The Center for Youth Wellness (CYW), a clinic and research center located in the Bayview Hunters Point neighborhood of San Francisco, was created to respond to the new medical understanding of how early life adversity harms the developing brains and bodies of children. The mission of CYW is to improve the health of children and adolescents exposed to adverse childhood experiences (ACEs). By developing tools and methodologies for early detection and science-based interventions, the effects of ACEs and toxic stress are addressed through concerted clinical, research, and field-building efforts. CYW works in partnership with the co-located Bayview Child Health Center (BCHC), a pediatric primary care medical home. Together, CYW and BCHC form an integrated pediatric care model aimed at addressing the medical and behavioral health needs of children exposed to ACEs, supplemented by CYW’s research and field-building efforts.

Theoretical Framework
The BCHC-CYW Integrated Pediatric Care Model is rooted in substantial evidence demonstrating the association between ACEs and detrimental health outcomes, and the role of toxic stress in this relationship.

**ACEs**
ACEs are stressful or traumatic events that take place before a child is 18 years old. The 10 categories of ACE domains consist of physical, emotional, and sexual abuse; physical and emotional neglect; mental illness of caregiver; incarceration of a relative; violence toward the mother; substance abuse in the home; and parental divorce or separation. The term **ACE** or **ACEs** was coined in 1998 following the publication of the groundbreaking Adverse Childhood Experiences Study (ACE Study) by Vincent J. Felitti and colleagues (1998).

The ACE study asked more than 17,000 California adult patients at Kaiser Permanente in San Diego to self-report about their medical history and exposure to ACEs. Almost two thirds (63.3%) of participants reported having at least one ACE, and 12% reported having four or more ACEs (Anda et al., 2009). Furthermore, not only were ACEs common within this sample, researchers found a statistically significant association between
ACEs and numerous health conditions such as ischemic heart disease, cancer, chronic bronchitis or emphysema, stroke, and diabetes (Felitti et al., 1998). The study also demonstrated a dose-response relationship between the number of ACEs experienced and the risk for negative health outcomes. As the number of reported ACEs increased, the odds of reporting an illness or risk behavior also increased (Felitti et al., 1998). The ACE Study was the first to assess physical health outcomes related to ACEs in a large population-based sample.

Subsequent research with diverse populations of adults and children continues to confirm the high prevalence of ACEs and a strong association between ACEs and poor health outcomes. A nationally representative study found that approximately two thirds of adults reported at least one ACE (Gilbert et al., 2015). In children, the prevalence of at least one ACE has ranged from one third to nearly one half of the population in nationally representative samples (Bethell, Newacheck, Hawes, & Halfon, 2014; Bright, Alford, Hinojosa, Knapp, & Fernandez-Baca, 2015; Wing, Gjelsvik, Nocera, & McQuaid, 2015).

Research on ACEs and health outcomes outside of the original ACE studies further suggest a strong, dose-response association between ACEs and negative health outcomes, including cardiovascular disease, chronic lung disease, headaches, autoimmune disease, sleep disturbances, early death, obesity, smoking, general poor health, depression, post-traumatic stress disorder, anxiety, substance abuse, and binge drinking in adults (Kalmakis & Chandler, 2015). In children, ACEs have been correlated with fair or poor general health, illness requiring a doctor, fair or poor dental health, lifetime asthma, attention deficit hyperactive disorder, autism, being overweight or obese, and learning difficulties (Bethell et al., 2014; Bright et al., 2015; Burke, Hellman, Scott, Weems, & Carrion, 2011; Flaherty et al., 2013; Wing, et al., 2015).

Studies on ACEs during childhood have also found an association between ACEs and violent behavior (delinquent behavior, bullying, physical fighting, dating violence, carrying a weapon; Duke, Pettingell, McMorris, & Borowsky, 2010).

### TOXIC STRESS

While the mechanisms linking childhood adversity to poor health outcomes are still being explored, growing literature indicates that early adversity can profoundly alter child and adolescent development and long-term health outcomes. Scientists now understand that maladaptation of the physiological stress response plays an important role in negative long-term health outcomes.

The stress response refers to the physiological and behavioral response to selective pressures from the physical and social environment. These selective pressures challenge and disrupt homeostasis, or the self-regulating property to maintain internal stability (McEwen, 2000, 2005). The stress response is influenced by many factors, such as the intensity and severity of the stressor; the individual’s perception of the stressor; and the physical, mental health, and genetic makeup of the individual. The American Academy of Pediatrics (AAP) described three general categories of the stress response: positive stress response, tolerable stress response, and toxic stress response (Shonkoff et al., 2012).

The positive stress response is a normal and essential part of healthy development. It is characterized by brief increases in heart rate and blood pressure, as well as mild elevations in hormonal levels through the activation of the hypothalamic-pituitary-adrenal (HPA) axis as part of the neuro-endocrine-immune (NEI) network. The positive stress response involves a cascade of events preparing the body for a “fight or flight” response. When children are exposed to a stressor as part of their development, such as the first day of school or a school test, the stress response system is activated. However, the physiological stress response self-regulates through negative feedback once the child is no longer exposed to the stressor (Shonkoff, Boyce, & McEwen, 2009). In comparison, during the tolerable stress response, the body’s alert processes are elevated to a greater degree and for longer periods of time. This is due to stressors that are greater in severity or duration than those activating a positive stress response. However, a caring relationship with an adult can serve as a buffer, allowing the brain and organs to recover when the stress response self-regulates and the body returns to homeostasis (Shonkoff et al., 2009).

Conversely, the toxic stress response is an intense, frequent, and/or sustained activation of the body’s stress response and autonomic nervous system, without the buffer of a caring adult. This response is the result of a dysregulation of the NEI network via the HPA axis and the innervation of endocrine and immunological systems (McEwen, 2000). The cumulative effects of a chronic dysregulation of the NEI network do not allow the body to return to homeostasis. If these effects occur in early life due to ACEs in the absence of nurturing caregiving relationships, or in the presence of additional vulnerabilities of the child or family (e.g., biological and genetic susceptibility), it can activate a stress response that becomes “toxic” for the body (Taylor, 2010).

The effects of a toxic stress response during sensitive periods of development can become permanently incorporated into
Universal and routine screening for adverse childhood experiences in the pediatric medical home allow for prevention and early intervention, potentially leading to improved health outcomes for millions of children nationally.

Given the health implications of ACEs and toxic stress, screening children for ACEs promotes healthy development and is a critical investment in preventing poor health outcomes over the life course. The AAP recognized the importance of identifying child maltreatment in order to better support positive child development (Flaherty & Stirling, 2010). In its policy statement, Early Childhood Adversity, Toxic Stress, and the Role of the Pediatrician: Translating Developmental Science Into Lifelong Health, the AAP explicitly called on pediatricians to “actively screen for precipitants of toxic stress that are common in their particular practices” (Garner et al., 2011, p. e229). The primary care medical home is uniquely positioned to be the site for routine universal screening of ACEs for children and adolescents. Pediatricians and family practice physicians are trained to prevent disease and to understand the important role of caregivers and communities in determining a child’s well-being (Garner et al., 2011). Interacting with children and their families at regular intervals (e.g., annual well-child visits) allows primary care providers the opportunity to develop trusting relationships with their patients. These relationships can promote disclosure and collaboration when treatment for the effects of toxic stress is indicated.

By screening youth for ACEs early and regularly, pediatric care providers and their behavioral health partners can implement primary prevention strategies to educate caregivers about the impact of adversity on their child’s developing brain and body and can tailor integrated interventions based on an understanding of the child’s odds of illness or disease. In addition, because plasticity of the brain during early childhood and adolescence makes children particularly vulnerable to the effects of ACEs, it is an ideal time for early intervention and treatment. Increased neuroplasticity also offers the opportunity for healing when there is early detection and effective intervention (Knudsen, 2004).

The BCHC-CYW Integrated Pediatric Care Model

The BCHC-CYW Integrated Pediatric Care Model was created to recognize the impact of ACEs on health, and to treat toxic stress in children. These goals are accomplished through routine screening, which allows for early detection and intervention, paired with a multidisciplinary approach focused on addressing the NEI dysregulation of toxic stress. Children and adolescents are screened for exposure to ACEs during routine visits to BCHC. Based on the CYW Adverse Childhood Experiences Questionnaire (CYW ACE-Q) and information collected during the visit, pediatricians determine whether a referral to CYW for integrated care is indicated (see Figure 1).

THE CYW ACE-Q

The CYW ACE-Q, currently in the process of clinical validation studies, was developed through the BCHC-CYW partnership with input from the CYW community advisory boards, local youth stakeholders, health educators, and clinical and research staff. The tool is based on the instrument created by Vincent Felitti and Robert Anda for use with adults and has been modified to be de-identified (meaning that participants identify the number of experiences and not the specific experiences they have been exposed to) based on experiential evidence. The CYW ACE-Q includes all 10 ACE domains as well as additional

FIGURE 1. Center for Youth Wellness-Bayview Child Health Center Integrated Pediatric Care Model
experiences postulated to also disrupt the HPA axis and NEI network. These experiences are community specific and/or have been documented in literature but not accounted for in the original instrument (Felitti & Anda, 1998). The CYW ACE-Q is intended for use in pediatric and family practice settings to identify patients at increased risk for chronic health problems, learning difficulties, mental and behavioral health problems, and developmental issues due to changes in brain architecture and developing organ systems brought on by exposure to extreme and prolonged stress. The de-identified nature of the CYW ACE-Q is preferred by primary care providers, clinical staff, and families at BCHC because it allows doctors to assess exposure to ACEs with a focus on primary care outcomes given the contextual and time constraints of a pediatric visit. Deeper conversations of exposure to adversity are then addressed through integrated care at CYW upon referral.

The CYW ACE-Q tool is available in English and Spanish in three versions: (1) CYW ACE-Q Child, (2) CYW ACE-Q Teen, and (3) CYW ACE-Q Teen Self-Report (SR). The instrument is comprised of two sections. Section 1 of the CYW ACE-Q (items #1–10) consists of the traditional 10 ACEs, and Section 2 includes seven (CYW ACE-Q Child) or nine (CYW ACE-Q Teen and CYW ACE-Q Teen SR) items assessing for exposure to additional early life stressors identified by experts and community stakeholders that are relevant to the youth served in community clinics. (See Table 1).

The CYW ACE-Q is either an informant (CYW ACE-Q Child and CYW ACE-Q Teen) or self-report (CYW ACE-Q Teen SR) instrument. It is presented to the parent/caregiver and/or youth upon check-in for standard medical appointments. It is administered to all new patients who are 9 months and older prior to their first appointment, at the 9- and 24-month well-child visits, and then yearly thereafter.

**SCORING**

The CYW ACE-Q calculates cumulative exposure to ACE categories in patients from birth to 19 years old. It asks respondents to report how many categories of adversity apply, rather than which categories they have been exposed to. Each completed CYW ACE-Q generates a two-number score. For example, a patient could be given a score of 3+2 (three categories endorsed in Section 1 and two endorsed in Section 2) or 4+4 (four categories endorsed in each section). The traditional ACEs (Section 1) and additional items (Section 2) are kept separate in the CYW ACE-Q for purposes of research and evaluation, given that Section 1 has population-based reference data about risk of disease. In addition to using the CYW ACE-Q as a screening tool, the data is used to help evaluate the effectiveness of the BCHC-CYW Integrated Pediatric Care Model in decreasing risk of adverse health outcomes.

**SCREENING**

Upon check-in for well-child exams, a BCHC medical assistant provides the patient or patient caregiver (depending on the age of the patient) with the appropriate CYW ACE-Q instrument. The CYW ACE-Q is provided as part of a packet of routine assessments. The medical assistant describes all of the paperwork in the packet, including the purpose of the CYW ACE-Q and instructions for its completion. The medical assistant normalizes the screening process for all patients, explaining that the primary care provider will review the results with them during the

### TABLE 1. The Center for Youth Wellness Adverse Childhood Experiences Questionnaire (CYW ACE-Q)

<table>
<thead>
<tr>
<th>Screening tool</th>
<th>Description</th>
<th>Section One</th>
<th>Section Two</th>
<th>Age range</th>
<th>Completed by</th>
</tr>
</thead>
<tbody>
<tr>
<td>CYW ACE-Q Child</td>
<td>17-item instrument, 2 sections, 2–5 minutes to complete</td>
<td>Original ACEs (1–10)</td>
<td>7 additional ACEs (foster care, bullying, parent/guardian death, separation due to deportation/immigration, serious medical procedure/illness, violence in neighborhood, discrimination)</td>
<td>Children birth to 12 years old</td>
<td>Parent/caregiver on behalf of child</td>
</tr>
<tr>
<td>CYW ACE-Q Teen</td>
<td>19-item instrument, 2 sections, 2–5 minutes to complete</td>
<td>Original ACEs (1–10)</td>
<td>9 additional ACEs (foster care, bullying, parent/guardian death, separation due to deportation/immigration, serious medical procedure/illness, violence in neighborhood, discrimination, youth intimate partner violence, youth arrest/incarceration)</td>
<td>Youth 13 to 19 years old</td>
<td>Parent/caregiver on behalf of teen</td>
</tr>
<tr>
<td>CYW ACE-Q Teen Self-Report</td>
<td>19-item instrument, 2 sections, 2–5 minutes to complete</td>
<td>Original 10 ACEs (1–10)</td>
<td>9 additional ACEs (foster care, bullying, parent/guardian death, separation due to deportation/immigration, serious medical procedure/illness, violence in neighborhood, discrimination, youth intimate partner violence, youth arrest/incarceration)</td>
<td>Youth 13 to 19 years old</td>
<td>Youth (self-report)</td>
</tr>
</tbody>
</table>
appointment, and that only the number of categories experienced is desired, rather than the specifics of any one experience. All of the patient’s paperwork is completed by the caregiver and/or child in the waiting room or the exam room.

During the screening, the primary care provider follows a standard procedure for reviewing the CYW ACE-Q results with patients and their caregivers. First, the provider shares relevant information on stress and its effects on health and development. The provider normalizes screening and reminds the child and/or caregiver that all patients are asked to complete the tool because it provides essential information for understanding the patient’s health needs. Second, the provider asks about symptoms associated with toxic stress (see Table 2). These symptoms have been identified through direct clinical experience and also through an extensive review of the research literature documenting symptomatology that is associated with the disruption of the NEI network. Third, on the basis of the patient’s CYW ACE-Q score and relevant symptomatology, the primary care provider will provide anticipatory guidance or recommend integrated care through the BCHC-CYW partnership.

Specifically, if the CYW ACE-Q score (from Sections 1 and 2 combined) is 0, or 1 to 3 without symptomatology, the primary care provider provides anticipatory guidance. This may include specific information on ACEs, toxic stress, strategies for decreasing exposure to ACEs, and the importance of stress management and consistent, supportive relationships. If the CYW ACE-Q score (from Sections 1 and 2 combined) is between 1 and 3 with symptomatology, or if the CYW ACE-Q score is 4 or more (regardless of symptomatology), the provider will recommend integrated care (see Figure 2). This clinical protocol was developed to target resources to those patients already demonstrating symptomatology of NEI disruption or with ACE exposure so high as to be considered high risk for adverse health outcomes. In addition, many parents and/or caregivers may be reluctant to dedicate time to a treatment regimen when the child is not exhibiting obvious symptomatology.

Before a referral, the pediatrician describes CYW services and offers a direct introduction (i.e., a warm hand-off) to a CYW provider. The pediatrician may also emphasize the importance of good nutrition, quality sleep, regularly physical activity and exercise, mental health treatment, mindfulness-based practices (e.g., meditation), and healthy relationships—especially with a consistent and supportive caregiver—to help reduce the risk of long-term health problems (Khoury, Sharma, Rush, & Fournier, 2015; Lopresti & Drummond, 2013; Macdonald et al., 2012; Miller, Brod, Yu, & Chen, 2014; Simkin & Black, 2014; Slopen, McLaughlin, & Shonkoff, 2014).

INTEGRATED CARE

Once a child has been referred to CYW by a BCHC pediatrician, a multidisciplinary clinical team provides support to the patient and the family using a care coordination approach. Care coordinators, who are at the heart of the Integrated Pediatric Care Model, are trained to interact and respond to patients using an ACEs-informed lens. Care coordinators educate families and other providers about the impacts of ACEs and a toxic stress response on health, engage families at home and school, collaborate with the family and multidisciplinary team members to develop and implement a comprehensive treatment plan, provide consistent guidance, model self-care, and make referrals to additional services as needed.

CYW and BCHC partner to provide thoughtfully coordinated medical, mental health, and wellness interventions to address the impact of ACEs and toxic stress. Based on the science of NEI disruption, CYW’s clinical model integrates a multidisciplinary, family-focused approach that includes: care coordination, comprehensive bio-psycho-social assessment, home visits, health education, psychotherapy, wellness nursing, psychiatry,
biofeedback, acupuncture, and referrals to internal and external services (see Table 3 for more information). This suite of services has been carefully selected and designed through research of evidence-based practices and promising interventions, community input, and clinical expertise from CYW and partner institutions. These services are aimed at reducing exposure to ACEs and assessing and treating NEI disruption with the long-term goal of reducing health risk.

### Considerations for Introducing ACE Screening

ACEs threaten the developing brains and bodies of children. Universal and routine screening for ACEs in the pediatric medical home allow for prevention and early intervention, potentially leading to improved health outcomes for millions of children nationally. Before introducing ACE screening into clinical practice, health professionals are encouraged to explore models for screening and referral and to consider a number of factors to assess for organizational readiness.

Health professionals interested in implementing an ACE screening program should first familiarize themselves with the literature on ACEs and toxic stress. Although causal mechanisms are currently being explored, research documenting robust associations between exposure to ACEs and negative health outcomes is well established. Providers should then clearly articulate the purpose and value of screening at their particular clinic. Operationalization will require planning that begins with setting short-, medium-, and long-term goals. Evaluation and data collection plans should be prioritized to measure the success of the implementation efforts. In addition, institutions should evaluate and explore existing systems and processes to ensure compliance with state and other regulatory bodies.

Developing and implementing an integrated care model that encompasses screening, referral, and possibly treatment may require new community partnerships, staff training, professional development, and the hiring of additional or expertise-specific providers and support staff to monitor and track data and conduct evaluations. Because one organization may not be able to develop or reproduce a wide array of specialty services, working with community partners or experts that may already be well-situated to do so is highly advisable. Health professionals should also incorporate training for staff on topics such as

### TABLE 3. Center for Youth Wellness Clinical Program Services

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinical evaluation</td>
<td>Care coordinators administer a set of comprehensive intake forms and clinical tools to evaluate behavioral and mental health status, needs, and strengths of patients and families.</td>
</tr>
<tr>
<td>Home visits</td>
<td>Care coordinators and nurses engage with families at home and at school, recognizing barriers such as lack of access to child care and transportation.</td>
</tr>
<tr>
<td>Education</td>
<td>Clinical team members offer targeted education that helps families better understand the causes and symptoms of chronic stress and provide strategies to mitigate the kind of stress that can hurt children’s health and well-being.</td>
</tr>
<tr>
<td>Psychotherapy</td>
<td>Therapists provide a variety of evidence-supported treatments and promising practices that share core principles of culturally competent, trauma-informed therapy that are appropriate for children and families from diverse cultural backgrounds, including Child-Parent Psychotherapy and Cue-Centered Therapy.</td>
</tr>
<tr>
<td>Wellness nursing</td>
<td>Nurses provide education to families about the impacts of adverse childhood experiences (ACEs) and toxic stress on health and wellness. They coordinate specialty care appointments, often accompanying patients/families to see specialists, and provide consultation on strategies for attaining, maintaining, or recovering optimal health.</td>
</tr>
<tr>
<td>Psychiatry</td>
<td>Psychiatrists provide medication evaluations of children and caregivers and offer consultation to Bayview Child Health Center physicians and Center for Youth Wellness (CYW) staff as needed.</td>
</tr>
<tr>
<td>Biofeedback</td>
<td>A biofeedback specialist works directly with children and teens to build awareness and control over body processes such as muscle tension, blood pressure, and heart rate. Identification and monitoring of these body processes helps patients recognize and better regulate their “fight or flight” stress response.</td>
</tr>
<tr>
<td>Referrals</td>
<td>Care coordinators make appropriate referrals for CYW clinical services and also coordinate referrals to high-quality institutional partners who also use an ACEs-informed service lens.</td>
</tr>
</tbody>
</table>

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**Learn More**

**Center for Youth Wellness**

[http://centerforyouthwellness.org](http://centerforyouthwellness.org)

Watch CYW CEO and BHCH pediatrician Dr. Nadine Burke Harris talk about how childhood trauma affects health across a lifetime on TEDMED: [https://www.ted.com/speakers/nadine_burke_harris_1](https://www.ted.com/speakers/nadine_burke_harris_1)

The CYW ACE-Q and User Guide have been made available to primary care providers for the purpose of information sharing*. Visit the “Health Care Professionals” tab on our main website to access this material or visit [http://sgiz.mobi/s3/ab0291ef106d](http://sgiz.mobi/s3/ab0291ef106d)

*The CYW ACE-Q is free and is intended to be used solely for informational or educational purposes. The CYW ACE-Q is not a validated diagnostic tool, and is not intended to be used in the diagnosis or cure of any disease.
trauma-informed care, vicarious trauma, conflict resolution, and mandated reporting, along with consistent supervision, specialty areas that staff may not be familiar with. Finally, because screening for ACEs and certain interventions are not yet reimbursable by health insurance companies, institutions must be creative, resourceful, and strategic about securing sustainable sources of funding.

Conclusion

The BCHC-CYW Integrated Pediatric Care Model was developed from an understanding of ACEs and their childhood and adult health implications. BCHC pediatricians routinely screen children for ACEs at their primary care visits using the CYW ACE-Q to identify children exposed to adversity who may be at risk of poor health outcomes. Upon identification of children and families who are in need of support from exposure to high doses of adversity, CYW responds by providing comprehensive integrated care using evidence-based strategies.

Successfully applying an understanding of the impacts of early life stress on health within pediatric medical settings requires extensive and iterative program development. We hope that the information provided here and in the CYW ACE-Q User Guide (available online) provides a starting point for health professionals to begin discussing how screening and healing may occur in their own clinics. Ultimately, validating a prospective, age-appropriate ACE screening tool for children will lead to an evaluation of the feasibility of a universal integration of screening in a pediatric health care setting. Widespread and routine screening for exposure to ACEs and risk of developing adverse health outcomes can help assure that children and families exposed to ACEs receive the care they need and prevent long-term negative health outcomes.

Sukhdip K. Purewal, MPH, is a research coordinator at the Center for Youth Wellness where she coordinates research projects and manages community-engaged research. Her prior work in early childhood includes research on autism at the University of California, Davis and direct service community-engaged research. Her prior work in early childhood includes research on autism at the University of California, Davis and direct service community-engaged research.

Monica Bucci, MD, is the director of research at the Center for Youth Wellness where she coordinates research projects and manages the research team in developing and presenting on the dissemination and implementation of CPP in community-based settings.

Kadiatou Koita, MD, MSc-GHS, is a research assistant at the Center for Youth Wellness. Her work focuses on conducting an environmental scan of the research and interventions addressing the effects of adverse childhood experiences on health, as well as coordinating the Bay Area Research Consortium on toxic stress and health.

Sara Silvério Marques, DrPH, MPH, is a research associate at the Center for Youth Wellness where she is currently studying adverse childhood experiences, toxic stress, and the health and developmental outcomes associated with these. Sara’s career has focused on child and adolescent health and development and the use of research to inform policy and program development.

Debora Oh, PhD, MSc, is a research associate at the Center for Youth Wellness where she is responsible for synthesizing and critically evaluating the research surrounding adverse childhood experiences, as well as communicating findings to staff and the larger medical community. She is also a graphic designer for a San Francisco-based magazine focused on women’s and children’s issues.

Nadine Burke Harris, MD, MPH, is founder and chief executive officer of the Center for Youth Wellness and a pediatrician at the Bayview Child Health Center. She has earned international attention for her innovative approach to addressing adverse childhood experiences. Dr. Burke Harris serves as an expert advisor on numerous boards including Hillary Clinton’s Too Small to Fail initiative and the Clinton Foundation in association with Next Generation. This initiative aims to help parents and businesses take meaningful actions to improve the health and well-being of children from birth to 5 years old.

REFERENCES


San Francisco (UCSF) and UCSF Benioff Children’s Hospital Oakland. In her previous positions at UCSF as assistant professor in the Department of Neurology and as research fellow in the Department of Neuroradiology, Dr. Bucci’s work has primarily focused on the study of brain plasticity and developmental neuroscience.

Lisa Gutiérrez Wang, PhD, MA, is the director of clinical programs at the Center for Youth Wellness where she manages a multidisciplinary team in providing clinical services aimed at addressing the neuro-endocrine-immune dysregulation of toxic stress in children and adolescents. She completed her pre- and post-doctoral fellowship training at the Child Trauma Research Program at the University of California San Francisco under the mentorship of Dr. Alicia F. Lieberman. She is a Child-Parent Psychotherapy (CPP) trained therapist and supervisor and has written and presented on the dissemination and implementation of CPP in community-based settings.
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