

# Modifiable Resilience Factors to Childhood Adversity for Clinical Pediatric Practice

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Childhood adversity is highly prevalent and associated with risk for poor health outcomes in childhood and throughout the life course. Empirical literature on resilience over the past 40 years has identified protective factors for traumatized children that improve health outcomes. Despite these empirical investigations of resilience, there is limited integration of these findings into proactive strategies to mitigate the impact of adverse childhood experiences. We review the state of resilience research, with a focus on recent work, as it pertains to protecting children from the health impacts of early adversity. We identify and document evidence for 5 modifiable resilience factors to improve children's long- and short-term health outcomes, including fostering positive appraisal styles in children and bolstering executive function, improving parenting, supporting maternal mental health, teaching parents the importance of good self-care skills and consistent household routines, and offering anticipatory guidance about the impact of trauma on children. We conclude with 10 recommendations for pediatric practitioners to leverage the identified modifiable resilience factors to help children withstand, adapt to, and recover from adversity. Taken together, these recommendations constitute a blueprint for a trauma-informed medical home. Building resilience in pediatric patients offers an opportunity to improve the health and well-being of the next generation, enhance national productivity, and reduce spending on health care for chronic diseases.

Early childhood adversity is common, with a study of nearly 54 000 Americans finding that 60% had experienced at least 1 adverse childhood experience (ACE)<sup>1</sup> and data from the National Survey of Child Health finding that 48% of American children have suffered at least 1 ACE.<sup>2</sup> Findings of the literature on ACEs have been remarkably consistent: early life trauma, in a graded, dose-response fashion, impacts the developmental trajectory of children and numerous health outcomes over the life course.<sup>1,3-12</sup>

In 2012, the American Academy of Pediatrics (AAP) released a policy statement encouraging pediatricians

to develop leadership roles in addressing the enduring effects of early life adversity and toxic stress on child health and development.<sup>13</sup> Although there is agreement that there is an urgent need to identify ways for pediatric clinical providers to foster resilience in children given what we know of the detrimental health consequences of untreated ACEs and their high prevalence, clinicians and policy makers are unsure of how best to move forward.<sup>12,14</sup>

The literature on resilience has clearly identified protective factors for traumatized children that improve health outcomes.<sup>15-25</sup>

## abstract

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Ms Traub conceptualized the manuscript, conducted the initial literature review and drafted and revised the manuscript; Dr Boynton-Jarrett participated in the conceptualization, assisted with the literature review, and critically edited the manuscript; and both authors approved the final manuscript as submitted and agree to be accountable for all aspects of the work.

**DOI:** 10.1542/peds.2016-2569

Accepted for publication Nov 15, 2016

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PEDIATRICS (ISSN Numbers: Print, 0031-4005; Online, 1098-4275).

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**FINANCIAL DISCLOSURE:** The authors have indicated they have no financial relationships relevant to this article to disclose.

**FUNDING:** No external funding.

**POTENTIAL CONFLICT OF INTEREST:** The authors have indicated they have no potential conflicts of interest to disclose.

**To cite:** Traub F and Boynton-Jarrett R. Modifiable Resilience Factors to Childhood Adversity for Clinical Pediatric Practice. *Pediatrics*. 2017;139(5): e20162569

Just under half (48%) of high-risk preschoolers were found to be resilient in a 2016 study; significantly correlated with resilience were no experiences of maltreatment and a nondepressed primary caregiver.<sup>26</sup> Yet despite empirical investigations of resilience over the past 40 years, there is limited integration of these findings into proactive strategies to mitigate the impact of ACEs on the life course health trajectory.<sup>14</sup>

What specifically can be done in pediatric clinical practice to build resilience to ACEs? To answer this focused question, we comprehensively reviewed the research about resilience to childhood trauma across many different fields: child development, child maltreatment, preventive health, clinical pediatrics, psychiatry, traumatology, neurobiology, and sociology. Using PubMed, we concentrated on those peer-review studies published in the last 5 years that explored possible levers for change, those that investigated modifiable characteristics of a child's psychosocial and family environment associated with increasing resilience to ACEs. We primarily included 2 types of resilience studies: (1) longitudinal investigations of traumatized children that elucidate factors associated with resilience; and (2) randomized controlled trials (RCTs) or quasi-experimental studies of interventions that had resilience as a primary outcome. We considered modifiable resilience factors at the community level to be beyond the scope of this review because we were looking specifically at malleable, health-enhancing resilience factors in the context of pediatric clinical practice. We enhanced our search results with a review of bibliographies of included research. This review aims to empower pediatricians with specific recommendations to bolster the resilience of traumatized children,

while highlighting the need for more research.

The Adverse Childhood Experiences study was a landmark investigation of the relationship between childhood trauma and long-term health outcomes. Subsequent work expanded the original set of ACEs to include several types of adversities common in diverse, nonwhite, lower socioeconomic-level communities.<sup>27</sup> Research supports the hypothesis that adult health outcomes are influenced by the cumulative incidence of ACEs, although differences in risk are appreciated by chronicity, severity, contextual factors, and type of childhood traumas.<sup>1,3-5,7-11,16,28</sup> There is a graded, dose-response association between ACEs and the risk for poor health outcomes, including asthma, ischemic heart disease, stroke, obesity, diabetes, chronic obstructive pulmonary disease, autoimmune disease, substance use disorder, and sexually transmitted diseases.<sup>1,3-5,7-10,16-20,29-38</sup> Mental health consequences of adversity include emotional and behavioral problems, school failure, major depressive disorder (MDD), anxiety, posttraumatic stress disorder (PTSD), and dissociative disorders, which similarly increase in a dose-response relationship with adversity.<sup>2,7,11,16-20,30-35,39,40</sup> Not only are those with ACEs sicker, but they have lower overall satisfaction with their lives, have less access to health care, use more expensive health care, and die nearly 20 years earlier on average.<sup>41</sup>

We first present the definition and components of resilience to childhood adversity, focusing on 5 modifiable resilience factors identified in the comprehensive search of the literature. We then offer recommendations for preventive pediatric care aimed at promoting resilience in pediatric patients through individual practice

modifications and broader systems-level change.

## RESILIENCE

Resilience is defined in this review as good mental and physical health despite the assaults of early adversity (the ability to withstand, adapt to, and recover from adversities).<sup>42</sup> Far from being inherent to the child, resilience results from a complex interplay between the child's genetics, natural temperament, knowledge and skills, past experiences, social supports, and cultural and societal resources.<sup>8,32,34,43-48</sup> Zolkoski and Bullock<sup>42</sup> published a recent review of the resilience literature that identified 3 consecutive waves of resilience research since its inception around 1970: the first wave concerned itself with understanding and preventing psychopathology; the second wave focused on how resilience factors lead to good outcomes for children despite risks; the third wave, into which our work falls, investigates how to promote resilience through prevention, intervention, and policy changes.

The early resilience research focused on the traits of children with ACEs who fared better than their peers, with an implication that some children were immune to ACEs as a result of inherent characteristics.<sup>46,49</sup> Multiple authors identify similar resilient traits: high self-esteem, internal locus of control, external attributions of blame, optimism, determination in the face of obstacles, cognitive flexibility and reappraisal ability, social competence, and the ability to face fears.<sup>8,32,34,44,45,50</sup> Rutter<sup>46</sup> elaborated the concept of resilience instead as a mediating factor that buffers a child from adversity by reducing the impact of trauma, reducing negative chain reactions stemming from trauma, and enabling opportunities for recovery from

**TABLE 1** Modifiable Resilience Factors Relevant to Pediatric Clinical Practice

Level	Resilience Factor	Description
Individual	Cognitive traits: positive appraisal style and executive function skills	Positive appraisal styles, defined by optimism and confidence about one's ability to manage adversity, are associated with resilience to adversity. Improved executive function, especially cognitive flexibility and inhibitory control, is also associated with resilience to ACEs.
Family	Parenting	Responsive parenting and good parental relationships foster resilience. The HPA axis normalizes in traumatized children when parenting improves.
	Maternal mental health	Maternal mental health problems are associated with risk for trauma as well as less sensitive parenting (a resilience factor); identifying and treating maternal psychopathology could foster resilience in children and prevent ACEs.
	Self-care skills and household routines	ACEs are associated with poor sleep, nutrition, and exercise habits. Teaching children self-care skills and using consistent routines at home are associated with healthy resilient development.
Individual/family	Trauma understanding	Educating children and families about trauma in pediatric settings and through trauma-focused interventions builds resilience.

trauma. More recently, researchers are elucidating the relationships between genetic, specifically genes modulating neurotransmitters, and environmental factors with resilience.<sup>47,51-53</sup>

If resilience is conceptualized as the shield protecting children from toxic stress, the shield gets battered and worn down from use.<sup>26,31,54,55</sup> Wingo et al<sup>34</sup> found that resilient individuals had both fewer and less severe lifetime experiences of childhood physical, sexual, and emotional abuse. On the other hand, the child's resilience can flourish in an ecosystem that proactively develops resilient coping.<sup>32,42,43,52,56</sup> Recent research has shed light on a paradoxical phenomenon related to resilience of particular relevance to medicine: the "John Henryism" hypothesis, which states that high-effort coping styles defined by hard work and determination ("grit") by low-income youth may lead to improved socioeconomic outcomes, but are associated with hypertension.<sup>57-59</sup>

Many interventions have shown promise in enhancing resilience in traumatized children.<sup>16-19,21-23,60-63</sup> Toxic stress is purported to permanently alter brain architecture and make the child vulnerable to stress-related disease processes.<sup>7,31,64</sup> However, there is evidence that children's stress hormone regulation is responsive to psychosocial interventions.<sup>18,20-22,25,65</sup>

We posit that resilience has 3 temporal aspects relevant to pediatrics: resilience to withstand, adapt to, and recover from adversity.<sup>66</sup> The literature has ample evidence for 5 such modifiable resilience factors, by no means the only modifiable resilience factors: a positive appraisal style and good executive function, nurturing parenting, maternal mental health, good self-care skills and consistent household routines, and an understanding of trauma (Table 1). We will highlight some of the many interactions between these resilience factors.

### Positive Appraisal Style and Executive Function Skills

Several researchers have identified a positive appraisal style as predictive of resilience.<sup>32,49,50,67,68</sup> Although there is a biological, and likely genetic, element to appraisal style, resilience theorists maintain that appraisal style is modifiable via experience and explicit cognitive behavioral therapy.<sup>67</sup> In a prospective study of children, positive expectations about the future were found to be significantly associated with future lower rates of depression.<sup>68</sup>

Similarly, researchers identify strong executive function as predictive of resilience.<sup>32</sup> Early adversity and poverty in childhood are both associated with lower levels of executive function.<sup>69-71</sup> Blair et al<sup>70</sup>

found that higher executive function in 3-year-old children was associated with more positive parenting ratings in infancy, potentially mediated by lower stress hormone activation. Davidovich et al<sup>72</sup> studied executive function in children exposed to the adverse event of parental MDD and found fewer depressive symptoms among those children with improved executive function, specifically better cognitive flexibility and inhibitory control. Executive function in children improves with several educational approaches from the narrow, computer training programs on executive function to the general, aerobic exercise and mindfulness training.<sup>73</sup>

### Parenting

Parent-child interactions and relationships have a profound effect on resilience. Two notable longitudinal studies identify parental competence and relationship quality as key to resilience. Collishaw's team<sup>45</sup> used data from the 40-year Isle of Wight study. Forty-four percent (44%) of those who had been physically or sexually abused showed resilience, with lower rates of self-rated health problems, better interpersonal relationships, and less criminality than the control group. Participants who rated at least 1 of their parents as "very caring" were significantly more likely to be resilient in midlife (61.5% vs 20% who rated neither parent as such). Savage-McGlynn et al<sup>74</sup>

reanalyzed the Avon Longitudinal Study of Parents and Children data, focusing on infants experiencing maternal postpartum depression at 8 months of age. The study found that the best correlate of resilience at age 11 was a composite indicator of mothers' positive feelings about their ability to parent at 8 and 21 months' postpartum. In other words, a woman's belief that she is doing a good job parenting her child was associated with resilience in the child.<sup>74</sup>

Measures of parenting have also been linked to neuroendocrine activation. In families with high levels of psychosocial stressors, parents are at risk for developing less sensitive and warm early caregiving patterns, with a concomitant increase in cortisol levels in their children.<sup>69</sup> Blair et al<sup>70</sup> studied salivary cortisol levels in a diverse group of low-income infants and correlated these findings to observations of parenting interactions. "Positive parenting," evaluated on the axes of sensitivity, positive/negative regard, intrusiveness, detachment, and animation, was inversely correlated with cortisol levels at baseline and after a standardized stressful event.<sup>70</sup> Gunnar et al<sup>20</sup> found that mothers rated low in sensitivity during infant medical exams had toddlers with higher cortisol responses to vaccinations. This finding is consistent with earlier research showing the effect of nurturant foster and adoptive parenting secondary to early abuse and neglect. Children removed from orphanages have consistently been shown to have perturbations of the hypothalamic-pituitary-adrenal (HPA) axis that normalize with adoption by a stable caregiver by 3 years later.<sup>19,20</sup> The Attachment and Bio-Behavioral Catch-up intervention, a manualized parenting intervention designed to foster sensitive caregiving, was found to normalize participant toddler and preschooler cortisol levels at

significantly greater rates than control group participants in multiple RCTs.<sup>17-20,22,24,65</sup>

### **Treating Maternal Mental Health Problems**

Yet another way to enhance children's resilience is to screen for, identify, and treat maternal psychopathology, which has been found to be harder to treat when the mother herself has a history of trauma.<sup>75-77</sup> Depressed mothers are less responsive to and more punitive of their infants, less able to develop and implement consistent household routines, more likely to employ punitive disciplinary measures, and less available to supervise adolescents, resulting in cognitive, social, and emotional deficits for their children.<sup>74,78,79</sup> Furthermore, when mothers have a history of ACEs themselves, they are less able to modulate their own stress responses and teach coping.<sup>80</sup> Chemtob et al,<sup>75</sup> in a study of preschoolers in a pediatric clinic, found that maternal PTSD was associated with an average of 5 potentially traumatic events per preschooler, maternal comorbidity with PTSD and depression with 3.2, and maternal depression alone with 1.2 potentially traumatic events. The more severe the maternal depression, the higher was the risk of child physical abuse and neglect.<sup>75</sup> A 2009 joint consensus report of the Institute of Medicine and the National Research Council highlighted the scale of the challenge: 15.6 million children live with a parent suffering from MDD. The report identified pediatric health visits as an opportunity for addressing parental depression, noting that parenting is often what depressed parents care most about.<sup>54,56,78</sup>

### **Self-Care Skills and Routines**

Self-care and consistent routines are key ingredients in understanding resilience. Adults who have experienced ACEs are less likely to have healthy sleep, nutrition, and

physical activity habits.<sup>81,82</sup> Nurius et al<sup>81</sup> found that study participants with high ACE scores who demonstrated healthy sleep and exercise habits were no more likely to miss work for mental health problems than were those with lower ACE scores.

Consistent routines in the household are essential for establishing feelings of safety in young children, and form the basis for learning to care for themselves, self-regulation, and school readiness, while also mitigating toxic stress.<sup>17,23,56,79,83,84</sup> Household chaos is associated with poor health in adolescents.<sup>56</sup> When parents adhere to predictable structure around mealtimes, bedtimes, and media consumption, there are reductions in rates of obesity, substance use, and improved nutrition for their children.<sup>56</sup> Children with asthma who have a regular bedtime routine experience fewer asthma symptoms and are more likely to sleep through the night.<sup>54,56</sup> In a 2015 longitudinal study, Staples et al<sup>85</sup> found that having a consistent bedtime routine (usually story, bath, and pajamas) was associated with greater nightly sleep time for 3-year-old children, an effect that was enhanced when parents used consistent parenting practices throughout the day. A recent longitudinal study of children's sleep and consistent routines found that inadequate sleep at age 6 years was associated with a lack of household routines both at ages 4 and 6 years.<sup>86</sup>

Fiese et al<sup>56</sup> note that maintaining routines requires planning, time, and clear communication, all of which are scarcer in families dealing with adversity, poverty, and housing instability.<sup>84,87</sup> In addition, parental depression has been found to be independently associated with fewer household routines (odds ratio [OR] = 0.68 for consistent routines).<sup>79</sup> Using data from a national database of over 2000 mothers, Winders

Davis et al<sup>79</sup> found that mothers evincing depressive symptoms were less likely to employ bedtime, naptime, and mealtime routines in their parenting. Illustrating another interrelationship between modifiable resilience factors, mothers heading chaotic households had lower executive function capacity and were more likely to use harsh parenting techniques.<sup>88</sup>

The Early Intervention Foster Care program (EIFC) teaches caregivers how to create an environment with consistent caregiving and predictable routines. The EIFC pilot showed improvements in child behavior, reductions in parental stress, and improved parenting along with concordant changes in the neuroendocrine activation of the children, as evidenced by changes in salivary cortisol that had the EIFC group coming to resemble the untraumatized community control, whereas the regular foster care cohort maintained blunted cortisol and high cortisol variability.<sup>17,18</sup> A 5-year RCT evidenced significant increases in permanent placements for the treatment group over the control group (90% vs 64%).<sup>21</sup>

### Enhancing Trauma Understanding

The final lever that will be examined in this article to enhance resilience to pediatric trauma is education about the nature of toxic stress and children's response to toxic stress. Streeck-Fischer and Van der Kolk<sup>31</sup> note that children who have experienced chronic stress and trauma rarely spontaneously speak of their experiences and tend to have little insight about the relationship between their experiences and how they feel and act. Several psychotherapy approaches, including child-parent psychotherapy and trauma-focused cognitive behavioral therapy, show the positive impact of trauma education on children's mental health outcomes.<sup>16,23,60,62,63</sup> In a clear interaction between

resilience factors, parents who are able to jointly make meaning out of traumatic experiences with children are able to improve their children's resilience.<sup>54</sup> Traumatized children and families treated with these approaches have dramatically reduced incidences of PTSD, depression, and behavioral problems.<sup>16,62,63</sup> Cohen et al<sup>23</sup> describe how age-appropriate breathing and muscle relaxation techniques that can be taught in the pediatric office reduce the physiologic hyperarousal seen in pediatric PTSD.

### RECOMMENDATIONS FOR PEDIATRIC PRACTICES TO ENHANCE RESILIENCE TO ACES

Pediatric primary care, with its focus on preventive health care, is the right place to deliver interventions to enhance resilience to childhood adversity. Results of a subgroup analysis of an AAP 2013 survey including 302 pediatricians show that only 4% screen for all 7 ACEs routinely and almost a third (32%) screen for none.<sup>89</sup> Only 11% were familiar with the original ACE study, whereas more than three-quarters (76%) were not at all familiar.<sup>80,89</sup> Pediatricians agree on the need to offer evidence-based interventions proven to successfully address the needs of traumatized children.<sup>17,20,23,90,91</sup> Despite recognizing the importance of parenting to resilience, most did not screen for parental ACEs.<sup>80</sup> Barriers to the identification and treatment of trauma in pediatrics include a perceived lack of time, lack of training, lack of reimbursement, and a reluctance to experience the discomfort of discussing trauma and parenting, especially when children are in the room.<sup>11,91-94</sup>

The following are 10 recommendations for leveraging these modifiable resilience factors in a pediatric clinical setting. Table 2 summarizes additional

studies that pertain to the specific recommended practices. Taken together, these recommendations constitute a blueprint for a pediatric trauma-informed medical home. Table 3 offers a comparison of this theoretical trauma-informed medical home to usual care.

1. Train all pediatric clinical staff in the principles of trauma-informed care. Trauma-informed pediatric care aims to ensure a safe experience for children, families, and staff.<sup>41,95,102</sup> A study of Massachusetts pediatricians found that <20% reported having adequate knowledge of pediatric trauma, frequently learning of trauma through direct inquiry, and regularly assessing for and treating PTSD; there was also a significant association between training in PTSD and learning of traumatic experiences through direct inquiry.<sup>94</sup>
2. Screen pediatric patients for ACEs, resilience, maternal psychopathology and ACEs, family functional capacity, and family violence. Childhood adversity is common, causes significant morbidity, and is eminently treatable once identified; yet the vast majority of children with emotional and behavioral problems, many of which may be due to trauma, go unidentified and untreated.<sup>23,93,103</sup> There are validated screening tools for trauma and resilience that enable clinicians to target the age group and type of screening (for trauma symptoms, resilience, or specific types of ACEs) (Table 4).<sup>104-107</sup> Ahern et al<sup>104</sup> and Wevodau et al<sup>105</sup> have published recent reviews of resilience and trauma screening tools. The most basic screening is to ask patients and caregivers the question: "Has anything scary or upsetting happened to you [your child]

**TABLE 2** Recommendations and Associated Key Studies

Reference	n (Age)	Method	Main Findings
Recommendation 1: Train All Pediatric Clinical Staff in the Principles of Trauma-Informed Care Oral et al (2016) <sup>41</sup>	—	Literature review summarizing components of trauma-informed care, its relevance to pediatrics and childhood adversity, and early evidence of its effectiveness.	Review finds that implementation of trauma-informed care would require surveillance of trauma, resilience, functional capacity, and health consequences of ACEs. There is a significant public health need to identify childhood trauma when it occurs.
Banh et al (2008) <sup>65</sup>	587 (average, 46; SD, 10.3)	Survey of all known PCP pediatricians in Massachusetts (60% response rate), evaluating pediatricians' self-reported practices in identifying, assessing, and treating trauma and PTSD. Survey data were analyzed with descriptive statistics and multivariate analyses.	18% of survey respondents reported adequate knowledge of childhood PTSD. 15% of respondents reported that they frequently learned of traumatic experiences in their patients through direct inquiry. 10% of respondents reported frequent assessment and treatment of PTSD. There were significant associations between having received PTSD training and believing that PTSD treatment is within the purview of pediatricians and learning of trauma through direct inquiry.
Recommendation 2: Screen Pediatric Patients for ACEs, Resilience, Maternal Psychopathology, Parental ACEs, and Family Violence Horwitz et al (2007) <sup>93</sup>	687 (average, 45.4 y; SD, 10.4 y)	Questionnaire to a random sample of the cross-sectional survey of the AAP membership (52% response rate). Factor analysis performed on the questionnaire data.	Majority of physicians provide mental health care to children (61%); few screen regularly for maternal depression (4.5%) and treat maternal depression (4.3%). Lack of time to treat mental health problems (77%) and long waits to see mental health providers (74%) were the most common barriers cited to treating psychosocial issues in children. Lack of training (74.5%) and lack of time (64.3%) were the most frequent barriers cited to the treatment of maternal depression.
Dubowitz et al (2011) <sup>77</sup>	102 (average, 45 y)	Cluster RCT at 18 pediatric practices of the SEEK model of screening for risk factors for child maltreatment, with random assignment to intervention and standard care groups. Data collected at 6, 18, and 36 mo into intervention.	SEEK model showed significantly ( $P < .05$ ) greater improvement from baseline over controls on provider questionnaire of their ability and confidence to address depression (6 mo); substance abuse (18 mo); intimate partner violence (6 and 18 mo); and stress (6, 18, and 36 mo). SEEK providers screened significantly ( $P < .001$ ) more often for targeted problems than control group providers.
Recommendation 3: Employ Nonphysicians To Conduct Psychosocial Screening and Offer Education to Families Coker et al (2018) <sup>96</sup>	251 (parents of infants <12 mo)	RCT comparing an intervention (PARENT) to usual well-child care for parents of infants <12 mo. Primary outcome measures included receipt of preventive care services, parent experiences of care, and health care use.	PARENT model showed significantly greater preventive care delivered (anticipatory guidance, psychosocial screening, health education, and parental concerns addressed) in the intervention group and 52% fewer intervention children with >2 emergency department visits over 1 year. No difference was found between intervention and control groups for well-child care or sick visits.
Recommendation 4: Create a Medical Home for Children With ACEs, Emphasizing Strong Relationships With Families, Regular Care Providers, and Individualized Care Raphael et al (2015) <sup>97</sup>	240 (0–18 y; average, 8.9 y; SD, 4.8 y)	Survey of families of low-income children with chronic health conditions and their pediatric practices to assess the degree to which they were cared for in a patient-centered medical home.	There were associations between parents' reports of having a usual health care provider and pediatric practice reports of higher organizational capacity and lower rates of emergency department use. Parent reports of a patient-centered medical home was associated with higher scores on the medical home index of the pediatric practice.
Winders Davis et al (2015) <sup>79</sup>	2068 (parents of children 0–3 y old)	Secondary analysis of telephone interview data of parents of children under 3 y, stratified by parental depression, examining parenting practices and access to family-centered care.	Depression was associated with a significant increase in punitive discipline (OR = 1.51, $P = .007$ that the parent performed more than the median number of punitive discipline behaviors) and decrease in household routines (OR = 0.68, $P = .018$ that the parent performed more than the median number of routines). Family-centered care was independently associated with performing more household routines (OR = 1.12, $P = .011$ that the parent performed more than the median number of routines).
Bethell et al (2014) <sup>2</sup>	95677 (range, 0–17 y)	Secondary analysis of data collected in the 2011–2012 National Survey of Child Health. Multivariate and multilevel regression analysis of data.	Prevalence of ACEs was found to be 48% for 1 of ACE and 23% for $\geq 2$ ACEs. Those with ACEs had significantly lower rates school engagement and higher rates of chronic disease. Resilience among those with ACEs was positively correlated with school engagement and receipt of care in a family-centered medical home.
Recommendation 5: Integrate Behavioral and Physical Health Care in the Pediatric Office			

**TABLE 2** Continued

Reference	n (Age)	Method	Main Findings
Asanow et al (2015) <sup>96</sup>	13 129 (0–21 y)	Systematic meta-analysis of 31 eligible RCTs of combined pediatric medical-behavioral health care versus usual care after PubMed search yielded 6792 studies. Meta-analysis with random effects model used to calculate overall effect across trials.	Significant ( $P < .001$ ) behavioral health outcome advantages were found for integrated practices over usual care. The most beneficial were “treatment” models where a particular subgroup of patients were targeted and “collaborative care” models where team-based interdisciplinary care was provided to jointly evaluate, treat, and monitor patients. Probability was 66% (73% in collaborative care practice) that a randomly selected youth would have a better outcome after receiving integrated medical-behavioral treatment over usual care.
Recommendation 6: Offer Group-based Parenting Education Martin et al (2011) <sup>99</sup>	1851 (0–3 y)	17 Early Head Start sites, randomized to receive parenting services or control. Data collected 6, 15, and 26 mo into intervention as well as at age 3 y. Multivariate regression models used to analyze service receipt and outcomes.	At age 3 y, 76% of mothers reported regular bedtime for child and 81% reported a bedtime routine. Participation in parent-child group or parenting education at child's age of 0–10 mo or receipt of case management services at child's age of 11–19 mo significantly increased the odds of having a bedtime at age 3 y. Only parent-child group participation between 11 and 19 mo of age significantly increased the odds of having a bedtime routine at age 3 y of all the parenting services offered.
Bethell et al (2016) <sup>100</sup>	—	Literature review of emotional and behavioral problems in children with ACEs and approaches to building resilience through parental support.	Mindfulness-based and mind-body training for parents can build resilience in children with emotional and behavioral problems as a result of adversity.
Recommendation 7: Offer Peer-based Group Education to Pediatric Patients With Multiple ACEs About Trauma and Self-Care Nurius et al (2015) <sup>81</sup>	13 593 (>18 y; average, 57.1 y; SD, 16 y)	Secondary analysis of a sample of 2010 Behavioral Risk Factor Surveillance System for Washington State. Analysis included bivariate correlations and theory-guided hierarchical regression.	With an Eye Toward Fostering Resilience and Increasing Social Support for Children ACE scores were significantly associated with all mental health outcomes in the expected direction. ACEs were associated with diminished resilience resources (sense of community and ameliorating health behaviors). Sense of community and ameliorating health habits (sleep and physical activity) were, to a lesser extent, associated with improved mental health, despite ACEs.
Recommendation 8: Customize Pediatric Health Care to the Needs of the Family Flynn et al (2015) <sup>14</sup>	3422 (0 y to adult)	Considering the Broad-Reaching Effects of Trauma on Physical and Mental Health as Well as Social and Academic Outcomes Systematic meta-analysis of 10 eligible studies (6 RCTs) of interventions to address toxic stress in pediatric primary care.	Authors of 9 of the 10 included studies concluded that interventions in screening, recognition and discussion of trauma, and provider education about community resources for trauma had positive effects on intended outcomes: provider behavior, provider knowledge/skills, child maltreatment, family violence exposure, and child behavioral problems.
Recommendation 9: Familiarize Pediatric Staff With Mental Health and Social Service Resources in the Community Hornor (2015) <sup>32</sup>	—	Literature review of appropriate responses to ACEs by pediatric clinicians on the topics of toxic stress physiology, resilience to ACEs, ACE screening, intervention, and referral to the community.	Make Individualized Referrals for Children and Their Families Toxic stress and trauma change children's physiology and predispose them to health problems. Early identification and intervention by pediatric clinicians can avert lifelong health consequences of early adversity. Enhancing resilience by supporting families in parenting and referring to community-based resilience-building services is key to protecting children from ACEs.
Recommendation 10: Be Cognizant of the Barriers to Engagement Dorsey et al (2014) <sup>101</sup>	47 (6–15 y and foster parent)	Facing Families of Children With ACEs RCT of an engagement intervention (McKay's) in a group of foster children referred to TF-CBT.	Families in the intervention, which included discussions of concrete and perceptual barriers to treatment and caregivers' greatest concerns for their child, were significantly more likely to attend at least 4 sessions of TF-CBT (96% vs 75%) and to complete treatment (80% vs 41%).

PARENT, parent focused redesign for encounters, newborns to toddlers; PCP, primary care provider; SEEK, safe environment for every kid; TF-CBT, trauma-focused cognitive behavioral therapy; —, literature reviews which do not quantify the number of participants in study.

**TABLE 3** Trauma-Informed Medical Home Versus Usual Care

Care Component	Trauma-Informed Medical Home	Usual Care
Medical health care	History and physical Provider trained in trauma-informed care	History and physical
Behavioral health care	Integrated Trauma-informed, team-based, engagement-focused	Separate Usually not trauma-informed
Trauma/resilience screening	Comprehensive screening Referral and integrated case management with screening results	Trauma/resilience screening rare
Anticipatory guidance provided	Anticipatory guidance re: trauma impacts and recovery; self-care skills, mental health treatment; age-appropriate risk reduction, and parenting	Anticipatory guidance re: age-appropriate risk reduction and parenting
Case management	Integrated team-based case management with regular follow-up	Usually none provided at the pediatric office
Referrals to community-based services	Relationships and communication with community-based service providers ongoing Staff with knowledge of community resources helps families trouble-shoot and overcome obstacles	Referrals are made, but there is no ongoing communication with service providers or attempt to surmount obstacles to accessing services
Parenting support	Trauma-informed Integrated into care	Not usually offered except for brief conversations during well-child visits
Peer support	Trauma-informed Integrated into care	Not usually offered
Educational advocacy	Educational advocacy, educational testing	Not usually offered

or your family since the last time I saw you?”<sup>23</sup> Dubowitz et al<sup>77</sup> conducted an RCT of a screening tool and found that those pediatricians trained with the tool were both doing significantly more screening and feeling significantly more competent to effectively address these issues as far as 3 years postintervention.

3. Employ nonphysicians to conduct psychosocial screening and offer education to families about healthy development, trauma impacts, and recovery; self-care skills and mental health treatment; age-appropriate risk reduction; and parenting. An RCT of a parent-coach model found significant increases in pediatric psychosocial screening and reductions in emergency department visits.<sup>96</sup>
4. Create a medical home for children with ACEs, emphasizing strong relationships with families, regular care providers, and individualized care. The literature demonstrates the health benefits to children of medical homes, particularly

those that target vulnerable patient subgroups.<sup>97</sup> Bethell et al<sup>2</sup> found that children who had >2 ACEs were significantly less likely than children with no ACEs (43.5% vs 61.4%) to receive care in a family-centered medical home. Furthermore, those children with ACEs who did not have a medical home were significantly less likely to evince resilient characteristics (OR = 0.69).<sup>2</sup> Winders Davis et al<sup>79</sup> found a significant positive relationship between the provision of family-centered care and consistent household routines (OR = 1.12), itself a correlate of resilience.

5. Integrate behavioral health care into the pediatric office. Asarnow et al,<sup>98</sup> in a 2015 meta-analysis of 35 RCTs comparing integrated medical and behavioral health care for pediatric patients to standard care, found a 73% likelihood that a randomly selected child treated in a “collaborative care” model would have a better outcome than a child in the standard care comparison group.

6. Offer group-based parenting education and support. Emphasize responsive parenting, the importance of the parental role in enabling trauma recovery and resilience, and the establishment of consistent routines at home.<sup>99,100</sup> Pediatricians are well situated to inquire about and offer anticipatory guidance about the importance of consistent routines for all children, and especially those who have experienced ACEs. This guidance should include an understanding of the particulars of the child’s living arrangements as well as determining current routines, elucidating barriers to consistent routine implementation, and offering individualized, scaffolded support to implement more consistent and appropriate routines.<sup>56</sup>
7. Offer peer-based group education and anticipatory guidance to children and families with multiple ACEs about trauma and self-care to foster resilience and increase social support for these children. Nurius et al<sup>81</sup> report that a strong sense of

**TABLE 4** Pediatric Screening Tools for Trauma and Resilience

Characteristics of Screening Tool	PEDS-ES <sup>108</sup>	TESI-C <sup>109</sup>	CTQ <sup>110</sup>	TSC-C/ TSC-YC <sup>111</sup>	WBTH <sup>112</sup>	UCLA <sup>113</sup>	STEP <sup>114</sup>	SDQ <sup>115</sup>	CD-RISC <sup>116</sup>	RS/RS-14/ RS-10 <sup>117</sup>	READ <sup>118</sup>
Domains of trauma											
Any trauma	✓				✓						
Physical abuse	✓		✓								
Emotional abuse	✓		✓								
Sexual abuse	✓		✓								
Physical neglect	✓		✓								
Emotional neglect	✓		✓								
Witness to violence	✓										
Resilience											
Individual traits								✓		✓	✓
Ecological aspects											✓
Symptoms of trauma exposure											
Emotional	✓			✓	✓		✓	✓			
Behavioral	✓			✓	✓		✓	✓			
PTSD				✓	✓						
Administration considerations											
Ages 0–5 y	> 2 y	> 4 y		> 3 y	> 7 y	> 7 y	> 8 y	> 4 y	> 10 y	> 8 y	
Ages 5–12 y	✓	✓		✓, > 8 y	✓	✓	✓	✓	✓	✓	✓
Ages 12–18 y	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Parent version/component	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Time to complete	7 min	10–30 min	5–10 min	15–20 min	10–20 min	15–30 min	10 min	10 min	5 min	5 min	10–20 min
Published psychometric properties	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

CD-RISC, Connor Davidson Resilience Scale; CTQ, Childhood Trauma Questionnaire; PEDS-ES, Pediatric Emotional Distress Scale-Early Screener; READ, Resilience Scale for Adolescents; RS/RS-14/RS-10, Resilience Scale/14-Item/10-Item; SDQ, Strengths and Difficulties Questionnaire; STEP, Screening Tool for Early Predictors of PTSD; TESI-C, Traumatic Events Screening Inventory for Children; TSC-C/TSC-YC, Trauma Symptom Checklist for Children/Young Children; UCLA, UCLA 9-Item PTSD Reaction Index; WBTH, When Bad Things Happen Scale.

- community among adults with previous ACEs is the most closely associated with health in adulthood of all the examined resilience factors. Children’s increased understanding of trauma’s toll has the potential to augment resilience by modifying children’s self-esteem, internal locus of control, and attribution of blame, all cognitive traits associated with resilience. At the same time, as families learn about PTSD and symptoms of emotional distress in their children, they will be more likely to seek help for them.<sup>23</sup>
8. Customize pediatric health care to the needs of the family, considering the broad-reaching effects of trauma on physical and mental health as well as social and academic outcomes. Flynn et al<sup>14</sup> conducted a systematic review of primary care interventions to address toxic stress in children and their families, finding that 9 out of the 10 included studies had positive outcomes for children and families. Children with ACEs are more at risk for academic failure than those without, which contributes to poor health outcomes.<sup>2,11,29,30,40</sup>
  9. Familiarize pediatric staff with resources in the community and make individualized referrals for children and their families. Bolstering children’s resilience requires treating the whole family, which is often not possible without adjunct services.<sup>17,32</sup>
  10. Be cognizant of barriers to engagement facing families of children with ACEs. These families often have negative perceptions of mental health services; family stress; lack of social support for receiving behavioral health services; and difficulty with logistics of participating in services.<sup>63,103</sup>

Using evidence-based engagement strategies can increase engagement of these families in treatment.<sup>101</sup> Having a history of trauma, belonging to a cultural or ethnic minority group, and having nonbiological caregivers are all independent predictors of premature treatment disengagement.<sup>63,119</sup>

### LIMITATIONS OF EXISTING RESEARCH

The existing literature has few longitudinal studies of resilience in children who experience adversity. We need more rigorous trials of resilience-building interventions, especially those that include a nontraumatized comparison group, those housed in pediatric practices, and those that identify mechanisms of risk and resilience, including measures of allostatic load, health risk behaviors, and ecological elements of resilience. The existing resilience research is heavily weighted toward the mental health outcomes of childhood adversity and retrospective studies of adults who experienced adversity as children. As our understanding of the impact of ACEs on life course and health trajectory deepens, the investigation of resilience pathways will enable informed clinical care and policy improvements.

### CONCLUSIONS

Pediatricians are ideally situated to address both primary and secondary prevention of trauma as well as to identify treatable trauma sequelae and build resilience. In order for pediatricians to be successful in this undertaking, significant change at the individual pediatric practice level, as well as in the broader health care policy environment, is required. Addressing the malleable social and environmental resilience factors identified through this review offers a reasonable set of enhancements

to clinical practice that would help children withstand, adapt to, and recover from adversity. We need innovative models to ensure that those payers who invest in treating early adversity share in the cost savings that will surely result. To intervene in the lives of children experiencing adversity offers an opportunity to improve the health and well-being of the current and future generations. Not only is this the right thing to do, but it will also enhance national productivity and reduce spending on health care for chronic diseases.

#### ABBREVIATIONS

AAP: American Academy of Pediatrics  
 ACE: adverse childhood experience  
 EIFC: early intervention foster care program  
 HPA: hypothalamic–pituitary–adrenal  
 MDD: major depressive disorder  
 OR: odds ratio  
 PTSD: posttraumatic stress disorder  
 RCT: randomized controlled trial

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*Pediatrics* 2017;139;

DOI: 10.1542/peds.2016-2569 originally published online April 19, 2017;

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