations such as a tertiary care center or

practitioner in the community who is skilled and trained in the diagnosis of autism.

Stage 3 evaluations will often involve administration of very specialized instruments such as the ADI-R (Autism Diagnostic Interview-Revised) and the ADOS (Autism Diagnostic Observation Schedule). Caution must be taken to assure appropriate training and supervision of personnel who will administer these complex tools. Since training and implementation of these tools are so time-intensive there is potential for a clinician or educator who has not had formal training in the tool and adequate supervision to use these tools in an invalid manner. Each center or program which has personnel that administers the ADI-R or ADOS must develop adequate systems of maintaining adequate validity and reliability of the ADI-R and ADOS, according to published standards (e.g., 90% and 80% reliability, respectively). The evaluation should include observation of the child and family in different settings. If observation in a school setting is not possible, a videotape of typical behavior of the child will provide valuable information. If that is not available, the team should have access to a narrative of observations by the child's educator, developmental or behavioral therapist. As in Stage 2, a lead clinician (or it might be the only evaluator) should be responsible for reviewing and integrating available information to guide the focus of the evaluation. The team should be provided with all the data from previous evaluations at earlier stages.

Treatment Plan Based on Evaluation Results

Whether the child progresses to Stage 2 or Stage 3, the evaluation team should collaborate with service providers in multiple systems to develop an appropriate treatment plan. Examples of appropriate treatments based on results of the evaluation might include behavioral-based intervention, social skills support, pragmatic language treatment, and many others.

Integrating Different Systems In To The Process

It is the obligation of the evaluation and treatment teams to communicate with the child and family's educational, developmental and medical care providers. This may include referral back to primary care physicians for ongoing medical follow-up, medical investigation for etiology and medical management of associated problems. Based on results of the developmental evaluations and associated deficits such as cognitive impairment the primary care physician may want to refer the child for further evaluation by specialists such as pediatric neurology, genetics or child psychiatry. There is a need for closer cooperation and collaboration between the other systems involved in evaluation. Currently there is great redundancy, and families often have to endure separate evaluations for services in different systems.

Formulation of Results Of Evaluations and Feedback Of Results

Providing feedback to the family, which will assist them in choosing appropriate treatments for their child, is one of the most important aspects of the evaluation process. Team members should synthesize findings into an easy to read, coherent summary. Such a format has been described in the California Department of Developmental Services, *Autistic Spectrum Disorders: Best*

Practice Guidelines for Screening, Diagnosis and Assessment (2002; www.ddhealthinfo.org). A complete report should include identifying information, review of previous evaluations, medical, developmental and behavioral history, results from standardized testing, results from direct observation, how the results compare to DSM-IV-TR criteria, summary and diagnostic impressions and recommendations. Teams are encouraged to seek support and training for appropriate parent counseling and support.

Challenges of Evaluation

There are many challenges to evaluating children with suspected autism based on the systems responsible for those evaluations as well as the clinical characteristics of the child. Below, we detail some of these challenges, focusing first on system level and then on clinical issues.

Early Intervention – 0-3 years old

The mandate under IDEA, Part C is to develop and implement a statewide, comprehensive, coordinated, multidisciplinary, interagency system that provides early intervention services for infants and toddlers with disabilities and their families. Early Intervention for up to age 3 years provides evaluation to determine eligibility for services and develop an Individualized Family Service Plan. The evaluation is most often completed in the home and is not meant to produce a diagnosis. Therefore it is vital that early intervention staff members are trained in screening for autism in children who present with concerns in communication, social and/or behavioral domains. Support for parents at this

stage of screening is also critical when screening indicates risk for autism. Referral to qualified Stage 1 evaluation teams would be a logical next step.

Major hurdles include the lack of orientation in this system towards attaining a specific diagnosis and frequent lack of personnel specifically trained to complete a diagnostic evaluation of a young child with autism. One model of care to overcome these hurdles might be to collaborate with 3-5 (Intermediate Unit) and establish a team of evaluators (at Stage 2 and/or Stage 3 level) who would work with children and families from EI and from the IU. Each child in early intervention who has language, social and/or behavioral difficulties or delays should be screened with an Autism specific screener (e.g., M-CHAT for children 18 months to 30 months) and then referred for evaluation to the team. Chester County Intermediate Unit has been piloting such a model.

Preschool evaluation (ages 3-5 years)

The mandate under IDEA, Part B for preschoolers is similar to Part C. In Pennsylvania, Intermediate Units, School Districts or agencies that enter into a Mutually Agreed upon Written Arrangement (MAWA) with Pennsylvania Department of Education (PDE) are responsible for identifying all children ages 3 to 5 years who are eligible for early intervention services in their designated geographical area. This evaluation may or may not yield a diagnosis or probability of a diagnosis. In conducting the evaluation the educational agency must “use a variety of assessment tools and strategies to gather relevant functional, developmental and academic information including information provided by the parent that may assist in determining 1) whether the child is a

child with a disability; and 2) the content of the child's individualized education program. Furthermore the law requires the "use of technically sound instruments that may assess the relative contribution of cognitive and behavioral factors in addition to physical or developmental factors," (section 614). Depending on the expertise of the individual MAWA's evaluation team, red flags for autism may be identified and further autism specific evaluation will be conducted or referral for further autism evaluation will ensue. Again, it is essential that preschool early intervention staff members are trained in screening for ASD in children who present with concerns in communication, social and or behavioral domains. Support for parents at this stage of screening is also critical when screening indicates risk for autism. Referral to qualified Stage 1 evaluation teams would be a logical next step. Thus, it is very important to modify the system so that children who clearly display autistic conditions or symptoms in the 0-3 age range can be properly diagnosed.

Some children who have not been diagnosed or identified in the 0-3 age range may come to professional attention because they begin to manifest difficulties when they enter preschool. Such children may have higher functioning skills (e.g., they may have age appropriate language skills, good nonverbal abilities and some degree of social interaction), so they may be more challenging to diagnose. Parents may have had some concerns about their child's development, but not enough to prompt them to seek an evaluation. More difficulties may manifest in such children when they enter a group situation, where there are greater demands for social interaction with peers, for social use

of language, behavioral flexibility and interactive play. Teacher concern may then prompt parents to seek an evaluation. Thus, it is vital that an assessment of a child in the 3-5 year age range include input from teachers and observation in a group setting if the child attends a group program.

School age child (over age 5 years)

The mandate under IDEA states that the local educational agency (School District in Pennsylvania) is responsible for evaluating school age children to determine eligibility for special education services. The content and process of evaluation to determine eligibility must adhere to the same requirements as the 3-5 educational agencies (see above). If students are 16 years of age (or younger if appropriate), transition to adult life must be an area of assessment and programming as well (§300.320). A mechanism should be developed to screen children already enrolled in the special education system (who have social and/or communicative deficits) for possible autism. Educators should be trained to identify potential red flag behaviors in the older child who is not enrolled in special education (e.g., difficulties with peer interaction, unusual language, and others).

The child over 5 years who has significant global developmental delays, cognitive impairment and/or severe language impairment presents special challenges. It is sometimes difficult to distinguish cognitive delays with “autistic behavior” versus autism with concurrent cognitive impairment. To complicate matters, many of the tools (e.g., SCQ, ADOS, and ADI-R for example) are not valid in children with cognitive skills below an 18-month level. Thus, the

evaluation team is dependent upon clinical judgment and how the child's characteristics and functional capacities compare to DSM-IV-TR criteria. An accurate diagnosis depends greatly on having a team (or team members) with experience in the evaluation of children with autism and good data about the child's performance in the home and school environment.

The child over 5 years of age who has advanced cognitive and language skills is similarly a challenge. Children with high functioning autism or Asperger disorder will frequently have associated co-morbid behavioral or emotional difficulties (e.g., hyperactivity, anxiety, others), which may complicate the differential diagnosis. In addition, some of the screening and diagnostic tools currently in use were not intended for this population. As in the child with cognitive challenges, an accurate diagnosis is dependent upon a very experienced team (or team members), and good data about the child's performance in the home and school environment.

Co-Morbid Disorders or Symptoms

Many children with autism may also have other associated developmental, behavioral, psychiatric and medical conditions. Behavior difficulties may be related to core features (e.g., perseveration or obsessiveness), co-morbid diagnoses or symptoms (e.g., aggression, disruption, hyperactivity, self-injury and others) or sensory abnormalities. Psychiatric conditions such as anxiety, depression and bipolar disorder are sometimes seen in individuals with autism. Psychiatric symptoms may be influenced by severity of core deficits, cognitive impairments, and/or co-morbid medical disorders. Behavioral difficulties

consistent with symptoms of ADHD also are fairly common and may have a big impact on success in school. Medical issues include higher risk for seizures (25% of individuals over their life span may have seizures). The team must be sensitive to these co-morbid conditions and have team members who are experienced in evaluating these issues or establish collaborations with other disciplines, such as psychology, psychiatry or others.

Quality Assurance

The curriculum for education about autism and training in evaluations must include a system to monitor the quality of evaluations. This will include requirements for ongoing competency according to discipline (including level of expertise for each level of evaluation), standards for ongoing monitoring of accuracy of evaluation, the need for refresher training, establishing reliability for certain tools (e.g., ADOS), updating the listing of recommended evaluation tools and others. Quality assurance will include consensus of measures of reliability across evaluators, frequency of centralized review of requirements and standards. Furthermore, as the field evolves and new or improved tools/processes emerge, this document's relevance will change. It is therefore important to review it on a regular basis.

Recommendations of The Workgroup

3. Appropriate evaluation requires a multidisciplinary team approach that examines multiple domains of functioning and provides a profile of the child's strengths and weaknesses.

4. The standard of care for autism evaluation should include three stages: conducting a medical and developmental history; completing a comprehensive developmental evaluation that addresses cognitive, language, adaptive, play, affective, sensory, behavioral and motor skills; and for uncertain cases, a specialized diagnostic evaluation, completed by a highly skilled clinician, using gold standard tools. Information from all stages of evaluation must be integrated into recommendations for intervention or educational programming.

5. The standard of care must include providing results to parents in a cohesive, concise summary with supportive, ongoing counseling provided immediately following.

6. In order to increase the capacity within Pennsylvania to provide appropriate diagnosis and assessment of children with autism, the protocol described in this report should be integrated into an interdisciplinary curriculum to train clinicians and educators. Training should occur at different levels of professional training, from undergraduate through continuing education. This training should also be integrated with training offered to professionals within the Department of Education.

7. Implementation of this protocol should include a system to monitor and maintain quality of assessments through ongoing evaluations and training.

8. All efforts should be overseen by an advisory board that includes diverse representation from different disciplines and families of children with autism.

9. In order to ensure that this protocol is implemented in an efficient and effective manner, collaboration between the mental health/mental retardation and education systems and coordination of their resources must be improved and should include developing a shared standard for diagnosis and assessment.

10. In order to create clinician incentives for appropriate diagnosis and assessment, insurers must be required to reimburse for an interdisciplinary team conducting this protocol as part of the assessment process.

References

Adams, C., J. Lloyd, et al. (2006). "Exploring the effects of communication intervention for developmental pragmatic language impairments: a signal-generation study." Int J Lang Commun Disord **41**(1): 41-65.

Bhasin, T. K., S. Brocksen, et al. (2006). "Prevalence of four developmental disabilities among children aged 8 years--Metropolitan Atlanta Developmental Disabilities Surveillance Program, 1996 and 2000." MMWR Surveill Summ **55**(1): 1-9.

Chakrabarti, S. and E. Fombonne (2005). "Pervasive developmental disorders in preschool children: confirmation of high prevalence." Am J Psychiatry **162**(6): 1133-41.

COCWD (2006). "Identifying infants and young children with developmental disorders in the Medical Home: An algorithm for developmental surveillance and screening." Pediatrics **118**: 405-420.

Eaves, L. C. and H. H. Ho (2004). "The very early identification of autism: outcome to age 4 1/2-5." J Autism Dev Disord **34**(4): 367-78.

Filipek, P. A., P. J. Accardo, et al. (1999). "The screening and diagnosis of autistic spectrum disorders." J Autism Dev Disord **29**(6): 439-84.

Fombonne, E. (2005). "Epidemiology of autistic disorder and other pervasive developmental disorders." J Clin Psychiatry **66 Suppl 10**: 3-8.

Howlin, P. (2005). "The effectiveness of interventions for children with autism." J Neural Transm Suppl(69): 101-19.

Howlin, P. and A. Asgharian (1999). "The diagnosis of autism and Asperger syndrome: findings from a survey of 770 families." Dev Med Child Neurol **41**(12): 834-9.

Klin, A., J. Lang, et al. (2000). "Brief report: Interrater reliability of clinical diagnosis and DSM-IV criteria for autistic disorder: results of the DSM-IV autism field trial." J Autism Dev Disord **30**(2): 163-7.

Lord, C. and J. McGee, Eds. (2001). Educating Children with Autism. National Research Council. Washington, D.C., National Academy Press.

Lord, C., A. Wagner, et al. (2005). "Challenges in evaluating psychosocial interventions for Autistic Spectrum Disorders." J Autism Dev Disord **35**(6): 695-708; discussion 709-11.

Mandell, D. S., J. Listerud, et al. (2002). "Race differences in the age at diagnosis among medicaid-eligible children with autism." J Am Acad Child Adolesc Psychiatry **41**(12): 1447-53.

Matson, J. L. (2006). "Determining treatment outcome in early intervention programs for autism spectrum disorders: A critical analysis of measurement issues in learning based interventions." Res Dev Disabil.

Newschaffer, C. J., M. D. Falb, et al. (2005). "National autism prevalence trends from United States special education data." Pediatrics **115**(3): e277-82.

Ozonoff, S., B. L. Goodlin-Jones, et al. (2005). "Evidence-based assessment of autism spectrum disorders in children and adolescents." J Clin Child Adolesc Psychol **34**(3): 523-40.

Sallows, G. O. and T. D. Graupner (2005). "Intensive behavioral treatment for children with autism: four-year outcome and predictors." Am J Ment Retard **110**(6): 417-38.

Stahmer, A. C. and D. S. Mandell (2006). "State Infant/Toddler Program Policies for Eligibility and Services Provision for Young Children with Autism." Adm Policy Ment Health.

Williams, J. G., J. P. Higgins, et al. (2006). "Systematic review of prevalence studies of autism spectrum disorders." Arch Dis Child **91**(1): 8-15.

Yeargin-Allsopp, M., C. Rice, et al. (2003). "Prevalence of autism in a US metropolitan area." Jama **289**(1): 49-55.

FIGURE 1 - Algorithm

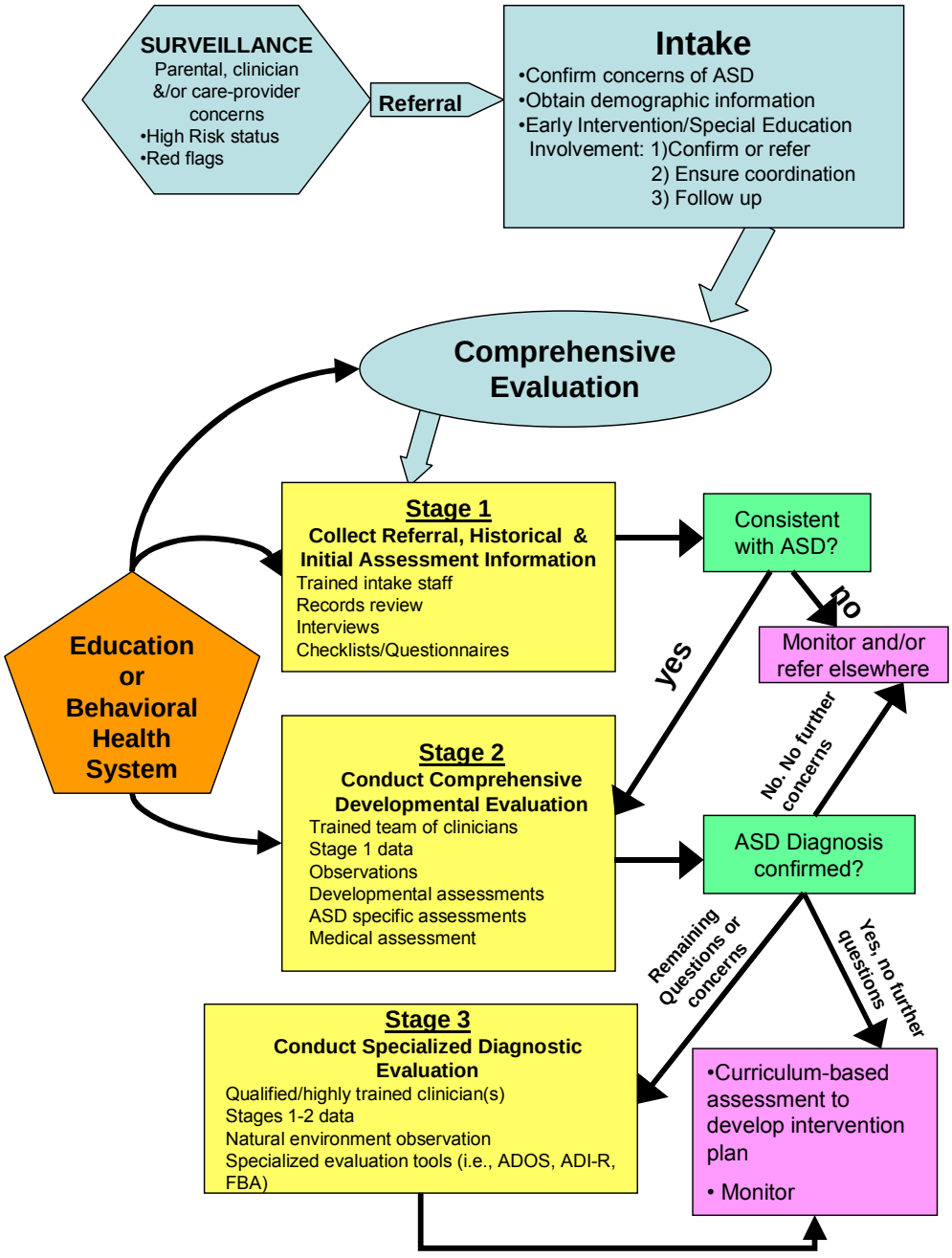

TABLE 1 – List of Participants

Participant	Affiliation	Location
Susan E. Levy, M.D. Chairperson		
David S. Mandell, Sc.D. Co-Chairperson		
Jennifer Sands, Coordinator		
Mary Barbera, R.N., M.S.N., BCBA	Private Practice Parent	Wyomissing, PA
Larry Brown, M.D.	The Children's Hospital of Philadelphia, Neurology	Philadelphia, PA
Pamela Brown	School District of Philadelphia	Philadelphia, PA
Megan Carolan	The Children's Hospital of Philadelphia, Division of Child Development, Rehabilitation and Metabolic Diseases	Philadelphia, PA
Susan Chaplick, M.A., CCC-Sp.	Bryn Mawr College	Bryn Mawr, PA
Mary Anne Delaney, M.D.	Drexel University College of Medicine	Philadelphia, PA
Judith Gravel, CCC-A	The Children's Hospital of Philadelphia, Center for Childhood Communication	Philadelphia, PA
Susan Hyman, Ph.D.	Drexel University College of Medicine, Department of Psychology	Philadelphia, PA
Daniel Ingram, Psy.D.	Lincoln Intermediate Unit 12	New Oxford, PA
Jaures Johnston	School District of Philadelphia	Philadelphia, PA
Susan E. Levy, M.D.	The Children's Hospital of Philadelphia, Division of Child Development, Rehabilitation and Metabolic Diseases	Philadelphia, PA
Carol Lynch	Pennsylvania Department of Public Welfare, Autism Affairs Office	Boothwyn, PA
Richard Malone, M.D.	Drexel University College of Medicine	Philadelphia, PA
David S. Mandell, Sc.D.	Center for Mental Health Policy & Services Research, University of Pennsylvania School of Medicine	Philadelphia, PA

Susan Mayes, Ph.D.	Hershey Medical Center, Department of Psychiatry	Hershey, PA
John McGonigle, Ph.D.	Western Psychiatric Institute	Pittsburgh, PA
Lynn Medley, M.S., CCC-SLP	Medley & Mesaric Therapy Associates	Philadelphia, PA
Scott Myers, M.D.	Geisinger Medical Center	Danville, PA
Harris Rabinovich, M.D.	Community Behavioral Health	Philadelphia, PA
Leslie Rescorla, Ph.D.	Bryn Mawr College	Bryn Mawr, PA
Michele Robins, Ph.D.	The Children's Hospital of Philadelphia, Behavioral Health	Philadelphia, PA
Lois Robinson-Redd	School District of Philadelphia	Philadelphia, PA
Ruby Salazar, L.C.S.W., B.C.D.	Salazar Associates	Clarks Summit, PA Philadelphia, PA
Jennifer Sands, B.S.	The Children's Hospital of Philadelphia, Division of Child Development, Rehabilitation and Metabolic Diseases	Philadelphia, PA
Roseann Schaaf, Ph.D., OTR/L, FAOTA	Thomas Jefferson University, Department of Occupational Therapy	Philadelphia, PA
Margaret Souders, CRNP	The Children's Hospital of Philadelphia, Division of Child Development, Rehabilitation and Metabolic Diseases	Philadelphia, PA
Lawrence R. Sutton, Ph.D.	Bureau of Juvenile Justice Services	New Castle, PA
Cindi Troxell, M.S., CCC-SLP	Lincoln Intermediate Unit 12	New Oxford, PA
Heidi Wettlaufer	The Pennsylvania Training and Technical Assistance Network, Early Intervention	Pittsburgh, PA

TABLE 2 – DSM-IV-TR diagnostic criteria**

Diagnostic criteria for 299.00 Autistic Disorder

A total of six (or more) items from (1), (2), and (3), with at least two from (1), and one each from (2) and (3)

1. Qualitative impairment in social interaction [at least 2]
    a. Marked impairment in use of nonverbal behaviors such as eye-to-eye gaze, facial expression, body postures, and gestures to regulate social interaction.
    b. Failure to develop peer relationships appropriate to developmental level
    c. Lack of spontaneous seeking to share enjoyment, interests or achievements with other people (e.g., by a lack of showing, bringing, or pointing out objects of interest)
    d. Lack of social or emotional reciprocity
2. Qualitative impairments in communication [at least 1]
    a. Delay in, or total lack of, the development of spoken language (not accompanied by an attempt to compensate through alternative modes of communication such as gesture or mime)
    b. n individuals with adequate speech, marked impairment in ability to initiate or sustain a conversation with others
    c. Stereotyped and repetitive use of language or idiosyncratic language
    d. Lack of varied, spontaneous make-believe play or social imitative play appropriate to developmental level
3. Restricted repetitive and stereotyped patterns of behavior, interests, and activities [at least 1]
    a. Encompassing preoccupation with one or more stereotyped and restricted patterns of interest that is abnormal either in intensity or focus
    b. Apparently inflexible adherence to specific, nonfunctional routines or rituals
    c. Stereotyped and repetitive motor mannerisms (e.g., hand or finger flapping or twisting, or complex whole-body movements)
    d. Persistent preoccupation with parts of objects

B. Delays or abnormal functioning in at least one of the following areas, with onset prior to age 3 years: (1) social interaction, (2) language as used in social communication, or (3) symbolic or imaginative play.

Disturbance is not better accounted for by Rett's Disorder or Childhood Disintegrative Disorder.

Diagnostic criteria for 299.80 Asperger's Disorder

Qualitative impairment in social interaction [at least 2]

1. Marked impairment in use of nonverbal behaviors such as eye-to-eye gaze, facial expression, body postures, and gestures to regulate social interaction.

2. Failure to develop peer relationships appropriate to developmental level

3. Lack of spontaneous seeking to share enjoyment, interests or achievements with other people (e.g., by a lack of showing, bringing, or pointing out objects of interest)

4. Lack of social or emotional reciprocity

Restricted repetitive and stereotyped patterns of behavior, interests, and activities [at least 1]

1. Encompassing preoccupation with one or more stereotyped and restricted patterns of interest that is abnormal either in intensity or focus

2. Apparently inflexible adherence to specific, nonfunctional routines or rituals

3. Stereotyped and repetitive motor mannerisms (e.g., hand or finger flapping or twisting, or complex whole-body movements)

4. Persistent preoccupation with parts of objects

The disturbance causes clinically significant impairment in social, occupational, or other important areas of functioning.

There is no clinically significant general delay in language (e.g., single words used by age 2 years, communicative phrases used by age 3 years).

There is no clinically significant delay in cognitive development or in the development of age-appropriate self-help skills, adaptive behavior (other than social interaction), and curiosity about the environment in childhood.

Criteria are not met for another specific Pervasive Developmental Disorder or Schizophrenia.

Pervasive Developmental Disorder Not Otherwise Specified (PDD-NOS)

This category should be used when there is a severe and pervasive impairment in the development of reciprocal social interaction associated with impairment in either verbal and nonverbal communication skills, or with the presence of stereotyped behavior, interests, and activities, but the criteria are not met for a specific Pervasive Developmental Disorder, Schizophrenia, Schizotypal Personality Disorder, or Avoidant Personality Disorder.

Source:
American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders, 4th Edition, Text Revised (DSM-IV-TR). Washington, DC, 2000.

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TABLE 3 - Factors to take into consideration for evaluation

Factor	Screening	Comprehensive Developmental Evaluation***	Complex Specialized Diagnostic Evaluation***
Cost	Inexpensive	Moderate	More Expensive
Time	Brief	Moderate	Time Intensive
User Qualification and/or level of training	No educational requirement; understanding of development and experience working with children	Post baccalaureate certificate with extensive experience working with children £	Graduate level training or as supervisor; plus extensive experience and specific training in tools*
Sensitivity	High	Moderate	Not as Important
Specificity	Low	Moderate	High
Multi-lingual versions available	Very important	Important	Important
Culturally fair	Very Important	Important	Important
Ease of Use	Very Important	Important	Less Important
Specialized equipment/ knowledge needed	No	Yes	Yes, very intensive
Ease of Scoring	Easy	Moderate	Labor intensive
Is instrument readily available?	Yes	Maybe	No
Good reliability	Extremely important	Important	Vital and required**
Good validity	Important	Important	Very Important
Desired outcome	At risk or not at risk; should result in referral for comprehensive evaluation and intervention	Description of strengths and weaknesses; illuminate risk for diagnosis of autism; this may be adequate to confirm diagnosis *May be diagnostic	Provides objective data, using gold standard tools to confirm diagnostic criteria

* Clinician or educator who has completed in depth training in administration of gold-standard tools (e.g., ADOS, ADI-R); strongly recommended that if this person is not at a doctorate level (e.g., Ph.D., ScD, or M.D.) that they work in collaboration with such an individual who is trained and reliable in these tools.

** Inter-rater reliability must be established (between raters at each center), at levels of ≥ 80% for ADOS, > 90% for ADI-R.
£ Some tools may require graduate training in measurement and assessment (see requirements of publisher of tool)
*** If the team is specifying a diagnosis (such as autism) the lead person should have a doctorate or medical degree.

TABLE 4 – Stages of assessment by age

STAGE I – Referral, Historical & Initial Assessment Information

Method	Content
Intake coordinator/ Intake Worker/ Trained interviewer	Current concerns/ onset of issues Narrative (overview) of when concerns arose, and course (keeping in mind core features of ASD)
	Behavioral history –Social skills –Play skills –Peer interaction –Repetitive behaviors/ routines –Sensory issues –Problem behaviors – inattention, hyperactivity, self-stimulation/ others
	Request consent for obtaining all previous records (if not already done)
Medical, Developmental and Behavioral history intake form (parent completed, either independently or with assistance)	*Medical History*: Prenatal, birth history, medical treatments, medications
	Hearing status
	Developmental history of milestone acquisition Language Fine motor/ adaptive Gross motor Regression
Intake worker requests - Parent and Caregiver General Developmental Screening Questionnaires	Examples include Child Behavior Checklist (over 1 ½ yrs), BASC

Clinician or Intake coordinator – record review and synthesis into a summary form for evaluation team.	**Records** –Previous evaluations –Educational records –Language assessment –OT evaluation –Psychological evaluation - Results of previously administered parent, caregiver or teacher questionnaires
Autism Specific Screen	CBCL (subscales of withdrawal, DSM related subscales) M-CHAT (children 18-30 months) SCQ (children over age 4 years, language age over 2 years) ASDS (over age 4 years)

STAGE II – Comprehensive Developmental Evaluation

Information or Tools	0-3 years	3-5 years	≥ 6 years, age level or advanced verbal skills	≥ 6 years, low verbal and/or non-verbal skills
Parent and Caregiver Questionnaires – General (if not already done in Stage I)	CBCL (over 1 ½ yrs) BASC (over 2 yrs)	CBCL BASC	CBCL BASC	CBCL BASC
Clinical observation and interview of parent and child by team. Completion of checklist with DSM-IV-TR criteria (from past history and current assessment) ["checklist"]	DSM-IV-TR - checklist For assistance see Checklist for autism in young children (Mayes)	DSM-IV-TR - checklist	DSM-IV-TR - checklist	DSM-IV-TR - checklist
Developmental assessments (clinical team determines which tools & assessments are appropriate)				
Cognitive – verbal and nonverbal	Bayley Mullens DAS Stanford Binet Leiter	Mullens WPPSI-R DAS Stanford Binet Leiter	WAIS WISC-IV TONI Leiter	Stanford Binet Leiter TONI
Language	LDS (from CBCL) PLS-4 Rosetti Infant Scale Reynell Language Scale REEL CSBS-DP PPVT/ EOWPVT	CELF PPVT EOWPVT	CELF PPVT TLC CCC	CSBS CELF
Adaptive	VABS-2	VABS-2	VABS-2	VABS
Play	SRS MCI Scale			

Affect/ social-emotional reciprocity	Bayley Scales ESCS		SRS	CSBS SRS
Sensory	Sensory Processing Measure (SPM) Infant Toddler Sensory Profile	SPM and/or Sensory Profile Sensory Integration and Praxis Tests (SIPT)	SPM and/or Sensory Profile	SPM
Behavior	CBCL	CBCL	VABS ABAS-2 ABS SIB-R	
Motor	Peabody Developmental Motor Scale - 2	Peabody Developmental Motor Scale – 2	Bruinicks-Oseretsky Test of Motor Proficiency	Cinical Observation of Posture and Motor control
Autism Specific Assessment				
Questionnaires	PDDBI SCQ (over age 4 years) PIA	ASDS (over 4 years) SCQ (≥ 4yrs) PIA PDDBI	SCQ ASDS PDDBI	SCQ PDDBI
Observational	STAT Greenspan Social-emotional growth chart CARS M-CHAT FEAS PDDBI	CARS	CARS	CARS

STAGE III – Specialized Diagnostic Evaluation

Features	0-3 years	3-5 years	≥ 6 years, high verbal	≥ 6 years, low verbal
Observation for child's function and comparison with DSM-IV-TR criteria	Observation in the home environment	Observation in the school and home environment	Observation in the school and home environment	Observation in the school and home environment
ADI-R	For children with mental age over 2 years	For children with mental age over 2 years		
ADOS	Module 1 or 2 (according to language age)	Module 2 (unless language age <2 years); for high functioning (usually over age 4 years) use Module 3	Module 3 through mid-teens Module 4 teenager to adult	Module 1, 2 or 3 (according to language age) Note: in -older children with significant cognitive impairment ADOS may not be appropriate; may have to rely on clinical judgment.
FBA (functional behavioral assessment)				
Feedback to pediatrician or family doctor: Discuss with pediatrician or family MD if referral to specialist such as DP, Neurology, Psychiatry, Genetics or other is appropriate for evaluation for etiology and/or associated problems				

KEY FOR ABBREVIATIONS

ABAS-2 – Adaptive Behavior Assessment System, Second Edition
ABS-S:2 – AMMR Adaptive Behavior Scales-School
ASDS – Asperger Syndrome Diagnostic Scale
ADI-R – Autism Diagnostic Interview-Revised
ADOS – Autism Diagnostic Observation Schedule
ASIEP-2 – Autism Screening Instrument for Educational Planning
AQ – Autism-spectrum Quotient
BAYLEY-III – Bayley Scales of Infant and Toddler Development
BASC-2 – Behavior Assessment System for Children, Second Edition

BEERY VMI – The Beery-Buktenica Test of Visual Motor Integration, Fifth Edition
CALS – Checklist of Adaptive Living Skills
CBCL – Child Behavior Checklist
CAST – Childhood Asperger Syndrome Test
CARS – Childhood Autism Rating Scale
CHAT – Checklist for Autism in Toddlers
CCC-2 – Children's Communication Checklist, Second Edition
CELF – Clinical Evaluation of Language Function-Preschool, Second Edition
CELF-4 – Clinical Evaluation of Language Fundamentals, Fourth Edition
CSBS-DP – Communication and Symbolic Behavior Scales-Developmental Profile
CASL – Comprehensive Assessment of Spoken Language
DISCO – Diagnostic Interview for Social and Communication Disorders
DAS-II – Differential Ability Scales, Second Edition
DSM-IV-TR – Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision
ESCS – Early Social-Communication Scales
EOWPVT – Expressive One-Word Picture Vocabulary Test, 2000 Edition
FBA – Functional Behavior Assessment
FAST – Functional Analysis Screening Tool
FEAS – Functional Emotional Assessment Scale
GADS – Gilliam Asperger's Disorder Scale
GARS-2 – Gilliam Autism Rating Scale, Second Edition
KADI – Krug Asperger's Disorder Index
LDS – Language Development Survey
Leiter-R – Leiter International Performance Scale-Revised
M-CHAT – Modified Checklist for Autism in Toddlers
MCI – Mother Child interaction scale
Mullens – Mullens Scale of Early Development
MVPT-3 – Motor-Free Visual Perception Test, Third Edition
PIA – Parent Interview for Autism
PDDBI – PDD Behavior Inventory
PDMS-2 – Peabody Developmental Motor Scales, Second Edition
PPVT-III – Peabody Picture Vocabulary Test, Third Edition
PEDI – Pediatric Evaluation of Disability Inventory
PLS-4 – Preschool Language Scale, Fourth Edition

PEP-3 – Psychoeducational Profile
REEL-3 – Receptive-Expressive Emergent Language Scale, Third Edition
RDLS – Reynell Language Development Scales
SIB-R – Scales of Independent Behavior-Revised
STAT – Screening Tool for Autism in Two Year Olds
SIPT – Sensory Integration and Praxis Tests
SPM – Sensory Processing Measure
SCQ – Social Communication Questionnaire
SRS – Social Responsiveness Scale
SB5 – Stanford-Binet Intelligence Scales, Fifth Edition
TLC-Expanded – Test of Language Competence-Expanded Edition
TOLD – Test of Language Development
TONI-3 – Test of Nonverbal Intelligence, Third Edition
TVPS-3 – Test of Visual Perceptual Skills (non-motor), Third Edition
UNIT – Universal Nonverbal Intelligence Test
VABS-2 – Vineland Adaptive Behavior Scales, Second Edition
WAIS-III – Wechsler Adult Intelligence Scale, Third Edition
WISC-IV – Wechsler Intelligence Scale for Children, Fourth Edition
WPPSI-IIIR – Wechsler Preschool and Primary Scale of Intelligence, Third Edition-Revised

TABLE 5 – Index of standardized tools

Tool	Ages	Format	Time to complete	Training *	Purpose	Source
Adaptive Behavior Assessment System, Second Edition (ABAS-2)	birth – 89.11 years	Questionnaire	15 – 20 minutes	Min	o Adaptive skills functioning assessment o Assess the ten specific adaptive skills areas specified in the DSM-IV	Purchase: Harcourt Assessment http://harcourtassessment.com/
AAMR Adaptive Behavior Scales-School (ABS-S:2)	3.0 years – 18.11 years	Questionnaire	15 – 30 minutes	Min	o Assess current functioning of children being evaluated for evidence of mental retardation o Evaluate adaptive behavior characteristics of children with autism o Differentiate children with behavior disorders who require special education assistance from those with behavior programs who can be educated in regular class programs	Purchase: Pro-Ed www.proedinc.com

Asperger Syndrome Diagnostic Scale (ASDS)	Over age 4 years	Questionnaire	10 – 15 minutes	Mod	o Help determine whether a child has Asperger Syndrome o Provide AS Quotient that tells the likelihood that an individual has Asperger Syndrome	Purchase: Pearson Assessments http://ags.pearsonassessments.com/
Autism Diagnostic Interview-Revised (ADI-R)	18 months – adult	Interview	1 – 2.5 hours	Int	o Diagnose autism, help plan treatment and help distinguish autism from other developmental disorders	Purchase: Western Psychological Services www.wpspublish.com
Autism Diagnostic Observation Schedule (ADOS)	2.0 years – adult	Direct testing	30 – 50 minutes	Int	o Assess and diagnose autism and PDD across ages, developmental levels and language skills	Purchase: Western Psychological Services www.wpspublish.com
Autism Screening Instrument for Educational Planning (ASIEP-2)	18 months - adult	Direct Testing	90 – 120 minutes	Mod	o Provide a profile of abilities in spontaneous verbal behavior, social interaction, education level and learning characteristics	Purchase: Pro-Ed http://www.proedinc.com/
Autism-spectrum Quotient (AQ) for Adolescents	12.0 years – 15.11 years	Questionnaire	10 min	Min	o Quantify autistic traits in adults	http://www.autismresearchcentre.com/tests/aq_adolescent_test.asp

Autism Spectrum Screening Questionnaire (ASSQ)	6.0 years – 17.11 years	Questionnaire	10 minutes	Min	o Preliminary identification of children whose behaviors warrant more comprehensive evaluation of pervasive developmental disorders	Ehlers S, Gillberg C, Wing L. A screening questionnaire for Asperger syndrome and other high-functioning autism spectrum disorders in school age children. *Journal of Autism and Developmental Disorders*, 1999; 29(2): 129-141.
Bayley Scales of Infant and Toddler Development (BAYLEY-III)	1 month – 42 months	Direct testing	10 – 20 minutes	Min-mod	o Examine all facets of a young child's development	Purchase: Harcourt Assessments http://harcourtassessment.com/
Behavior Assessment System for Children, Second Edition (BASC-2)	2.0 years – 21.11 years	Questionnaire	10 – 30 minutes	Mod	o Measure behavior areas important for IDEA and DSM-IV classifications o Differentiate between hyperactivity and attention problems o View of adaptive and maladaptive behavior	Purchase: Pearson Assessments http://ags.pearsonassessments.com/
Checklist for Adaptive Living Skills (CALS)	Birth – 40+ years	Questionnaire	60 minutes	Min	o Measures adaptive living skills	Purchase: Riverside Publishing http://www.riverpub.com/
Child Behavior Checklist (CBCL)	1.6 years – 18.11 years	Questionnaire	15 minutes	Min	o Assess behavior o Includes Language Development Survey (LDS) for identifying language delays	Purchase: Achenbach System of Empirically Based Assessment http://shop1.mailordercentral.com/aseba/
Childhood Asperger Syndrome Test (CAST)	4-11 years	Questionnaire		Min	o Screen for autism spectrum conditions	Download: http://www.autismresearchcentre.com/tests/cast_test.asp

Childhood Autism Rating Scale (CARS)	2.0 years – adult	Observation	5 – 10 minutes	Mod	o Measure autism in children	Purchase: Pearson Assessments http://ags.pearsonassessments.com/
Children's Communication Checklist, Second Edition (CCC-2)	5.0 years – 17.11 years	Questionnaire	10 – 15 minutes	Min	o Screen for children who are likely to have language impairment o Identify pragmatic impairment in children with communication problems o Identify children who may need further assessment for an autism spectrum disorder	Purchase: Harcourt A http://harcourtassessment.com/
Clinical Evaluation of Language Function-Preschool, Second Edition (CELF)	3.0 years – 6.11 years	Direct testing	30 – 45 minutes	Mod	o Measure broad range of language skills o Help guide intervention planning	Purchase: Harcourt Assessment http://harcourtassessment.com/
Clinical Evaluation of Language Fundamentals, Fourth Edition (CELF-4)	5.0 years – 21.11 years	Direct testing	30 – 60 minutes	Mod	o Evaluate language performance	Purchase: Harcourt Assessment http://harcourtassessment.com/

Communication and Symbolic Behavior Scales-Developmental Profile (CSBS-DP)	8 months – 2.11 years	Caregiver Report	60 minutes	Min	o Determine communicative competence (use of eye gaze, gestures, sounds, words, understanding and play) of children with a functional communication age between 6 months and 24 months	Purchase: Brookes Publishing http://www.brookespublishing.com/store/
Comprehensive Assessment of Spoken Language (CASL)	3.0 years – 21.11 years	Direct Testing	30 – 45 minutes	Mod	o Measure language comprehension, expression and retrieval	Purchase: Pearson Assessments http://ags.pearsonassessments.com/
Developmental Behavior Checklist (DBC)	4.0 years – 18.0 years	Questionnaire	96 item checklist completed by caregivers. 10-15 minutes	Min	o Broadly assess behavioral and emotional disturbance in children and adolescence	Einfeld, S. L., & Tonge, B. J. (1995). The Developmental Behaviour Checklist: The development and validation of an instrument to assess behavioural and emotional disturbance in children and adolescents with mental retardation. Journal of Autism and Developmental Disorders, 25(2), 81-104.

Diagnostic Interview for Social and Communication Disorders (DISCO)	Any age	Interview	3 hour structured interview	Int	o For diagnosis of autism and other developmental disabiltiise	Leekam SR, Libby SJ, Wing L, Gould J, Taylor C. The Diagnostic Interview for Social and Communication Disorders: algorithms for ICD-10 childhood autism and Wing and Gould autistic spectrum disorder. *J Child Psychol Psychiatry* 2002 Mar;43(3):327-42
Differential Ability Scales, Second Edition (DAS-II)	2.60 years – 17.11 years	Direct testing	45 - 6025 – 65 minutes	Mod	o Identify child's strengths and weaknesses o Help develop appropriate IEP goals, intervention strategies and progress monitoring	Purchase: Harcourt Assessment http://harcourtassessment.com/
Early Social-Communication Scales (ESCS)	8 months – 30 months	Structured Observation	15-25 minutes	Mod	o Obtain behavioral measure of nonverbal communicative abilities	https://www.psy.miami.edu/faculty/pmundy/ESCS.pdf
Expressive One-Word Picture Vocabulary Test, 2000 Edition (EOWPVT)	2.0 years – 18.11 years	Direct testing	10 – 15 minutes	Mod	o Evaluate how individual processes language o Measure of verbal expression of language	Purchase: Pearson Assessments http://www.pearsonassessments.com/

Functional Emotional Assessment Scale (FEAS)	7 months – 4.11 years	Direct observation	15 – 20 minutes	Mod	o Framework for observing and assessing a child's emotional and social functioning o Identify critical areas deserving of further clinical inquiry	Purchase: Harcourt Assessment http://harcourtassessment.com/
Gilliam Asperger's Disorder Scale (GADS)	3.0 years – 21.11 years	Questionnaire	5 – 10 minutes	Min	o Provide documentation about the essential behavior characteristics of Asperger's Disorder necessary for diagnosis	Purchase: Pearson Assessments http://ags.pearsonassessments.com/
Gilliam Autism Rating Scale, Second Edition (GARS-2)	3.0 years – 22.11 years	Questionnaire	5 – 10 minutes	Min	o Assist in identifying and diagnosing autism o Help estimate severity of the child's disorder	Purchase: Pearson Assessments http://ags.pearsonassessments.com/
Greenspan Social Emotional Growth Chart	Birth – 42 months	Questionnaire	10 minutes	Min	o Monitor the milestones of social-emotional development	Purchase: Harcourt Assessment http://harcourtassessment.com/
Krug Asperger's Disorder Index (KADI)	6.0 years – 21.11 years	Questionnaire	15 – 20 minutes	Min	o Distinguish individuals with Asperger's disorder from individuals from individuals with other forms of high functioning autism	Purchase: Pro-Ed http://www.proedinc.com/

Language Development Survey (LDS) [from CBCL]	1.6 years – 5.0 years	Questionnaire	10 minutes	Min	o Identify language delays	Purchase: Achenbach System of Empirically Based Assessment http://shop1.mailordercentral.com/aseba/
Leiter International Performance Scale-Revised (Leiter-R)	2.0 years – 20.11 years	Direct testing	25 – 90 minutes	Mod	o Measure intelligence and cognitive abilities	Purchase: Psychological Assessment Resources, Inc. http://www3.parinc.com/
MacArthur Communicative Development Inventory (CDIs), Second Edition	8 months – 37 months	Questionnaire	20 -40 minutes	Min	o Assess lexical [vocabulary] growth	Purchase: Brookes Publishing http://www.brookespublishing.com/store/
Modified Checklist for Autism in Toddlers (MCHAT)	birth – 36 months	Checklist Questionnaire	5 -10 minutes	Min	o Screen for autism spectrum disorders	Download: www.dbpeds.org/media/mchat.pdf or www.firstsigns.org/downloads/m-chat.PDF Scoring: www.firstsigns.org/downloads/m-chat_scoring.PDF
Motor-Free Visual Perception Test, Third Edition (MVPT-3)	4.0 years – 85.11 years	Direct Testing	20 minutes	Mod	o Assess visual perception without reliance on individual's motor skills	Purchase: Pro-Ed http://www.proedinc.com/
Mullen Scales of Early Learning	Birth – 68 months	Direct testing	15 – 60 minutes	Mod	o Assess language, motor and perceptual abilities	Purchase: Pearson Assessments http://ags.pearsonassessments.com/
Parent Interview for Autism (PIA)	2.0 years – 6.11 years	Questionnaire	20 – 30 minutes	Min	o Measure autism symptom severity across a wide range of behavioral domains	Stone WL, Coonrod EE, Pozdol SL & Turner LM. The Parent Interview for Autism – Clinical Version (PIA-CV). *Autism* 2003;7(1):9-30.

PDD Behavior Inventory (PDDBI)	2.0 years – 12.11 years	Questionnaire	30 -45 minutes	Min	o Assess responsiveness to intervention in children with a pervasive developmental disorder	Purchase: Psychological Assessment Resources, Inc. http://www3.parinc.com/
Peabody Developmental Motor Scales, Second Edition (PDMS-2)	Birth – 5.11 years	Direct Testing	45 – 60 minutes	Min	o Assess motor skills	Purchase: Harcourt Assessment http://harcourtassessment.com/
Peabody Picture Vocabulary Test, Third Edition (PPVT-III)	2.6 years – 90+ years	Direct testing	10 – 15 minutes	Mod	o Measure receptive vocabulary for standard English o Screen test of verbal ability	Purchase: Pearson Assessments http://ags.pearsonassessments.com/
Pediatric Evaluation of Disability Inventory (PEDI)	6 months – 6.11 years	Observation	45 – 60 minutes	Min	o Analyze functional capabilities	Purchase: Harcourt Assessment http://harcourtassessment.com/
Preschool Language Scale, Fourth Edition (PLS-4)	Birth – 6.11 years	Direct testing	20 – 45 minutes	Mod	o Measure receptive and expressive language	Purchase: Harcourt Assessment http://harcourtassessment.com/
Psychoeducational Profile (PEP-3)	1.0 year – 7.0 years	Direct Testing	45 – 90 minutes	Mod	o Provides information concerning several important domains of development o Yields an index of the severity of disturbed behaviors	Purchase: http://proedinc.com

Receptive-Expressive Emergent Language Scale, Third Edition (REEL-3)	birth – 3.11 years	Checklist	20 minutes	§	o Identify language impairments or other disabilities that affect language development o Useful in assessment and planning in Early Intervention programs	Purchase: Pearson Assessments http://ags.pearsonassessments.com/
Reynell Language Developmental Scales (RLDS)	1 year – 6.11 years	Direct Testing	30 minutes	Mod	o Measure comprehensive and expressive language ability	Purchase: Super Duper Publications http://www.superduperinc.com/
Rossetti Infant-Toddler Language Scale	birth – 3.11 years	Direct observation of behavior, eliciting desired behavior, parent report of behavior	10 – 30 minutes	§§	o Assess preverbal and verbal communication o Profile and monitor early language development	Purchase: LinguiSystems http://www.linguisystems.com
Scales of Independent Behavior-Revised (SIB-R)	birth – 80+ years	Interview	15 – 60 minutes	Min	o Comprehensive assessment of adaptive behavior and problem behavior	Purchase: Riverside Publishing http://www.riverpub.com/
Screening Tool for Autism in Two Year Olds (STAT)	24 months – 35 months	Interactive Observation	20 minutes	Mod	o Facilitate early identification of autism	Training: Vanderbilt Kennedy Center for Research on Human Development http://kc.vanderbilt.edu/kennedy/triad/services_screening.html
Sensory Integration and Praxis Tests (SIPT)	4.0 years – 8.11 years	Direct Testing	2 hours	Mod	o Assess sensory integration	Purchase: Western Psychological Services http://portal.wpspublish.com/

Social Communication Questionnaire (SCQ)	4.0 years – adult	Questionnaire	5 - 10 minutes	Min	o Screen for autism spectrum disorders	Purchase: Western Psychological Services http://portal.wpspublish.com/
Social Responsiveness Scale (SRS)	4.0 years – 18.11 years	Questionnaire 65 items	15 – 20 minutes	Min	o Distinguish autism spectrum conditions from other child psychiatric conditions by identifying presence and extent of autistic social impairment	Purchase: Western Psychological Services http://portal.wpspublish.com/
Stanford-Binet Intelligence Scales, Fifth Edition (SB5)	2.0 years – 85+	Direct testing	45 – 75 minutes	Mod	o Assess intelligence and cognitive abilities	Purchase: Riverside Publishing http://www.riverpub.com/
Test of Language Competence-Expanded Edition (TLC-Expanded)	5.0 years – 18.11 years	Direct testing	60+ minutes	Mod	o Measure metalinguistic higher-level language functions	Purchase: Harcourt Assessment http://harcourtassessment.com/
Test of Language Development (TOLD)	4.0 years – 8.11 years	Direct Testing	1 hour	Mod	o Test spoken language	Purchase: Pearson Assessments http://ags.pearsonassessments.com/
Test of Nonverbal Intelligence, Third Edition (TONI-3)	6.0 years – 89.11 years	Direct testing	15 – 20 minutes	Mod	o Language-free assessment of nonverbal intelligence and reasoning abilities	Purchase: Pearson Assessments http://ags.pearsonassessments.com/
Test of Visual Perceptual Skills (non-motor), Third Edition (TVPS-3)	4.0 years – 12.11 years	Direct Testing	30 – 40 minutes	Mod	o Determine visual perceptual strengths and weaknesses	Purchase: Western Psychological Services http://portal.wpspublish.com/
The Beery-Buktenica Test of Visual Motor Integration, Fifth Edition (BEERY VMI)	2.0 years – 18.11 years	Direct Testing	5 – 15 minutes per test	Int	o Assess visual-motor skills	Purchase: Pearson Assessments http://www.pearsonassessments.com/

Universal Nonverbal Intelligence Test (UNIT)	5.0 years – 17.11 years	Direct Testing	10 – 45 minutes	Mod	o Assess general intelligence	Purchase: Riverside Publishing http://www.riverpub.com/
Vineland Adaptive Behavior Scales, Second Edition (VABS-2)	birth – 90.11 years	Interview	20 – 60 minutes	Mod	o Measure of personal and social skills	Purchase: Pearson Assessments http://ags.pearsonassessments.com/
Wechsler Adult Intelligence Scale, Third Edition (WAIS-III)	16.0 – 89.11 years	Direct testing	60 – 90 minutes	Mod	o Measure intellectual ability	Purchase: Harcourt Assessment http://harcourtassessment.com/
Wechsler Intelligence Scale for Children, Fourth Edition (WISC-IV)	6.0 years – 16.11 years	Direct testing	50 – 70 minutes	Mod	o Measure intellectual ability	Purchase: Harcourt Assessment http://harcourtassessment.com/
Wechsler Preschool and Primary Scale of Intelligence, Third Edition-Revised (WPPSI-IIIR)	4.0 – 6.6 years	Direct testing	50 - 75 minutes	Mod	o Measure intellectual ability	Purchase: Harcourt Assessment http://harcourtassessment.com/

Other tools (non-standardized)

Tool	Ages	Format	Time to Complete	Training *	Purpose	Source
Australian Scale for Asperger's Syndrome	6.0 years – 12.0 years	Questionnaire	5 – 10 minutes	Min	o Identify behaviors and abilities indicative of Asperger's Syndrome	Online Asperger Syndrome Information and Support: http://www.udel.edu/bkirby/asperger/aspergerscaleAttwood.html
Checklist for Autism in Young Children	1.5 years – 14.0 years	Interview	10 minutes	Min	o Screening and diagnosing autism spectrum disorder	Download: http://www.hmc.psu.edu/psychiatry
Functional Analysis Screening Tool (FAST)	all	Interview/ Questionnaire	15 minutes	Mod - Int	o Screening tool to identify factors that may influence problem behaviors	Florida Center on Self Injury; Michael Cataldo, Ph.D.
Ingram-Troxell Preschool Autism & Observation Checklist	≤ 5 years	Observation tool	varies	Min	o Checklist to structure naturalistic observations	Daniel Ingram, Psy.D., Lincoln Intermediate Unit #12, Lucinda Troxell, M.S.CCC-SLP, Lincoln Intermediate Unit #12
Gillberg Criteria for Asperger Disorder		Checklist	15 minutes	Min	o Checklist of characteristics consistent with Asperger's Disorder in 5 categories (reciprocal social interaction, narrow interest, routines & interests, speech/language problems, non-verbal communication, motor clumsiness)	Leekam S, Libby S, Wing L, Gould J & Gillberg C. Comparison of ICD-10 and Gillberg's Criteria for Asperger Syndrome. *Autism* 2000;4(1):11-28. Gillberg, I. C., & Gillberg, C. (1989). Asperger syndrome – some epidemiological considerations: A research note. *Journal of Child Psychology & Psychiatry, 30*, 631-638;

Sensory Processing Measure (SPM)	5.0 years – 11.0 years	Rating Scale	15 – 20 minutes	Min	o Provides complete picture of sensory processing difficulties at school and at home	Purchase: Western Psychological Services www.wpspublish.com (available February 2007)

Training*
Min = minimal
Mod = moderate
Int = intensive

§ Physicians, SLP, Early Childhood Professionals
§§ Thorough knowledge of child development and language

TABLE 6 – DSM-IV-TR diagnostic criteria with likert scale

DSM-IV-TR - DIAGNOSTIC CRITERIA FOR 299.00 AUTISTIC DISORDER

0= not at all; 1= a little; 2= a lot; 3= very much

√	Criteria		Comments	0	1	2	3
------	**Qualitative impairment in social interaction *[at least 2]***						
	(a)	Marked impairment in use of nonverbal behaviors such as eye-to-eye gaze, facial expression, body postures, and gestures to regulate social interaction.					
	(b)	Failure to develop peer relationships appropriate to developmental level					
	(c)	Lack of spontaneous seeking to share enjoyment, interests or achievements with other people (e.g., by a lack of showing, bringing, or pointing out objects of interest)					
	(d)	Lack of social or emotional reciprocity					
------	**Qualitative impairments in communication *[at least 1]***						
	(a)	Delay in, or total lack of, the development of spoken language (not accompanied by an attempt to compensate through alternative modes of communication such as gesture or mime)					
	(b)	In individuals with adequate speech, marked impairment in ability to initiate or sustain a conversation with others					
	(c)	Stereotyped and repetitive use of language or idiosyncratic language					
	(d)	Lack of varied, spontaneous make-believe play or social imitative play appropriate to developmental level					
------	**Restricted repetitive and stereotyped patterns of behavior, interests, and activities *[at least 1]***						
	(a)	Encompassing preoccupation with one or more stereotyped and restricted patterns of interest that is abnormal either in intensity or focus					
	(b)	Apparently inflexible adherence to specific, nonfunctional routines or rituals					
	(c)	Stereotyped and repetitive motor mannerisms (e.g., hand or finger flapping or twisting, or complex whole-body movements)					
	(d)	Persistent preoccupation with parts of objects					
	TOTAL POSITIVE [minimum for diagnosis = 6]						
	Delays or abnormal functioning in ≥ 1 of following prior to age 3 years:						
------		Social interaction					
------		Language as used in social communication					
------		Symbolic or imaginative play					
	Onset prior to age 3 years						
	Disturbance not better accounted for by Rett's Disorder or Childhood Disintegrative Disorder.						

Source:
American Psychiatric Association. Diagnostic and Statistical Manual of Mental

Disorders, 4th Edition, Text Revised (DSM-IV-TR). Washington, DC, 2000.

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DSM-IV-TR - DIAGNOSTIC CRITERIA FOR 299.80 Asperger's Disorder

not at all; 1= a little; 2= a lot; 3= very much

√	Criteria		Comments	0	1	2	3
------	**Qualitative impairment in social interaction *[at least 2]***						
	(a)	Marked impairment in use of nonverbal behaviors such as eye-to-eye gaze, facial expression, body postures, and gestures to regulate social interaction.					
	(b)	Failure to develop peer relationships appropriate to developmental level					
	(c)	Lack of spontaneous seeking to share enjoyment, interests or achievements with other people (e.g., by a lack of showing, bringing, or pointing out objects of interest)					
	(d)	Lack of social or emotional reciprocity					
------	**Restricted repetitive and stereotyped patterns of behavior, interests, and activities *[at least 1]***						
	(a)	Encompassing preoccupation with one or more stereotyped and restricted patterns of interest that is abnormal either in intensity or focus					
	(b)	Apparently inflexible adherence to specific, nonfunctional routines or rituals					
	(c)	Stereotyped and repetitive motor mannerisms (e.g., hand or finger flapping or twisting, or complex whole-body movements)					
	(d)	Persistent preoccupation with parts of objects					

circle	
Y N	**Disturbance causes clinically significant impairment in social, occupational, or other important areas of function**
Y N	**No clinically significant general delay in language (e.g., single words used by age 2 years, communicative phrases by age 3 years)**
Y N	**No clinically significant delay in cognitive development or in the development of age-appropriate self-help skills, adaptive behavior (other than in social interaction), and curiosity about the environment in childhood.**
Y N	**Criteria are not met for another specific Pervasive Developmental Disorder or Schizophrenia.**

Source:

American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders, 4th Edition, Text Revised (DSM-IV-TR). Washington, DC, 2000.

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Pervasive Developmental Disorder Not Otherwise Specified (PDD-NOS) including Atypical Autism

This category should be used when there is a severe and pervasive impairment in the development of reciprocal social interaction associated with impairment in either verbal or nonverbal communication skills or with the presence of stereotyped behaviors, interests, and activities, but the criteria are not met for a specific Pervasive Developmental Disorder, Schizophrenia, Schizotypial Personality Disorder, or Avoidant Personality Disorder. For example, this category includes "atypical autism" – presentations that do not meet the criteria for Autistic Disorder because of the late age at onset, atypical symptomatology, or subthreshold symptomatology, or all of these.

0= not at all; 1= a little; 2= a lot; 3= very much

√	Criteria		Comments	0	1	2	3
------	**Qualitative impairment in social interaction *[at least 2]***						
	(a)	Marked impairment in use of nonverbal behaviors such as eye-to-eye gaze, facial expression, body postures, and gestures to regulate social interaction.					
	(b)	Failure to develop peer relationships appropriate to developmental level					
	(c)	Lack of spontaneous seeking to share enjoyment, interests or achievements with other people (e.g., by a lack of showing, bringing, or pointing out objects of interest)					
	(d)	Lack of social or emotional reciprocity					
------	**Qualitative impairments in communication *[at least 1]***						
	(a)	Delay in, or total lack of, the development of spoken language (not accompanied by an attempt to compensate through alternative modes of communication such as gesture or mime)					
	(b)	In individuals with adequate speech, marked impairment in ability to initiate or sustain a conversation with others					
	(c)	Stereotyped and repetitive use of language or idiosyncratic language					
	(d)	Lack of varied, spontaneous make-believe play or social imitative play appropriate to developmental level					
------	**Restricted repetitive and stereotyped patterns of behavior, interests, and activities *[at least 1]***						
	(a)	Encompassing preoccupation with one or more stereotyped and restricted patterns of interest that is abnormal either in intensity or focus					
	(b)	Apparently inflexible adherence to specific, nonfunctional routines or rituals					
	(c)	Stereotyped and repetitive motor mannerisms (e.g., hand or finger flapping or twisting, or complex whole-body movements)					
	(d)	Persistent preoccupation with parts of objects					

	Delays or abnormal functioning in ≥ 1 of following prior to age 3 years: (circle Yes or No)	
------	**Y N**	Social interaction
------	**Y N**	Language as used in social communication
------	**Y N**	Symbolic or imaginative play
	Onset prior to age 3 years	
	Disturbance not better accounted for by Rett's Disorder or Childhood Disintegrative Disorder.	

Source:
American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders, 4th Edition, Text Revised (DSM-IV-TR). Washington, DC, 2000.

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References – tools

Akshoomoff, N. (2006). "Use of the Mullen Scales of Early Learning for the Assessment of young children with Autism Spectrum Disorders." Neuropsychol Dev Cogn C Child Neuropsychol **12**(4): 269-77.

Allen, C.W., Silove, N, et al. (2006). "Validity of the Social Communication Questionnaire in Assessing Risk of Autism in Preschool Children with Developmental Problems." J Autism Dev Disord (in print).

Ball, M. J. (1999). "Reynell Developmental Language Scales III: a quick and easy LARSP?" Int J Lang Commun Disord **34**(2): 171-4.

Baron, I.S. (2005). "Test Review: Wechsler Intelligence Scale for Children-Fourth Edition (WISC-IV)." Child Neuropsychol **11**: 471-5.

Baron-Cohen, S., Hoekstra, R.A., et al. (2006). "The Autism-Spectrum Quotient (AQ)-Adolescent Version." Journal Autism Dev Disord **36**(3): 343-50.

Baron-Cohen, S., Weelwright, S., et al. (2000). "Early identification of autism by the Checklist for Autism in Toddlers (CHAT)." Journal of the Royal Society of Medicine **93**: 521-5.

Berg, M., Jahnsen, R., et al. (2004). "Reliability of the Pediatric Evaluation of Disability Inventory (PEDI)." Physical & Occupational Therapy in Pediatrics **24**(3): 61-77.

Berument, S.K., Rutter, M., et al. (1999). "Autism screening questionnaire: diagnostic validity." British Journal of Psychiatry **175**: 144-51.

Bishop, D.V.M. (1998). "Development of the Children's Communication Checklist (CCC): A Method for Assessing Qualitative Aspects of Communicative Impairment in Children." J Child Psychol Psychiat **39**(6) 879-91.

Brereton, A.V., Tonge, B.J., et al. (2002). “Screening Young People for Autism With the Developmental Behavior Checklist.” J Am Acad Child Adolesc Psychiat **41**(11): 1369-75.

Brown, G.T., Gaboury, I. (2006). “The Measurement Properties and Factor Structure of the Test of Visual-Perceptual Skills-Revised: Implications for Occupational Therapy Assessment and Practice.” The American Journal of Occupational Therapy **60**(2): 182-93.

Burtner, P.A., Qualls, C., et al. (2002). “Test-Retest Reliability of the Motor-Free Visual Perception Test Revised (MVPT-R) in Children With and Without Learning Disabilities.” Physical & Occupational Therapy in Pediatrics **22**(3-4): 23-36.

Campbell, J.M. (2005). “Diagnostic Assessment of Asperger’s Disorder: A Review of Five Third-Party Rating Scales.” J Autism Dev Disord **35**(1): 25-35.

Cermak, S.A., Murray, E.A. (1991). “The Validity of the Constructional Subtests of the Sensory Integration and Praxis Tests.” The American Journal of Occupational Therapy. **45**(6): 539-43.

Charman, T., Baron-Cohen, S., et al. (2001). “Commentary: The Modified Checklist for Autism in Toddlers.” J Autism Dev Disord **31**(2): 145-8.

Cohen, I.L., Schmidt-Lackner, S. (2003). “The PDD Behavior Inventory: A Rating Scale for Assessing Response to Intervention in Children with Pervasive Developmental Disorder.” J Autism Dev Disord **33**(1): 47-53.

Constantino, J.N., Davis, S.A., et al. (2003). “Validation of a Brief Quantitative Measure of Autistic Traits: Comparison of the Social Responsiveness

Scale with the Autism Diagnostic Interview-Revised." J Autism Dev Disord **33**(4): 427-33.

De Houwer, A., Bornstein, M.H., et al. (2005). "Assessing early communicative ability: a cross-reporter cumulative score for the MacArthur CDI." J Child Lang **32**: 735-58.

DiLalla, D.L., Rogers, S.J. (1994). "Domains of the Childhood Autism Rating Scale: Relevance for Diagnosis and Treatment." J Autism Dev Disord **24**(2): 115-28.

Doyle, A., Ostrander, R., et al. (1997). "Convergent and Criterion-Related Validity of the Behavior Assessment System for Children-Parent Rating Scale." J of Clin Child Psychol **26**(3): 276-84.

Dumont-Mathieu, T., Fein, D. (2005). "Screening for Autism in Young Children: The Modified Checklist for Autism in Toddlers (M-CHAT) and Other Measures." Mental Retardation and Developmental Disabilities Research Reviews **11**:253-62.

Dutra, L., Campbell, L., et al. (2004). "Quantifying Clinical Judgement in the Assessment of Adolescent Psychopathology: Reliability, Validity, and Factor Structure of the Child Behavior Checklist for Clinician Report." J of Clin Psychol **60**(1): 65-85.

Eaves, L.C., Wingert, H.D., et al. (2006). "Screening for Autism Spectrum Disorders With the Social Communication Questionnaire." Developmental and Behavioral Pediatrics **27**(2): S95-S103.

Kulp, M.T., Sortor, J.M. (2003). “Clinical Value of the Beery Visual-Motor Integration Supplemental Tests of Visual Perception and Motor Coordination.” Optometry and Vision Science **80**(4): 312-15.

Lecavalier, L. (2005). “An Evaluation of the Gilliam Autism Rating Scale.” J Autism Dev Disord **35**(6): 795-805.

Lecavalier, L., Aman, M.G., et al. (2006). “Validity of the Autism Diagnostic Interview-Revised.” Am J on Mental Retardation **111**(3): 199-215.

Lees, J. (1999). “From ‘which pig is not outside the field?’ to ‘which horse is not outside the field?’: commentary on the Reynell Developmental Language Scales III (RDLS III).” Int J Lang Commun Disord **34**(2): 174-80.

Lichtenberger, E.O. (2005). “General Measures of Cognition for the Preschool Child.” Mental Retardation and Developmental Disabilities Research Reviews **11**: 197-208.

Longman, R.S. (2004). “Values for Comparison of WAIS-III Index Scores With Overall Means.” Psychol Assess **16**(3): 323-5.

Lord, C., Risi, S., et al. (2000). “The Autism Diagnostic Observation Schedule-Generic: A Standard Measure of Social and Communication Deficits Associated with the Spectrum of Autism.” J Autism Dev Disord **30**(3): 205-23.

Msall, M.E. (2005). “Measuring Functional Skills in Preschool Children at Risk for Neurodevelopmental Disabilities.” Mental Retardation and Developmental Disabilities Research Reviews **11**: 263-73.

Muris, P., Steerneman, P., et al. (1997). “Brief Report: Interrater Reliability of the Psychoeducational Profile (PEP).” J Autism Dev Disord **27**(5): 621-6

Rescorla, L., Alley, A. (2001). “Validation of the Language Development Survey (LDS): A Parent Report Tool for Identifying Language Delay in Toddlers.” J of Speech, Language, and Hearing Research **44**: 434-45.

Robins, D.L., Fein, D., et al. (2001). “The Modified Checklist for Autism in Toddlers: An Initial Study Investigating the Early Detection of Autism and Pervasive Developmental Disorders.” J Autism Dev Disord **31**(2): 131-44.

Saemundsen, E., Magnusson, P., et al. (2003). “Autism Diagnostic Interview-Revised and the Childhood Autism Rating Scale: Convergence and Discrepancy in Diagnosing Autism.” J Autism Dev Disord **33**(3): 319-28.

Sloan, J.L., Marcus, L. (1981). “Some Findings on the Use of the Adaptive Behavior Scale with Autistic Children.” J Autism Dev Disord **11**(2): 191-99.

Smith, A. (1997). “Development and Course of Receptive and Expressive Vocabulary from Infancy to Old Age: Administrations of the Peabody Picture Vocabulary Test, Third Edition, and the Expressive Vocabulary Test to the Same Standardization Population of 2725 Subjects.” Intern J Neuroscience **92**(1-2): 73-8.

Steerneman, P., Muris, P., et al. (1997). “Brief Report: Assessment of Development and Abnormal Behavior in Children with Pervasive Developmental Disorders. Evidence for the Reliability and Validity of the revised Psychoeducational Profile.” J Autism Dev Disord **27**(2): 177-85.

Stone, W.L., Coonrod, E.E., et al. (2004). “Psychometric Properties of the STAT for Early Autism Screening.” J Autism Dev Disord **34**(6): 691-701.

Stone, W.L., Hogan, K.L. (1993). “A Structured Parent Interview for Identifying Young Children with Autism.” J Autism Dev Disord **23**(4): 639-52.

Swinkels, S.H.N., Dietz, C., et al. (2006). “Screening for Autistic Spectrum in Children Aged 14 to 15 Months. I: The Development of the Early Screening of Autistic Traits Questionnaire (ESAT).” J Autism Dev Disord **36**(6): 723-32.

Teal, M.B., Wiebe, M.J. (1986). “A Validity Analysis of Selected Instruments Used to Assess Autism.” J Autism Dev Disord **16**(4): 485-94.

Tieman, B.L., Palisano, R.J., Sutlive, A.C. (2005). “Assessment of Motor Development and Function in Preschool Children.” Mental Retardation and Developmental Disabilities Research Reviews **11**: 189-96.

Tsatsanis, K.D., Dartnall, N., et al. (2003). “Concurrent Validity and Classification Accuracy of the Leiter and Leiter-R in Low-Functioning Children with Autism.” J Autism Dev Disord **33**(1): 23-30.

Wetherby, A.M., Allen, L., et al. (2002). “Validity and Reliability of the Communication and Symbolic Behavior Scales Developmental Profile With Very Young Children.” Journal of Speech, Language, and Hearing Research **45**: 1202-18.

Wing, L., Leekam, S.R., et al. (2002). “The Diagnostic Interview for Social and Communication Disorders: background, inter-rater reliability and clinical use.” J of Child Psychol and Psychiat **43**(3): 307-25.

Zimmerman, I.L., Castilleja, N.F. (2005). “The Role of a Language Scale for Infant and Preschool Assessment.” Mental Retardation and Developmental Disabilities Research Reviews **11**: 238-46.