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Social-Emotional Screening for Infants and Toddlers in Primary Care

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KEY WORDS

preventive mental health services, colocation, infant mental health, social-emotional screening

ABBREVIATIONS

ASQ:SE, Ages and Stages Questionnaires—Social-Emotional ITS—infant toddler specialist

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WHAT'S KNOWN ON THIS SUBJECT: Recommendations in pediatrics call for general developmental screening of young children; however, research suggests social-emotional development, in particular, is important as an initial indicator of general well-being versus risk, and may warrant inclusion in screening protocols.



WHAT THIS STUDY ADDS: Via a social-emotional screening program, significant percentages of children can be identified as being at risk for social-emotional problems, and colocation of an early childhood psychologist promotes the ability to effectively address young children's social-emotional development within their medical home.

abstract

BACKGROUND AND OBJECTIVES: Recommendations in pediatrics call for general developmental screening of young children; however, research suggests social-emotional development, in particular, is important as an initial indicator of general well-being versus risk. We aim to describe a program designed to identify the social-emotional status of young children in the pediatric setting by using the Ages and Stages Questionnaires: Social-Emotional (ASQ:SE) as a universal screening tool, and to assess the effect of interventions by a colocated psychologist on changes in ASQ:SE scores over time.

METHODS: In a prospective cohort design we analyzed scores on ASQ:SE surveys completed on children 6 to 36 months of age, to determine if children were at risk for problems in social-emotional development. The probability of remaining at risk over time was then compared between subjects receiving intervention by the psychologist, and those who declined intervention. Logit specifications were used in multivariate comparisons to control for a set of covariates.

RESULTS: Three thousand one hundred and sixty-nine children were screened; 711 (22.4%) scored at or above the risk cutoff. Among the 711 at-risk children, 170 were rescreened. At the time of rescreening, those children who received intervention from the psychologist showed significant improvement on ASQ:SE scores compared with those who declined intervention ($P = .01$).

CONCLUSIONS: Universal social-emotional screening in a busy pediatric practice is challenging. Significant percentages of children can be identified as being at risk for social-emotional problems, and colocation of a psychologist promotes the ability to effectively address young children's social-emotional development within their medical home.

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In recognition of the importance of early identification and referral of developmental concerns in pediatrics,^{1,2} the American Academy of Pediatrics recommends an algorithm that calls for universal developmental surveillance and screening of infants and young children within the medical home.³

Although there is sufficient evidence related to the feasibility and effectiveness of developmental surveillance and screening within pediatrics, there is relatively scant literature regarding social-emotional screening of young children in the pediatric setting, despite compelling research on the importance of this particular developmental domain. Even as research findings on early childhood brain development underscore the importance of the child's relational and environmental experiences during these earliest years,⁴ formal assessment of this area within primary pediatrics is infrequent.

Despite reports of universal social-emotional screening within clinical treatment programs,⁵ foster care populations,⁶ or early intervention sites,⁷ published experience in the general pediatric literature is scant. Barriers that impede pediatricians from performing routine social-emotional screening include time limitations and lack of confidence/training to address concerns of pediatric mental health.^{8,9} The prevalence of social-emotional problems within the pediatric primary care population, however, and their importance in terms of later outcomes for children, suggest the need for enhanced models of care within pediatrics.

One such model involves colocating early childhood mental health professionals directly in the pediatric primary care medical home. Operating within this venue, such professionals can coordinate high-quality social-emotional screening programs, complete with follow-up assessment and intervention. Although the distinct

challenges to successfully colocating mental health professionals within the health care system are well documented,^{10–12} the objective of this report is as follows:

1. To document the feasibility of using such a model with a colocated psychologist (referred to as an infant toddler specialist [ITS]) to screen, identify, treat, and refer a high volume of young patients at a federally qualified health center in an urban community with an elevated prevalence of risk factors; and
2. To conduct a preliminary test of the effectiveness of the model by comparing the outcomes for children whose families accepted intervention by the ITS with outcomes for children whose families declined.

METHODS

Study Design

Our primary objective was to evaluate, by using a prospective cohort design, a universal social-emotional screening program. We attempted sequential (every 6 months) social-emotional screenings of all children 6 months to 3 years of age presenting to a primary care pediatric practice from March 2005 to March 2010. We used a parent-completed validated screening tool: the Ages and Stages Questionnaires: Social-Emotional (ASQ:SE).¹³ During the 5 years of program implementation, children who screened above the ASQ:SE risk cutoff thresholds were referred for assessment/intervention to the ITS, which enabled us to compare follow-up ASQ:SE scores for those who accepted ITS intervention with those who declined. This study was approved by the institutional review board at Montefiore Medical Center.

Setting

The study was conducted at a federally qualified health center affiliated with

a major academic medical center. A licensed bilingual early childhood psychologist with training in infant mental health was colocated within the health center, and was referred to as an ITS, in part to explain the specific age focus (children ages 3 and younger), and to reduce the stigma attached to a mental health title. The pediatric practice, staffed by 12 pediatric attending physicians, 1 pediatric nurse practitioner, licensed practical nurses, registered nurses, patient care technicians, 30 pediatric residents, a social worker, a nutritionist, and a developmental and behavioral pediatrician, serves as the continuity clinic for a large urban children's hospital, and annually provides more than 23 000 pediatric visits to more than 11 000 distinct patients, ages 0 to 21 years. The patient population of this practice reflects the urban nature of its setting, as more than 80% of patients are either Hispanic or African American, and more than two-thirds of patients are served by Medicaid or other state-sponsored insurance programs.

Program Description

The intent of the program was to screen all patients 6 to 36 months of age presenting for health care maintenance visits to identify those at risk for social-emotional difficulties; to offer monitoring, on-site intervention, or referral depending on clinical evaluation by the ITS; and to perform follow-up screening at regular intervals (see Fig 1). Screening was performed at 6 well-child visits (6, 12, 18, 24, 30, and 36 months) by using the ASQ:SE. The ASQ:SE is a parent-completed questionnaire, available in English and Spanish at a fifth-grade reading level, with questions specific to age intervals that correspond to well-child visits. The number of questions varies per form depending on the age of child being screened (19–33 items). Questionnaires take ~10 minutes to complete and 1 to 3 minutes to score. The questions assess 7 characteristics

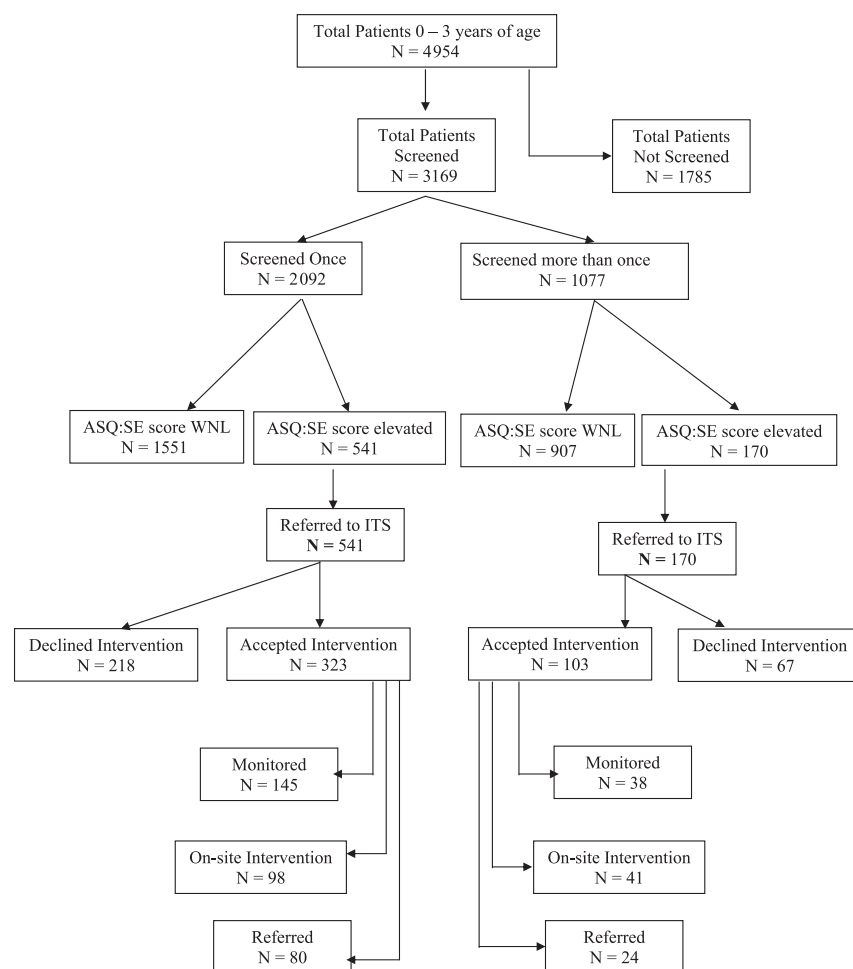


FIGURE 1
Program overview.

of development and behavior: self-regulation, compliance, communication, adaptive functioning, autonomy, affect, and interaction with others. Each questionnaire has an empirically derived cutoff score, at or above which children should be assessed further. The questionnaires are distinct from the “regular” Ages and Stages questionnaires, more commonly used, which assess motor, cognitive, language, and social-emotional characteristics. Psychometrics of the ASQ:SE are consistently high to strong; internal consistency ranges from 67% to 91%, test-retest reliability is 94%, concurrent validity ranges from 81% to 95%, sensitivity ranges from 71% to 85%, and specificity ranges from 90% to 98%.¹⁴

Nursing staff distributed the ASQ:SE while the family was waiting in the private examination room for the provider. The ASQ:SE was accompanied by a letter of explanation (in English or Spanish), reviewing the purpose of the screening. Families could decline to complete the ASQ:SE, or ask for help with completion. Completed questionnaires were returned to the ITS either during the child’s visit or after the visit in a mailbox. The ITS reviewed and scored all questionnaires, and a scoring sheet for each ASQ:SE was placed in the child’s chart. The ITS also collected demographic variables, including insurance type, race, and gender.

When children were identified via an elevated score (above the empirically

validated risk cutoff, considered at risk for social-emotional development) on the ASQ:SE, the ITS offered to complete a more comprehensive assessment. This assessment could occur as 1 aspect of the well-child visit, or at a separate appointment within the pediatric practice. The assessment addressed the concerns of the parent, provider (if applicable), and the ITS. Domains assessed included development, sleep, behavior, psychosocial concerns (such as domestic violence and homelessness), and mental health (of the child and the caregivers). From this assessment, the ITS made treatment and referral decisions, and, in consultation with the pediatric provider, either delivered the treatment (when short-term) or closely followed all referrals made (if long-term care, caregiver-focused care, or exclusively developmental therapies were indicated). Treatment by the ITS included office- and home-based appointments (as needed), and was dyadic (caregiver-child) in nature. Treatment ranged from 1-time consultations to more ongoing (yet short-term) arrangements, focusing on parenting education regarding discipline, sleep, feeding, toileting, and so forth, clarifying developmental goals and abilities of children, play therapy, and parent-child interaction therapy.¹⁵ A telephone information line was also available to all parents of identified children. Most commonly used outside referral options included early intervention, Early Head Start, preschool special education, and maternal and/or infant mental health services.

Subjects

Eligible subjects included all toddlers ages 6 months to 36 months presenting to the pediatric practice over the study interval for well-child care at the 6-, 12-, 18-, 24-, 30-, and 36-month visits. The focus of the preliminary effectiveness analysis we report here includes 170

infants and toddlers who had elevated ASQ:SE scores on an initial screening and who returned for subsequent screening after evaluation/intervention by the ITS.

Outcome Measures

Screening results on the ASQ:SE were dichotomized as the percentage of children screened who received a score above the risk cutoff at the 6-, 12-, 18-, 24-, 30-, and 36-month assessments, separately and combined at any screening occasion.

Data and Statistical Analysis

Demographic information and ASQ:SE scores were collected on all 6- to 36-month-olds screened at the pediatric practice between March 2005 and March 2010. To address the study's first objective (feasibility), we calculated the percentage of children screened who received a score above the risk cutoff, both overall and at the 6-, 12-, 18-, 24-, 30-, and 36-month assessments separately. We also compared these percentages across demographic groups by using χ^2 analyses. Finally, we determined the proportions originally screened who had at least 1 follow-up screening and reasons for lack of follow-up in those with only a single screening. We compared all children whose clinical screening scores were above the at-risk threshold with a random sample of children who scored below the risk cutoff to determine if there were differences between at-risk and not-at-risk children in reasons for lack of follow-up screening. We also calculated total percentage of children screened at least once, from the entire practice population, and determined the type of follow-up care these children received, if any.

To address the second objective (effectiveness), we conducted analyses of data from the subset of children who scored above the risk cutoff and were subsequently rescreened. By using χ^2 analyses, we compared the proportions

continuing to score above the risk cutoff on subsequent screening among those who did and those who did not receive intervention from the ITS in the interim. Logistic regression analysis was conducted to assess whether differences in improvement (moving from a score above the risk cutoff to a score below the risk cutoff at rescreening) on the ASQ:SE was associated with receiving intervention from the ITS while controlling for a series of covariates: gender, age, insurance type, and presenting problem (development, sleep, behavior, psychosocial, mental health).

RESULTS

Universal Screening

A total of 3169 infants and toddlers from 6 to 36 months of age were screened either once or repeatedly at regular intervals. A total of 4954 infants and toddlers presented to the pediatric practice for well-child care visits at the indicated screening intervals (6-, 12-, 18-, 24-, 30-, and 36-month health care maintenance visits), which results in a screening rate of 64% (3169/4954). Descriptive statistics of the screened cohort are presented in Table 1. Those children eligible for screening yet never screened did not differ from the screened cohort by gender, race, or insurance status (data not shown but available on request).

The percentage of children who received ASQ:SE scores above the risk cutoff ranged from a low of 8% at 6 months to a high of 29% at 36 months. Figure 2 displays scores above the risk cutoff by age. Age at screening was significantly associated with scoring above the risk cutoff ($P < .001$).

In Table 2 we display bivariate associations between demographic variables and the percentage of children scoring above the risk cutoff on at least 1 ASQ:SE screen. We documented a significant relationship between insurance status (used as a proxy for poverty status¹⁶)

TABLE 1 Descriptive Statistics for Screened Children at Time of Initial Screening: Total Population

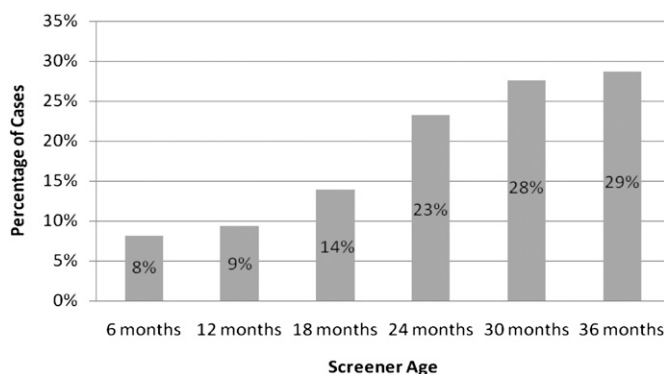
Characteristic	Frequency No.	Percentage
Total	3169	100
Gender		
Male	1647	52.0
Female	1522	48.0
Age, mo		
6	798	25.2
12	704	22.2
18	494	15.6
24	451	13.6
30	308	9.7
36	434	13.7
Ethnicity		
Hispanic	1618	51.1
African American	982	31.0
White	235	7.5
Asian	104	3.3
Other/Unknown	230	7.3
Insurance Status		
Medicaid or SCHIP	2183	68.9
Private insurance	780	24.6
Uninsured	206	6.5

SCHIP, State Children's Health Insurance Program.

and scores above the risk cutoff. Children with Medicaid, State Children's Health Insurance Program, or no insurance were significantly more likely to score above the risk cutoff than were children with private insurance ($P = .001$). In addition, we found a higher rate of scores above the risk cutoff for male children ($P < .001$), but no significant difference with respect to race ($P = .056$).

Rescreening Rate

Although program design called for screening all age-eligible children who presented for well-child checkups, only 34% of children were screened more than once. Reasons for lack of rescreening of the remaining children were multiple. To test whether the reasons for lack of rescreening differed between children who scored at-risk on their initial ASQ:SE screen with those who did not score at-risk, we categorized all 541 at-risk children and a random sample of 394 not-at-risk children according to the reasons for lack of rescreening.

**FIGURE 2**

Percentage of screening tests above risk cutoff score by age of child: total population. Figure represents multiple screenings for each child; number of screeners at each age varies: 6 months = 65/807; 12 months = 82/889; 18 months = 107/773; 24 months = 197/847; 30 months = 158/574; 36 months = 220/768. χ^2 (5, n = 4658) = 221.48, P = .000.

Within the group of children not-at-risk according to their initial ASQ:SE, 31% were older than 36 months (our last screening interval), and thus were determined ineligible for further screening. We then examined a random sample (n = 394) of the not-at-risk children still age eligible for rescreening. We found that 79 children (14%) were too young for the next screening at the time of this study, 114 children (20%) never returned to the clinic, and 201 (35%) were eligible for follow-up screening yet never rescreened for unknown reasons. In the at-risk children, 30% were older than 36 months and thus

determined ineligible for further screening, 81 children (15%) were too young for the next screening, 121 children (22%) never returned to the clinic, and 176 (33%) were eligible for follow-up screening yet never rescreened. Differences in the rescreening rates and reasons for lack of rescreening between the at-risk and not-at-risk groups did not reach statistical significance (P = .71). These findings suggest that neither elevated initial screening scores nor the probability of being rescreened were associated with the reasons for lack of follow-up. In addition, children with scores above the risk cutoff who were rescreened,

and children with scores above the risk cutoff who were eligible for rescreening yet missed, did not differ according to bivariate comparisons on gender, race, insurance type, or mean age (P > .05).

Impact of Intervention From ITS on Screening Scores

To determine the impact of intervention from the ITS on screening scores, we examined the 170 children who scored above the risk cutoff and received a subsequent rescreening. Of these, 41 (24%) received intervention by the ITS during the time period between screenings, 38 (22%) were monitored (ie, the ITS conducted an assessment and determined that behaviors were within normal limits and continued monitoring would occur via screening), 24 (14%) were referred for outside services owing to a presenting problem too severe for sufficient intervention from the ITS (eg, early intervention for developmental delay), and 67 (40%) declined services (either did not return phone calls or reported that they had no significant concerns or need for intervention). For children with an initial screening score above the risk cutoff, receipt of intervention from the ITS predicted improvement on subsequent screening, as more than half (56%) of the children who received intervention by the ITS improved (had scores that moved below the risk cutoff on subsequent assessment). In contrast, only 25% of those who were referred to other services, 43% of those whose parent/guardian declined follow-up intervention, and 45% of those who were monitored showed improvement on a subsequent screening.

Table 3 shows the adjusted odds ratio of the ASQ:SE score declining below the risk threshold on follow-up screenings, subsequent to intervention from the ITS in the interim. Controlling for the child's presenting problem, gender,

TABLE 2 Bivariate Associations Among Participants Above and Below Risk Cutoff Scores on ASQ:SE Screener

Characteristic ^a	Total No.	Below Risk Cutoff, n (%)	Above Risk Cutoff, n (%)	χ^2	P
Total	3169	2458	711 (22.4)		
Gender					
Male	1647	1236 (75.0)	411 (25.0)	12.50	<.001
Female	1522	1222 (80.3)	300 (19.7)		
Ethnicity					
Hispanic	1618	1243 (76.8)	375 (23.2)	9.21	.056
African-American	982	777 (79.1)	205 (20.9)		
White	235	193 (82.1)	42 (17.9)		
Asian	104	80 (76.9)	24 (23.1)		
Other/Unknown	230	165 (71.7)	65 (28.3)		
Insurance Status					
Medicaid or SCHIP	2183	1669 (76.5)	514 (23.5)	13.81	.001
Private Insurance	780	640 (82.1)	140 (17.9)		
Uninsured	206	149 (72.3)	57 (27.7)		

SCHIP, State Children's Health Insurance Program.

^a Table represents subjects who scored above risk cutoff on at least 1 screener at any point in screening program; demographic characteristic taken at time of initial screening.

insurance type, and age, children whose parents declined services were only one-fourth as likely as those who received intervention from the ITS to demonstrate an improved screening score (odds ratio = 0.25, $P = .01$). By contrast, the odds of ASQ:SE scores declining below the risk cutoff among children who were referred elsewhere or only required simple monitoring were also lower, but not significantly different from those of children who received ITS intervention (the omitted category).

Having a developmental problem as the reason for an elevated ASQ:SE score was a significant predictor of the likelihood of improving on subsequent evaluation, as these children were less than one-third as likely to improve (odds ratio = 0.29, $P = .01$) compared with children without developmental problems. Developmental problems included diagnoses such as language, motor, or cognitive delay, and autism. Other types of presenting problems (sleep, behavior, psychosocial, and mental health), gender, age, and insurance type were not associated with whether

a child continued to score above the risk threshold at follow-up.

DISCUSSION

Our experience confirms the feasibility and effectiveness of a colocation model of an early childhood psychologist in a pediatric practice, the role of whom was to facilitate screening all young children for social-emotional concerns, and to treat and refer those children appropriately. Results from this program suggest the need for social-emotional screening in pediatric practices, the utility of the ASQ:SE as a valid and useful screening tool, and the positive impact of intervention from the ITS.

The program uncovered a high prevalence of social-emotional and developmental concerns in this population, many of which appear to be responsive to short-term intervention. Our study population showed an increase in the proportion of children with ASQ:SE scores above the risk cutoff as children aged, which may provide further evidence for the cumulative effects of risk, and the need for early identification and

intervention. Models have demonstrated that at-risk children are subjected to more risks/negative health impacts, and this prevalence exerts a negative long-term effect on their health and well-being outcomes.¹⁷ Male children, and children with a form of federally or state-sponsored insurance or without health insurance, were more likely than any other group to receive an ASQ:SE score above the risk cutoff. These findings are congruent with the original ASQ:SE sample,¹⁸ which showed a significant difference in scores based on risk status. The original sample also found a gender difference, but only among older children, at 30, 36, 48, and 60 months.

Intervention from the ITS was a significant predictor of future reduction in scores, and, thus, reduction in risk for problematic social-emotional development. An exception was the group of children with developmental delay, who were less likely to show improvement at rescreening. These children were referred to external treatment programs to address these problems, as they were beyond the scope of the current program, which was geared toward short-term assessment and intervention related to social-emotional problems. We also gain some insight regarding the effectiveness of the program by comparing the unadjusted and adjusted associations of improved ASQ:SE scores and intervention status in our sample. The unadjusted associations indicate that the probability of scoring below the risk cutoff among children who initially screened at risk on their first screen was 43% among children whose parents declined ITS intervention and 56% among families who accepted this service. Once we controlled for demographic factors and the presenting problem, the odds of having an improved score among children who declined services relative to those who accepted ITS intervention was 0.25. This change in

TABLE 3 Multivariate Association of Improvement in ASQ:SE Score at Rescreening for Children Initially Above Risk Cutoff, by Intervention Status

	Adjusted Odds Ratio of Improved ASQ:SE Score	95% CI	<i>P</i>
Gender			
Female	0.80	0.39–1.64	NS
Male	1.0	—	—
Age			
Younger than 2 y	1.89	0.65–5.52	NS
Older than 2 y	1.0	—	—
Insurance			
Medicaid	1.16	0.50–2.66	NS
Other	1.0	—	—
Presenting problem			
Developmental	0.29	0.12–0.70	= .01
Sleep	0.65	0.24–1.77	NS
Behavior	0.65	0.31–1.40	NS
Parental concern	0.29	0.11–0.77	= .01
Psychosocial	0.61	0.17–2.23	NS
Mental health	0.24	0.02–3.40	NS
Disposition			
Declined	0.25	0.09–0.71	= .01
Referred	0.48	0.14–1.72	NS
Monitored	0.73	0.26–2.04	NS
Intervention	1.0	—	—

All *P* values reflect comparison with residual category; *N* = 170. CI, confidence interval; NS, not significant; —, not applicable.

effectiveness can be attributed to the inclusion of the presenting problem in the logistic specification (data available on request). This suggests 2 possible interpretations. It is possible that families with children who accepted intervention selected to do so because of an underlying sense on their part that their children would benefit from this service and this decision proved correct on subsequent testing. An additional explanation might be that the triage decisions made by the ITS were particularly astute and the ITS was uniquely successful in convincing families of children who would be likely to benefit from the intervention to accept this service. Our data do not permit us to distinguish between these explanations. To our knowledge, this is the first report of the effectiveness of using the ASQ:SE to identify children at risk within a general pediatric sample, treat those children, and chart their improvement via ASQ:SE scores. The results reported here, however, must be interpreted cautiously. Limitations of the current study include the fact that it was conducted at a single site so that the generalizability of these findings remains to be demonstrated. In addition, because the study was not constructed with a randomized control design, the possibility of selection bias among those parents who declined services cannot be discounted. Despite intensive efforts, there remains a portion of those eligible for repeat screening who did not receive it, and although we have no reason to believe that those children differ systematically from those who were successfully rescreened, we cannot discount the possibility of some attrition bias in our findings. True "universal" screening remains a formidable goal. Since this

study, we have taken significant steps to increase our universal screening rate. In addition, the model proposed by this study raises questions of feasibility, namely the financial cost to provide office space and personnel to achieve the program goals. The concern of space is likely a significant one for smaller practices, where devoting an exam room or other office to this type of program may prove problematic. For such practices, a reduced presence of the ITS (1 or 2 sessions per week) may lessen the space burden.

Personnel costs represent the most significant implementation hurdle to be addressed. These costs can be offset to some extent by the coding of screening, formal evaluations and treatment, when appropriate. The American Academy of Pediatrics has supplied information on coding for developmental screening through its Practice Management Online service.¹⁹ The 2010 Medicare fee schedule (Resource-Based Relative Value Scale) assigns a total relative value unit of 0.2 for the *Current Procedural Terminology* code 96110 (Developmental testing; limited), which is the appropriate code for initial developmental screening with a validated instrument. This translates into a payment of \$7.21 by using the Medicare 2010 conversion factor. For children who need more extensive testing, the *Current Procedural Terminology* code of 96111 is associated with a relative value unit value of 3.61, translating into a Medicare payment of \$130.20. Although such reimbursement may not cover all personnel costs for a program of the kind described here, it must be recognized that, because ongoing developmental screening and management of screening results is the current standard of care within pediatrics, the

relevant question is whether it is more costly to devote scarce physician time to this enterprise when a less costly alternative would provide this service at lower cost. Practices can either institute a program such as this one, which may not completely pay for itself, or they must use current personnel to achieve a comprehensive screening program. Inevitably, this will take pediatricians away from seeing additional patients to conduct the assessment or referrals.

CONCLUSIONS

The findings of the current study suggest that social-emotional development be considered an important area for feasible and effective universal screening of infants and toddlers. A recent proposal²⁰ suggests that screening for social-emotional problems should occur, but only after an abnormal developmental or autism screening test or as a result of clinical observation and concerns. As the field increasingly understands the primacy of social-emotional development, however, it may be warranted to include such screening measures as a universal standard of pediatric care. As we seek to prevent developmental and social-emotional difficulties for future generations, successful collocation, screening, treatment, and referral regimens located in primary care settings represent a critical foundation for any comprehensive approach to these endeavors.

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