Developmental Screening in a Pediatric Care Practice

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In 2006, the American Academy of Pediatrics (AAP) formally recommended the use of developmental surveillance at each well child visit and the use of standardized developmental screening tools at nine, 18, and 30 (or 24) month visits.[1] In 2007 the AAP recommended the incorporation of an autism-specific screening at the 18 and 24-month visits.[2] In 2006 the Rhode Island Department of Health conducted a survey of 241 primary care pediatricians to better understand the current pediatric practice related to developmental surveillance and screening, identify barriers to developmental screening and assess the interest in training and support regarding developmental screening. All of the respondents indicated that they were providing developmental surveillance for their patients less than five years of age, largely using questions during the course of the exam or using surveillance checklists. At that time only 21.8% were using a standardized screening tool and the most widely used tool was the Denver Developmental Screening Test II.[3] The most commonly cited barriers to developmental screening in the office setting were time limitations (76%), lack of staff (47%), and inadequate reimbursement (41%).[3] All respondents indicated that they were somewhat or very familiar with supports and services for children with developmental risks or delays, 43.6% indicated that these services were adequate and those considered most lacking were supports for behavioral or mental problems and the availability of specialty evaluation following a failed screening.[3]

In 2007, a pediatric primary care office implemented a developmental screening program according to the recommendations of the 2006 AAP guidelines. Three months after the implementation of the screening program, a quality improvement study was conducted to determine physician responses to the results of the developmental screening program and to identify barriers to that process within the practice.

Methods

Setting

The study site, a private-practice pediatric primary care office, implemented developmental screening using **Parents' Evaluation of Developmental Status (PEDS)** and **Modified Checklist for Autism in Toddlers (M-CHAT)** screening tools. The practice consisted of six board certified general pediatricians (three male, three female) and two pediatric nurse practitioners (female) serving approximately 12,000 children. The experience of the physicians involved in the study ranged from seven to 25 years post-residency training with a mean of 13 years. Review of insurance status revealed that 82% of children in the practice were covered by commercial insurance plans, 11% were covered by commercial managed care, and 7% were covered by a state administered health care plan. The study received institutional review board approval.

Screening Tools

The PEDS is a parent-completed interview form designed to screen for developmental and behavioral problems and indicate the need for further evaluation.[4] One or more predictive concerns, Path A or Path B, on the PEDS constitutes a failed screen. Paths C, D, and E are designated as passed screenings. The M-CHAT is a parent-completed questionnaire designed to identify children at risk for autism.[5] Two or more critical items or any combination of three or more items answered incorrectly constitutes a failed screen.

Procedures and Participants

To accommodate the AAP recommendations for developmental screening while creating a screening practice that was feasible in a busy office setting, the PEDS was administered to all children at the nine, 15, and 24-month well child examinations while the M-CHAT screening tool was administered at the 18 and 24-month examinations. This protocol was adopted to assure that there were a minimum number of visits at which two screens were administered. The Medical Assistant gave the screening tools to parents at the time of the visit. Parents were asked to complete the forms prior to the arrival of the **primary care pediatrician (PCP).** The PCP reviewed the parents' responses, scored the screening tools and discussed the results of the screens with the parents. The decision as to referrals was left to the discretion of the PCP. The results of screening and dispositions of referrals were recorded in the **electronic health record (EHR)** and the original screening document was scanned into the patient's record.

Children who had developmental delays identified prior to their initial screening were excluded from the study, but children with other pre-existing medical conditions were included. Prior to the retrospective record review, the principal investigator confirmed that the scoring used by the PCP's followed PEDS and M-CHAT recommendations, that the PCP's understood the PEDS definition of "predictive concerns" and the protocol for referring children for

Table 1. Physician responses to failed screening
(Children screened with PEDS = 385. Children screened with M-CHAT = 207)

Test	PEDS – Path A	PEDS – Path B	M-CHAT
Patients	20	67	10
Referred	14	16	6
Deferred	6	51	4
Diagnosed with Developmental Delay	13	8	5
Parents refused evaluation	0	7	1

Path A = two or more predictive concerns. Path B = one predictive concern
Deferred - a referral for a diagnostic evaluation was not made.
Referred - a referral for a diagnostic evaluation was made

Table 2. Physician survey responses

Please indicate which barriers you have experienced in the provision of routine developmental screening.	Number of physicians responding affirmatively
Time limitations in current practice	3
Lack of medical office staff to perform screening	1
Lack of treatment options for positive screening results	1
Lack of knowledge regarding referral options for positive screening results	1
Lack of confidence in validity of screening instruments	2
Belief that clinical experience and observations are equally as effective as formal screening	2

	Number of physicians responding affirmatively			
How do you typically deal with patients with two or more predictive concerns on PEDS screening?	Path A	Path B	Path C	M-CHAT
Review answers with the parent during the visit to clarify responses.	6	6	6	5
Re-administer screening at the next visit.	1	1	2	1
Refer patient for diagnostic developmental testing/ evaluation	6	3	1	3
Have patient return for developmental surveillance before the next routinely scheduled visit.	5	5	3	1
Have patient return for developmental surveillance at the next routinely scheduled visit.	2	3	2	0
Administer the M-CHAT screening tool.	2	1	0	0

a diagnostic evaluation. All parents in the practice spoke fluent English.

Data Collection

A retrospective chart review was conducted by reviewing the EHR for the **current procedural terminology** (**CPT**) code 96110 that was used to bill for screening. The principal investigator reviewed the electronic charts of all patients identified by the billing code to confirm that the documented results matched those of the scanned screening questionnaires. The results were recorded as pass or fail and, when indicated, whether diagnostic developmental testing was recommended and/or performed on the basis of those results. If a child failed a screening and the physician elected not to refer for diagnostic evaluation, the outcome was recorded as deferred. If a child failed a screening and the physician referred the child for diagnostic evaluation, the outcome was recorded as referred. The results of diagnostic evaluation were recorded with the following designations: recommended but not obtained (due to parents not pursuing the recommended evaluation), obtained and passed, or obtained and developmental delay confirmed.

Analysis

Data were compared using descriptive statistics. The two-tail significance of the association between PEDS and M-CHAT results was assessed with Fisher's exact test. Pearson product-moment correlation coefficient was used to further characterize any significant associations. P values of 0.05 or less were considered significant. SPSS 12 statistical application was used for analysis.

Results

Four hundred eighty nine children were screened over the 12-month study period using either the PEDS for the risk of developmental delay or M-CHAT for the risk of **Autism Spectrum Disorder** (**ASD**). (Table 1) The PEDS was administered to 385 children. 87 children (23%) failed the screening. Physicians deferred further testing in 57 (66%) of the children who failed. Of the 30 (34%) children who were referred for further testing, 21 (70%) were diagnosed with developmental delay, seven (23%) did not pursue the recommended evaluation and two (7%) were found to have no developmental concerns upon diagnostic developmental testing.

Two hundred nine M-CHATs were administered to 207 children. Two children received M-CHAT testing twice during the study period and both passed on each occasion. Ten children (5%) failed the screening. The PCP referred six children and deferred diagnostic evaluation in four of the ten children who failed the screening. The six who were referred had further developmental testing and were diagnosed with non-ASD developmental delay; five of these children failed a previously or concurrently administered PEDS test and one did not have PEDS screening as developmental delay was diagnosed following the failed MCHAT at 18 months. Among the four children who were deferred, one passed the PEDS during the study period and three did not have PEDS testing during the study. Review of the medical records after the close of the study revealed that of these latter three, two passed MCHAT and PEDS screening at 24 months and the other one failed PEDS screening, but passed diagnostic developmental testing.

The expected concurrent administration of M-CHAT and PEDS screening was not observed in this study. There were also missed re-screening opportunities following a failed score on either PEDS or M-CHAT screens with 75% and 83% of children respectively not having such a re-screen during the study period. Most of the children referred for diagnostic developmental evaluations following a failed screen were diagnosed with developmental delays (93% Path A, 50% Path B). These figures may be under-representations since seven of the 16 referred children on Path B did not complete developmental assessments and some may have been ultimately diagnosed with developmental disorders.

A survey of the participating PCP's was conducted to determine the attitudes and perceptions of the developmental screening process. (Table 2) Of the six respondents,

two worked full time and four worked part-time (0.75 full-time equivalent). The full time PCP's saw an average of 40 well visits per week and the part-time PCP's saw an average of 35 well visits per week. Of the six physicians, the most commonly cited barriers to developmental screening in the office setting were time limitations (three), lack of confidence in the screening instrument (two), belief that clinical observation is as effective as screening (two), and lack of staff, lack of treatment options, and lack of knowledge of referral options each noted by one of the respondents. Physicians indicated that they refer 65-99% of patients who had two or more predictive concerns on the PEDS (Path A). The observed rate of referral was 70%. The estimated rate of referral for patients with one predictive concern (Path B) was 25-65% and the observed rate was 24%. Five of the 6 physicians (83%) indicated that they felt that the current screening practice reliably identifies children at risk for developmental delay.

Discussion

This retrospective study revealed that while the PEDS and M-CHAT can be routinely used in a busy private-practice, clinicians did not strictly adhere to the referral criteria for the screening tools. Survey results suggest that the observed rate of deferrals may indicate a reliance on clinical impressions and judgment and lack of confidence in the screening instruments when making referral decisions. The rates of developmental delay observed in children who failed the PEDS, particularly with two or more predictive concerns (Path A), underscore the importance of referring those children for developmental testing. Previous studies have shown that most (71%) pediatricians used clinical surveillance to identify children with developmental delays that need a diagnostic developmental evaluation.[6] A feasibility study done with a large Pacific Northwest medical group reported a dramatic increase in referrals with the introduction of a standardized developmental screening instrument.[7] In contrast, our results are similar to those experienced in a large urban community clinic that did not experience an increased referral rate with the introduction of the PEDS suggesting that clinical judgment was a critical factor in determining outcome.[8]

Following the publication of the 2006 recommendations, the AAP launched a pilot project to implement these recommendations in 17 diverse pediatric practices. The project investigators concluded that most practices were unable or unwilling to adhere to the three specific recommendations of the AAP guidelines; to implement a 30 month visit; to administer a screen after surveillance suggested concern; and to submit simultaneous referrals both to medical subspecialists and local early intervention programs for children who failed office based screening.[9]

This observational study concerned with the physician responses to the results of the PEDS and MCHAT screens has several important limitations. It was a retrospective study design and had a small sample size. Outcomes among children who passed the screenings were not recorded, as doing so would be a reflection of the psychometric properties of the screens. These screening tools have well-established sensitivity, specificity, and validity and challenging these properties was not the intended focus of this study. We were unable to determine the number of children who were eligible for screening but did not receive that screening. If these numbers of missed screening opportunities were large, they could have a significant impact on the outcome data.

Despite these limitations, this study illustrated some important information regarding primary care physicians' responses to developmental screening in a busy primary care setting. Clinicians did not strictly adhere to the referral criteria indicated by the screening tools employed. While the psychometric properties of these developmental screening tools and the value of clinical judgment are not in question, there clearly are factors contributing to poor adherence of practitioners to recommended screening and referral guidelines.

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The authors and/or their spouses/significant others have no financial interests to disclose.

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