Below are two abstracts of papers using PEDS and the Modified Checklist of Autism in Toddlers. An analysis of both is included at the end of this document.

Can parents' concerns identify children likely to have autism-spectrum disorder?

Glascoe FP, Macias M, Wegner LM. Presentation to the Pediatric Academic Societies Annual Meeting, Spring, 2006.

Background: The American Academy of Neurology together with other professional societies recommend the use of a broad-band developmental screen to be followed, if results are problematic, by an autism-specific screen. Given that only 30% of health care providers use a broad-band screen, let alone a second-stage narrow-band one, and that most rely instead on informal methods, a reasonable research question is whether parents' concerns alone can detect children who need to be seen by an autism specialist.

Method: Links from various autism focused sites and from ad words on search engines, lead parents to www.forepath.org, a site that interfaces with electronic health records but is also offered directly to families for a small fee. The site provides for children between 18 and 60 months, two online screens: Parents' Evaluation of Developmental Status (PEDS), a ten item tool eliciting parents' concerns across each developmental domains, and the Modified Checklist of Autism in Toddlers (M-CHAT). Parents were provided a privacy policy notice that included consent to use anonymized results in research studies.

Results: Of 593 individuals who engaged the website from January, 2005 to January 2006, 135 (22.8%) did not fully complete both measures and were excluded from analysis. Of the remaining 458, 302 were mothers (65.9%), 32 were fathers (7%), 22 were grand- or foster-parents (4.8%), 22 were relatives/friends/teachers (4.8%) and 80 (17.8%) did not disclose their relationship. When compared to US Census Bureau data, respondents (who disclosed this information) were highly educated; 208 (61.5%) held college degrees and were disproportionately white; 292 (77.7%). Of their target children, the mean age was 34.7 months (sd = 11.39) and 302 (69%) were boys. On the M-CHAT, 289 children had failing scores (63.1%) while 169 (36.9%) passed. On PEDS, 427 (93.2%) received high or moderate risk scores (indicating the need for additional assessment or screening). At-risk PEDS scores identified 98% (283/289) of MCHAT failures but low-risk PEDS scores were only 15% specific (25/169) to M-CHAT passes. Thus PEDS alone would have resulted in excessive over-referrals to autism specialists. To discern whether unique constellations of parental concerns offered

more parsimonious referral decisions, logistic regression was deployed to predict M-CHAT performance from the 10 kinds of concerns onPEDS. Because children's ages are associated with different kinds of concerns (parents of older children tend to have more worries about expressive language and school performance), two regression analyses were run: one on children between 18 and 35 months of age, and a second on children 36 to 59 months of age.

 In the youngest age group (N = 249), five types of concerns were associated with M-CHAT performance: behavior (OR = 2.9, CI = 2.10 – 3.97), fine motor (OR = 4.2, CI = 2.11 – 8.20), gross motor (OR = 4.4, CI = 1.23 – 8.68), receptive language (OR = 3.4, CI = 2.28 – 5.05), and social-emotional skills (OR = 2.4, CI = 1.71 – 3.39). The presence of three or more of these predictive concerns identified 131 of the 168 MCHAT failures (sensitivity = 78%) while fewer than three such concerns, identified 61 of the 81 M-CHAT passes (specificity = 75%).
In the older age group (N = 209) concerns identified by logistic regression included receptive language (OR = 2.3, CI = 1.69 – 3.12), school performance (OR = 2.1, CI = 1.50 – 3.04), social-emotional (OR = 1.9, CI = 1.42 – 2.56), and expressive language concerns (OR = 2.0, CI = 1.48 – 2.63). The presence of three or more such concerns identified 81% of M-CHAT failures (98/121) while fewer than three was 70% specific to M-CHAT passes (62/88). When comparing respondents whose concerns accurately predicted M-CHAT results to those whose concerns did not, there were no differences on any demographic variable: child's gender, language spoken at home, prior diagnosis, race, relationship to the child, child's age or respondent's level of education.

Conclusion: The results reinforce the value of carefully eliciting parents' concerns because these provide a reasonable indicator of the probable presence or absence of autism spectrum disorder. Replication is needed on a more typical pediatric sample and preferably with diagnostic measures of autism in order to confirm the generalizability and validity of the findings. If confirmed, it may be advisable to modify the PEDS scoring paradigm so that it optimally identifies children with and without features of ASD. Nevertheless, adherence to the American Academy of Neurology recommendations for broad-band screening followed by an autism-specific tool yields far greater accuracy in determining the need for referral to an autism specialist.

Comparison of a General Developmental Screening Tool and an Autism Specific Screening Tool in Autistic Spectrum Disorder (Asd) Assessment.

Purpose/Background: The increasing prevalence of Autism Spectrum Disorders (ASD) has generated increased interest in identifying children with ASD at a young age. There is much discussion in the literature regarding best practices for screening and early identification. Some argue that at a young age, a general developmental screening tool at a first level (and then autism specific screening if the child fails) is as effective as using an ASD-specific tool at selected intervals to screen all young children.

Objective: Determine the utility of using a general developmental screening tool compared to an autism specific tool when screening for ASD.

Methods: An ongoing study to improve Developmental Delay (DD) and ASD screening practices in an urban pediatric primary care practice is underway. Data has been collected on the use and results of a standardized general developmental screening tool, the PEDS (Parents' Evaluation of Developmental Status) and an autism-specific screening tool, the Modified Checklist for Autism in Toddlers (M-CHAT) in children ages 15 to 30 months. Assessments are complete for 66 children (55% male, mean age 23 months, 41% African American, 30% Caucasian, 15% Biracial, 14% Asian). The sensitivity, specificity, and positive predictive value of the PEDS compared to the M-CHAT in identifying young children at risk for ASD was computed. While the sensitivity of the PEDS compared to the M-CHAT was 77.8%, the specificity was only 26.3% and the positive predictive value was just 14.3%.

Results: Preliminary analysis indicates that in this urban pediatric population the PEDS as a first line screen is not a good substitute for the M-CHAT when screening for ASD, as children who screen negative for general developmental concerns may score positive on the M-CHAT.

Conclusions: Specific red flag items for autism, included in ASD-specific screening tools, may not be adequately examined in a this specific general developmental screening tool. These findings should be replicated in a larger population with greater ethnic diversity. Sponsor: Centers for Disease Control and Prevention.

Comment from Dr. Glascoe*: The results of both papers show that*

the majority of children who fail the M-CHAT also receive moderate or at-risk scores on PEDS. But problematic PEDS results alone do little to identify which children need referrals to autism specialists, because PEDS, like any other quality broad-band screening tool is also designed to identify other problems such as language impairment, learning disabilities, and mental retardation.

In my paper, patterns of concerns helped identify which children were likely to need referring to an autism specialist (and the latest print run of the PEDS Brief Guide includes this information and guidance). That said, it is clear from both papers that we can do better at early detection of autism spectrum disorders if we routinely use a measure like the M-CHAT. Indeed, the American Academy of Pediatrics is now recommending administration of an ASD screen at 18 and 14 months. Although this is wise, it is critical for those involved in early detection to note that measures like the M-CHAT do not identify with much regularity, the more common disabilities of childhood. So both a broad-band screen and an ASD specific one should be deployed at these an other visits, and otherwise, an ASD screen should be administered whenever PEDS results fall into moderate to high-risk categories.