

Healthy Steps as a Moderator: The Impact of Maternal Trauma on Child Social-Emotional Development

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Child social-emotional development is foundational for future success, and depends on the presence of caregiver–child relationships characterized by positive “serve and return” interactions, during which caregiver responses are reliable, consistent, and empathic. Caregivers with childhood trauma may be limited in their ability to provide this type of interaction, and child social-emotional development may be at risk. We describe a Healthy Steps (HS) program and the moderating effect of this program on the relationship between reported caregiver childhood trauma and child social-emotional development. In a quasi-experimental, longitudinal design, we determined the relationship between maternal report of childhood trauma and child social-emotional development on the Ages and Stages Questionnaires: Social-Emotional (ASQ:SE) at 36 months, adjusting for covariates, and tested for a moderating effect of participation in HS on this relationship. One hundred twenty-four children were assessed at 36 months. Children of mothers with childhood trauma had higher (worse) ASQ:SE mean scores than children of mothers without childhood trauma (75.9 vs. 35.9; $p < .0001$). Differences in adjusted mean ASQ:SE scores between children of mothers with and without childhood trauma were more apparent in the comparison group (90.4 vs. 28.3) than in HS (44.5 vs. 28.2; $p < .001$). Caregiver experiences of childhood trauma are related to deficits in social-emotional development in their 3-year-old children. HS, with a focus on caregiver trauma and child social-emotional development, may serve as a moderator of this association.

Keywords: preventive mental health services, colocation, infant mental health, social-emotional development, caregiver trauma

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Social-emotional development in young children is increasingly recognized as foundational for future success. The young child's ability to manage emotions, navigate interpersonal relationships, and to feel safe enough to explore the environment are all critical building blocks of age appropriate social-emotional development. Key to the formation of these skills is the presence of a caregiver-child relationship characterized by abundant and positive "serve and return" interactions, during which the caregiver's responses are reliable, consistent, and empathic (Shonkoff & Bales, 2011). However, evidence suggests that some caregivers, especially those with significant mental health challenges and/or unresolved traumatic childhoods, struggle to engage in these types of interactions with their children (Banyard, Williams, & Siegel, 2003; Bert, Guner, & Lanzi, 2009; Cohen, Hien, & Batchelder, 2008). For example, mothers with a history of trauma may have difficulty interpreting their children's emotional states and responding in an affectively appropriate manner to their children's bids for interaction (Gusella, Muir, & Tronick, 1988; Schechter, Kaminer, Grienenberger, & Amat, 2003; Schechter et al., 2005). These parents may also employ more negative parenting practices, including higher rates of severe physical punishment, abuse potential, psychological aggression, and neglectful behaviors (Banyard et al., 2003; Bert et al., 2009; Cohen et al., 2008). In this way, an intergenerational cycle continues in which traumatized caregivers struggle to apply adequate parenting techniques, thereby potentially exposing their own children to trauma as well.

One pathway by which this cycle affects young children's socioemotional growth is by exacerbating the impact of their exposure to toxic stress, which refers to the protracted activation of a child's stress response, in the absence of an effective, supportive caregiver (Garner et al., 2012; Shonkoff, Boyce, & McEwen, 2009). In other words, appropriate and responsive caregiving is a protective factor against the potentially toxic effects of stress, but parents with their own traumatic histories may not be able to provide this type of environment. Thus, their children may be particularly vulnerable to toxic stress and thereby to changes in brain architecture that put them at risk for poor social-emotional development.

The American Academy of Pediatrics recently issued a policy statement (Garner et al., 2012) detailing the effects of toxic stress on the developing child, and calling for pediatricians to respond. This call to action suggested that the medical home was an ideal setting for interventions to interrupt the intergenerational cycle of trauma, as it is universally accessed and non-stigmatized (American Academy of Pediatrics, Medical Home Initiatives for Children with Special Needs Project Advisory Committee, 2002). However, the medical and psychological community remains undecided about the most effective way to identify and support children at risk.

Based on current evidence, we believe that the children most vulnerable to the effects of toxic stress may be those whose caregivers have been exposed to childhood trauma themselves. Thus, a reliable measure of adverse childhood experiences applied to adult caregivers could serve as a useful proxy instrument to identify at-risk children. In particular, we hypothesize that caregivers' childhood experiences of trauma would predict difficulties in their children's social-emotional development. Moreover, if we accept the initial hypothesis that a parent's own traumatic childhood is a valid way to identify young children at risk at the earliest possible moment, then we should devise appropriate interventions to interrupt the intergenerational cycle of trauma. Our second hypothesis, therefore, is that parent-focused interventions are a way to address this strategic objective.

One such program that may be effective in this regard is Healthy Steps (HS), an intervention that places early childhood development specialists in primary care pediatrics to co-manage the care of young children alongside the medical provider, with an enhanced focus on development and behavior (Lawrence, Magee, & Bernard, 2001; Minkovitz, Strobino, Hughart, Scharfstein, & Guyer, 2001). Although not manualized, the intervention, which has been implemented at numerous sites across the country, is standardized in its goal to increase caregivers' understanding of development and behavior using a range of tools and strategies (see <http://www.healthysteps.org>). Within this basic framework, however, there is room for each site to develop the program in such a way as to maximize its effectiveness for the particular population that it serves. Al-

though HS has historically focused primarily on developmental and procedural outcomes (Johnston, Huebner, Anderson, Tyll, & Thompson, 2006; Minkovitz et al., 2001), we have implemented an HS program at our institution that focuses significant attention on caregiver trauma and child social-emotional development. Over several years we have enrolled and followed a cohort of at-risk families. As part of the evaluation of our HS program, we collected data on parents' childhood experiences of trauma and also screened for problems in the child's socioemotional functioning at various intervals up to 36 months of age. We also obtained the same measures from a demographically similar group of families at another site that did not offer HS. This has provided us with the opportunity to examine the following hypotheses: (a) that there would be a positive relationship between caregiver report of childhood trauma and problems in their children's social-emotional development, and (b) that the HS intervention would serve as a moderator of this relationship, that is, that the association between presence of caregiver trauma and increased socioemotional problems in their children would be reduced or eliminated in families in the HS program.

Method

Design

We conducted a quasi experimental, longitudinal follow-up of children between the ages of birth and 3 years at two pediatric practices. The practices, although in separate buildings and distinct neighborhoods, were in the same division of the pediatrics department, shared the same medical director, were comprised of the same staffing levels, and treated a very similar patient population (see Table 1). In the intervention practice, HS was offered to all first-time parents by the pediatrician; if parents accepted, families were enrolled before children turned 2 months old (either prenatally during the last trimester to ensure a viable pregnancy, or within the first 2 months of life), and continued in the program until age 3. Throughout the course of the intervention, they were screened regularly regarding child social-emotional development. In the comparison practice, families needed to meet the same enrollment criteria (first-time

Table 1
Descriptive Statistics: Intervention and Comparison Group Practices

	Comprehensive family care center (Intervention group)	Family care center (Comparison group)
Total patients (birth to 3 years)	2,394	3,115
Race/ethnicity		
Hispanic (%)	53	47
Black (%)	35	28
White (%)	6	9
Insurance type		
Medicaid (%)	61	52
Commercial insurance (%)	12	14
Uninsured (%)	27	34

parents, children less than two months old). They were recruited by a trained research interviewer in the waiting room, and were asked to complete the same screening measures, during the same-age well-child visits as HS mothers. All enrolled participants provided written informed consent, and the study was approved by the Institutional Review Board of the Montefiore Medical Center.

Intervention

The HS program was located at a large urban pediatric practice within a federally qualified health center, and was staffed by one licensed child psychologist and one licensed clinical social worker as Healthy Steps Specialists (HSSs). The specialists had a combined 8 years of experience as HSSs. The pediatric practice serves as a continuity clinic for a large children's hospital, and annually provides more than 23,000 pediatric visits to over 11,000 distinct patients, ages 0 to 21. More than 80% of patients are either Hispanic or African American, and more than two thirds of patients have Medicaid or other state-sponsored insurance programs. As stated previously, the comparison practice was equivalent to the intervention practice on a range of variables.

HS program components included screening of child social-emotional development and caregiver childhood trauma, as well as intervention and support for both children and caregivers when necessary, as part of outpatient pedi-

atric care. Social-emotional screenings were completed by the caregiver, and occurred during the 6-, 12-, 18-, 24-, 30-, and 36-month well-child visits. Caregiver childhood trauma screening was completed upon enrollment. The HSSs reviewed screening results and planned interventions accordingly. Interventions were brief and problem focused in nature, within a theoretical framework incorporating attachment theory, eliminating toxic stress, and positive parenting techniques. HSSs focused on developmental guidance, effective discipline, and secure attachment. Developmental guidance interventions largely consisted of helping families to have appropriate expectations of children's developmental abilities, and adjust their parenting and concerns accordingly. Discussions of effective discipline focused on the importance of positive attention, planned ignoring, and the use of nonphysical behavior management techniques (e.g., time-outs). The importance of secure attachment relationships informed all interventions; serve-and-return interaction was modeled and encouraged, and caregivers were assisted in interpreting and soothing their children's emotional states. Discussions of the effects of caregiver childhood trauma were incorporated into interventions as relevant.

As a standard of HS care, families received comanaged visits at the newborn, 2-, 6-, 12-, 18-, 24-, 30-, and 36-month health care maintenance visits. Those families enrolled prenatally also received a prenatal HS visit. In addition, families received contacts in the form of additional office visits, a baby-and-me group, home visits and other nonclinic visits, and clinically based phone calls.

Families received services until their children were 3 years old, at which time they "graduated" from the program. In addition to the standard core elements, HS also offered home visits as needed (because of, e.g., safety concerns or desire to forge a stronger alliance with the family) and baby-and-me support and education groups. These groups were 1 hr in length, offered 1 day per week, and focused on parenting education, social support, and structured play time.

Measures

Family Psychosocial Screen (FPS; Kemper & Kelleher, 1996). The FPS, administered at enrollment, detects the presence of caregiver

risk factors that may impact aspects of child development. The questionnaire includes sections on family medical history, substance use, depression, and social support. The section "When you were a child" contains eight items that measure a respondent's history of trauma and abuse. Positive responses to any of the first four relevant questions, not including the question regarding parental use of time-outs, are considered a positive screen, which may predispose parents to disciplinary practices that may be abusive or too permissive. As per the scoring criteria, the four relevant questions are

1. Did either parent have a drug or alcohol problem?
2. Were you raised part of all of the time by foster parents or relatives (other than your parents)?
3. How often were you hit with an object such as a belt, board, hairbrush, stick, or cord?
4. Do you feel you were physically abused?

This section of the FPS has a sensitivity of 92% to 95% and specificity of 87% to 92% (Kemper & Kelleher, 1996).

Ages and Stages Questionnaires: Social-Emotional (ASQ:SE; Squires, Bricker, & Twombly, 2002). The ASQ:SE is a series of caregiver-completed screening questionnaires used to identify children at risk for social-emotional difficulties. Caregivers indicate whether their child does a behavior "most of the time," "sometimes," or "never or rarely," with an additional column to indicate whether the caregiver has a concern about the behavior being addressed by the question. Values of 0, 5, or 10 are given to responses and added to determine a total score. Each questionnaire has an empirically derived cutoff score, at or above which children should be assessed further. A high score is indicative of possible concern, whereas a low score suggests the child's social-emotional behavior may be considered typical for his or her age. The questionnaire can be completed in 10 to 15 min, sensitivity is moderate to good (0.71 to 0.85), and specificity ranges from 0.90 to 0.98 (Squires et al., 2002). The ASQ:SE was administered every 6 months beginning at 6 months of age and ending at program graduation (36 months). The score at

graduation was used in the present study as the outcome measure.

Analyses

General linear model (GLM) and logistic regression analyses were used to determine the relationship between maternal childhood trauma as measured on the FPS and maternal report of child's social-emotional development on the ASQ:SE at 36 months, adjusting for site of enrollment (HS vs. comparison group [CG]) and for baseline parental characteristics associated with childhood trauma that might affect child's functioning (age, educational level, race/ethnicity, having been depressed in the prior 12 months; Hypothesis 1). Analyses also tested for a moderating effect of HS on the relationship between maternal childhood trauma and child ASQ:SE score by determining whether there was a significant interaction between participating in HS and presence of caregiver childhood trauma (Hypothesis 2).

Results

For both the HS intervention and the CG, approximately two thirds of caregivers asked to participate agreed to do so; we originally enrolled 208 children in HS and 116 in the CG (total $N = 324$). Power analysis determined

these numbers would be sufficient to detect differences in their ASQ:SE scores following the intervention. However, at the 36-month assessment, we had experienced significant attrition, such that 85 HS children were assessed (41%) and 39 CG children were assessed (34%) on the ASQ:SE (see Figure 1). Differences between study completers and dropouts occurred only in CG families, in which dropouts were more likely to have gone beyond high school (51% vs. 25%) and to have recently experienced depression (35% vs. 15%), $p < .05$. Mothers who completed the study and mothers who dropped out did not differ in their reports of childhood trauma, either overall or within the HS and CG subgroups. Of the 124 children assessed at 36 months, they were slightly more likely to be female than male, predominately Hispanic and Black, and likely to have Medicaid insurance (see Table 2).

In addition, when we looked at the 124 families included in the present analyses, we found baseline differences between the HS and CG groups (see Table 2). HS mothers were more likely to have completed education beyond high school ($p < .001$), and they were, on average, approximately two years older than their CG counterparts ($p = .03$). HS mothers were also twice as likely to report experiences of childhood trauma (55% vs. 26%; $p = .003$; see Figure 2).

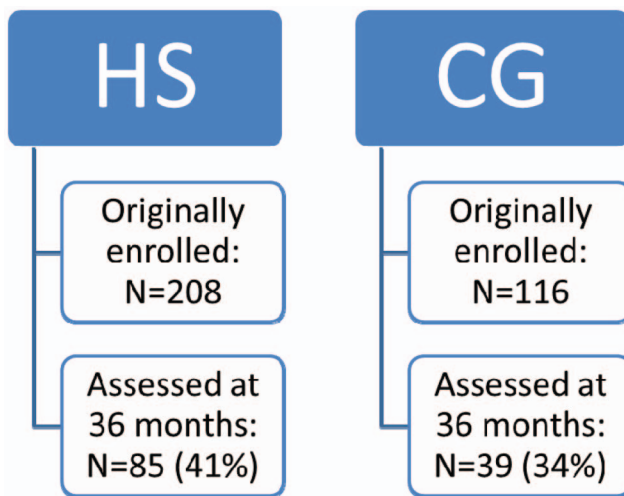


Figure 1. Initial enrollment and admission. The color version of this figure appears in the online article only.

Table 2
Sample Characteristics

	Healthy Steps (%)	Comparison group (%)	<i>p</i> value
Child female	53	56	NS
Child Hispanic	56	49	NS
Child Black	38	37	NS
Child Medicaid	76	50	NS
Maternal education \leq Healthy Steps	75	34	<.001
Mean maternal age	24 (\pm 5.6)	21.9 (\pm 3.9)	.03
Maternal childhood trauma	55	26	.003
History of depression in past year	30	15	.069

In addition to the standard HS comanaged visits, 85% of families received additional HS contacts, the most common of which were additional office visits (83%), phone follow-ups (70%), and baby-and-me group visits (24%; see Table 3).

Hypothesis 1

In the GLM analysis that adjusted for baseline differences, the overall mean score on the 36-month ASQ:SE was 55.9. As we had hypothesized, children of mothers reporting childhood trauma had significantly higher (worse) ASQ:SE mean scores than children of mothers who did not report childhood trauma (75.9 vs. 35.9; $p < .0001$), with their average

Table 3
Additional HS Contacts

	Percent	Mean	SD	Range
Office visits	83	4.3	5.1	0–27
Phone follow-up	70	3.5	5.3	0–25
Baby-and-me group	24	1.7	5.2	0–33
Nonclinic visits (home and other)	21	.44	1.1	0–5

Note. HS = Health Steps.

mean score falling well above the scale's risk cutoff of 59 (see Figure 3). In addition, 24% of the children overall (26% of HS, 21% of CG, *n.s.*) scored above the risk cutoff. The logistic regression analysis showed that, with baseline differences controlled, children of mothers with childhood trauma were 9 times as likely as children whose mothers did not report childhood trauma to have a score above the risk cutoff ($OR = 9.08$; $p < .0001$).

Hypothesis 2

As predicted, we found a significant interaction effect of Caregiver Trauma \times Enrollment in HS on the children's 36-month ASQ:SE scores ($p < .001$). As shown in Figure 4, at 36 months of age, differences in adjusted mean ASQ:SE scores between children of mothers with and without childhood trauma were more apparent in the CG (90.4 vs. 28.3) than in HS (44.5 vs. 28.2). Children of mothers without childhood trauma had

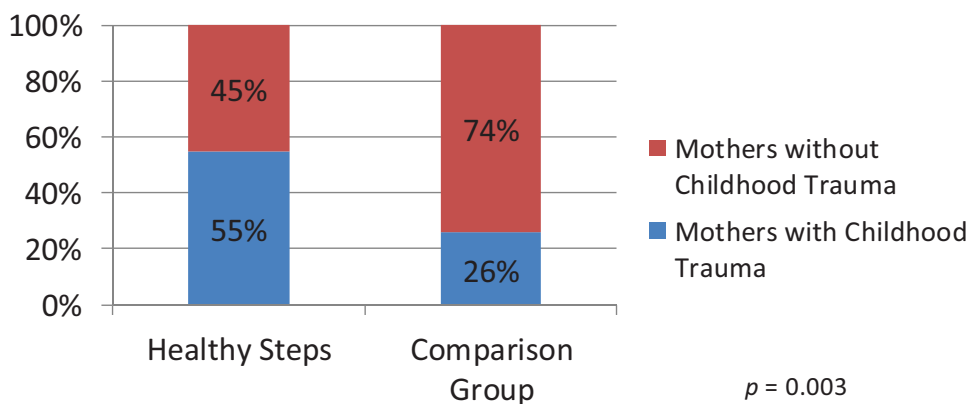


Figure 2. Prevalence of childhood trauma in mothers. The color version of this figure appears in the online article only.

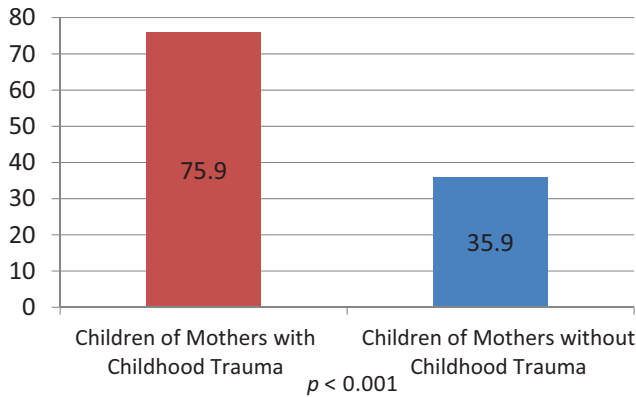


Figure 3. Full sample mean Ages and Stages Questionnaires: Social-Emotional scores. The color version of this figure appears in the online article only.

mean scores well below the risk cutoff, and in that subset, the means were basically indistinguishable by treatment group. In terms of the proportions over the cutoff, the HS and CG groups did not differ (11% vs. 10%) when looking only at children of nonexposed mothers. However, among caregivers reporting childhood trauma, the CG mothers had children with mean 36-month ASQ:SE scores well beyond the risk cutoff of 59, whereas mothers in HS had children with mean ASQ:SE scores below this cutoff. Moreover, higher proportions of CG than HS children had scores above this threshold (50% vs. 34%, odds ratio = 1.93; $p < .01$).

Discussion

In this preliminary quasi-experimental, longitudinal follow-up design, our results demonstrated that caregiver experiences of childhood trauma were related to at-risk social-emotional development in their 3-year-old children, and that a modified, targeted HS intervention may serve as a moderator of this association, as shown by the greatly attenuated relationship of those two measures among HS families. An argument could also be made for an alternative interpretation, wherein the intervention effect is moderated by the presence or absence of reported childhood trauma by caregivers, that is,

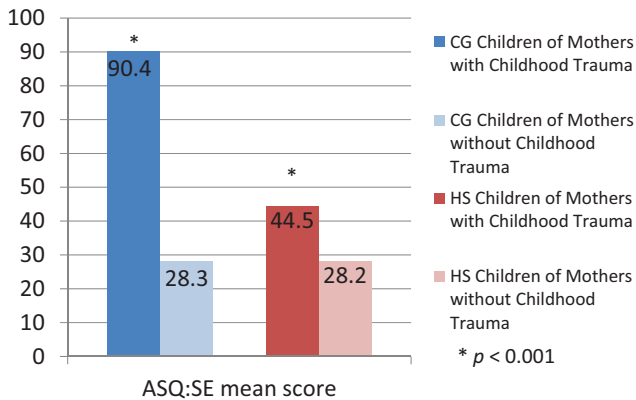


Figure 4. Impact of intervention on mean Ages and Stages Questionnaires: Social-Emotional (ASQ:SE) scores. The color version of this figure appears in the online article only.

HS only has an effect on child outcomes when the caregiver has been exposed to childhood trauma. We do think the data support our position, but further research is needed to either confirm or disconfirm this. More important, irrespective of the preferred interpretation, it is clear that caregiver childhood trauma is associated with poorer ratings of child socioemotional functioning and that participating in HS tempers this risk.

Reports of caregiver childhood trauma may be an appropriate method by which to identify children at risk for impaired social-emotional development at a very young age. Given the foundational nature of social-emotional development for future success, it is possible that interventions specifically targeting the parenting of caregivers with childhood trauma and the social-emotional development of their children may represent a promising approach.

A common refrain of our HSSs is, "If a baby feels safe, a baby will explore. And if a baby explores, a baby will learn." The association between responsive, serve-and-return caregiving environments that can buffer the effects of toxic stress and subsequent child exploration and learning is of great importance in our efforts to capitalize on the plasticity of the developing brain. It may allow us the possibility to prospectively address a range of important child outcomes, including school readiness, relationships, and the ability to manage their environment effectively.

It is important that we did not assess parenting behavior per se; nevertheless, research informs our assumption that healthy child social-emotional development stems from reliable, consistent, and empathic parenting behavior. We hypothesize that HS moderated the relationship between caregiver childhood trauma and impaired child social-emotional development by increasing these positive parenting behaviors that were perhaps more likely to be lacking in those mothers. Moreover, as mothers receive a package of many different services as part of the HS intervention, and these are delivered through multiple modalities and focus on a range of issues, we cannot be certain exactly which aspects of the program were responsible for measured differences between groups. Further understanding of this pathway represents an important area for future study.

There are important limitations of this study. First, our attrition rate, from enrollment at birth

to age 3, was substantial, as we lost 59% of the intervention group and 66% of the comparison group. The primary reason for attrition, as per our participants, was their choice to move, either out of the area completely or to a provider at a practice closer to their home. The intervention site practice also houses the high-risk obstetrics and gynecology practice for the borough, and many families begin their pediatric care there but then move to a more geographically convenient practice. Neither group received any financial remuneration for their participation in the assessments. Although these attrition rates are high, they are not unusual in a largely Hispanic research cohort. In their study of a largely Hispanic population in San Francisco, [Marin and Marin \(1991\)](#) reported a 45% attrition rate at 12 months follow-up; similarly, with a Hispanic sample in Texas, the attrition rate at 36 months follow-up was 65%.

Second, and related to attrition, is our small sample size, which may limit generalizability of results. Additionally, our intervention was not blinded, so that the participants in the intervention knew they were receiving specified services. This feature of our quasi-experimental design is not unique but rather common to care systems with limited resources that are able to offer certain services to some patients but not to all. In fact, it was the natural outcome of this apportionment of HS services that provided a built-in comparison group with which to compare the outcomes of HS participants.

An additional limitation is the absence of any independent observational data. Our reliance on self-report data for both caregiver childhood trauma and child social-emotional development may contribute to a reporting bias that limits our ability to understand the actual relationship between parenting practices and child social-emotional development. Additionally, this limitation raises the possibility that we are only changing parental perception of child social-emotional difficulties. However, if this was the case, there is no reason to believe we would change perception differently in mothers with childhood trauma versus those mothers without childhood trauma. In addition, if we did alter their perceptions in HS to make high-risk mothers more attuned and accurate reporters about their children, it is unlikely that these effects would only be in the direction in which HS parents have fewer concerns (lower

scores); we would expect that some mothers might report greater concerns about their child's socioemotional functioning because of this education.

Although the HSSs did observe the child during the program period, their ratings could not be used to corroborate parental reports because they also would not have been independent from ASQ:SE scores and knowledge of maternal childhood trauma. Pediatric records would also have primarily relied on maternal report. A superior model of independent observation and coding, such as that used in Perrin, Sheldrick, McMenemy, Henson, and Carter (2014), may be of use. However, it is worth noting that Perrin and colleagues reported that videotaped observations within pediatric practice were technologically challenging. Further research in this area would benefit from prospective measures of trauma and independent ratings of parenting practices and child social-emotional development. Future investigations of our own data will also include maternal depression screening results. We know that maternal depression can impact both parents' perceptions of their children and children's social-emotional development. Although we do screen for, and attempt to intervene with, maternal depression as part of HS, we do not do so at 36 months, thus making it impossible to include in this preliminary model.

Conclusion

Early identification of children at risk for suboptimal social-emotional development is increasingly at the forefront of pediatric practice design. Based on substantial evidence from the research community, there is agreement that young children are particularly susceptible to the effects of toxic stress, which can have a substantial and damaging impact on the architecture of the developing brain. Protective caregiver relationships represent an important buffer against these effects, and, thus, they are a promising focus of both prevention and intervention efforts.

Children growing up in poverty are in particular danger of exposure to toxic stress, because of community violence, impaired home caregiving environments, and suboptimal learning settings. Caregivers in these communities are more likely to have suffered traumatic experiences

during their childhoods, and current estimates of urban posttraumatic stress disorder are much higher than in the general population (Alim et al., 2006). Furthermore, the Adverse Childhood Experiences (ACEs) study (Felitti et al., 1998) demonstrated the extraordinary impact of a childhood characterized by negative experiences (including abuse, neglect, and household dysfunction) on a range of health outcomes manifest in adulthood. Based on retrospective survey data of over 17,000 adult respondents, a significant relationship emerged between the Adverse Childhood Experiences study and risk of adverse medical and psychiatric health outcomes later in life. For example, higher Adverse Childhood Experiences scores were associated with higher rates of smoking, obesity, depression, suicide attempts, illicit drug use, heart disease, and cancer. The potential for intergenerational transmission of risk and trauma requires early identification and intervention, delivered in a nonstigmatized and universally accessed setting, such as the outpatient pediatric primary care practice.

Although this much is generally agreed upon, significant challenges remain regarding the design of effective identification and intervention programs. HS, a national program begun in 1996, shows promise in this area. Our experience suggests that provision of a HS program, with particular focus on caregiver childhood trauma and child social-emotional development, may be an appropriate and effective intervention within the pediatric setting. In our setting, the HS program costs approximately \$100 per family, per year, also suggesting that it is a cost-effective approach to a significant challenge.

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