

Title: Adverse Childhood Experiences: What California Pediatricians & Health Professionals Need to Know

Adam Schickedanz, MD PhD, is Chair of the AAP-CA Chapter 2 Adverse Childhood Experiences Committee. He is an Assistant Professor of Pediatrics in the Department of Pediatrics at the David Geffen School of Medicine at UCLA and a Health Services Researcher with the UCLA Children's Discovery and Innovation Institute. He practices clinically at Olive View-UCLA Medical Center.

If there were a risk factor that markedly increased your patient's chance heart disease, diabetes, lung disease, mental illness, and early mortality, would you want to know about it? If that risk factor was found in well over half the population, would you call it a health epidemic? If it was a theme running through the biggest news stories of the day, from family separation at the border to gun violence to the opiate epidemic, would you expect us to be talking about it more? As it happens, such a health risk factor is all too real. Adverse childhood experiences (ACEs) pose exactly this type of highly common and hazardous risk to children and the adults they will become. Every day, in clinical practice and in the news, we see kids afflicted by maltreatment, loss of their parents and loved ones, the ravages of addiction on families, and many other ACEs with devastating health consequences. Now more than ever, many pediatricians and health professionals think it is time to not only talk much more about ACEs but to invest much more in ways to prevent and manage them.

For years, the AAP has identified childhood adversity as a threat to child health, recommending pediatricians understand the ample science linking adversity to health outcomes, while also recommending pediatricians address adversity and its health risks through clinical practice and advocacy.¹ Since the term *adverse childhood experiences* (ACEs) started gaining traction roughly two decades ago, helped in large part by a series of studies done here in Southern California at Kaiser Permanente, interest in the field has become widespread in pediatrics and other health care fields, not to mention education, child welfare, and public policy.

Recently, the focus on ACEs has only intensified. Media interest has grown [substantially](#) while many sectors serving children and families (including child health care) have explored how best to respond to a previously unrecognized epidemic of ACEs, which we know have been experienced by most Californians (Figure 1). This interest has been especially strong in California, where our state's first Surgeon General (a pediatrician, naturally), has made tackling ACEs a health care priority and brought attention to the issue nationally. Simultaneously, Governor Newsom's budget will soon make new Medicaid resources available for health care systems to support identifying and, hopefully, taking action to prevent and manage ACEs through clinical care. These developments put California pediatricians in position to lead the nation in addressing childhood adversity and improving population health.

This article is the first in a series from the Chapter's newly-formed Adverse Childhood Experiences Committee (<http://aapca2.org/aces>) to keep AAP members up to speed in this rapidly evolving area.

Figure 1. Percentage of Residents with at Least One Adverse Childhood Experience by California County

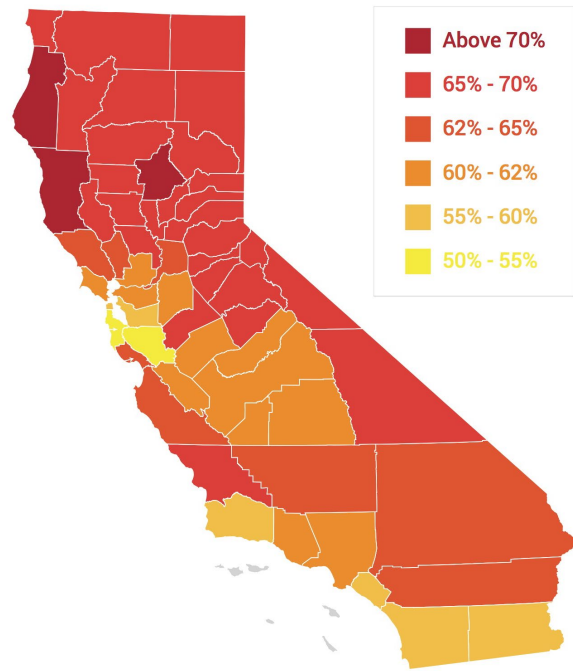


Image from Ewing D, Ryan-Ibarra S, Wright M, and Induni M for the Center for Youth Wellness, A Hidden Crisis: Findings on Adverse Childhood Experiences in California. <https://centerforyouthwellness.org/wp-content/themes/cyw/build/img/building-a-movement/hidden-crisis.pdf>

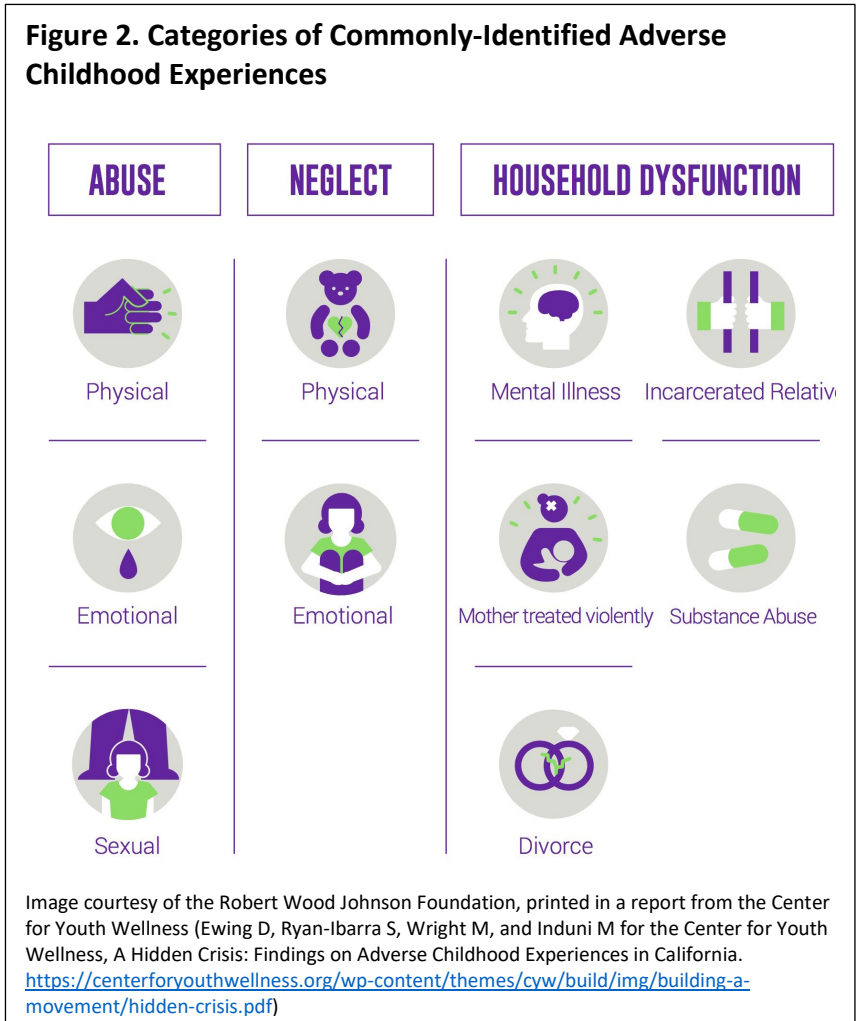
So, what should pediatricians and health professionals know about adverse childhood experiences (ACEs) as we approach this new frontier in health care delivery? We will begin to scratch the surface by providing an overview of what ACEs are, how commonly they occur, and how they are linked to health, along with a summary of the decades of science that helped us arrive at our current understanding of childhood adversity. Look out for future articles that take a deeper dive into the mechanisms by which childhood adversity impacts health, clinical approaches to identify and address ACEs, the emerging policy and advocacy landscape, and much more.

What Are Adverse Childhood Experiences & How Are They Linked to Health?

Adverse childhood experiences (ACEs) are stressful and potentially traumatic events, including abuse, neglect, and exposure to household dysfunction, that occur any time before age eighteen (Figure 2). They have major implications for health and health care, as pediatricians in California and around the country have recognized. Adverse childhood experiences are markers of adversity likely to outstrip a child’s ability to cope, resulting in so-called “toxic stress” that puts the body’s physiologic stress response into overdrive, while threatening the very social supports children rely on to develop and thrive.

As one would expect, ACEs are associated with higher risk of worse mental and physical health in childhood, adolescence, and adulthood. They have been shown to predict a number of major adverse health outcomes over the lifecourse, including greater risk-taking behavior, worse mental health, riskier health-related behaviors, greater chronic disease burden, and premature mortality.^{2 3 4} Evidence on the impact of ACEs over the lifecourse suggests they are associated with earlier appearance of biochemical and physiologic markers of cardiovascular and metabolic disease.^{5 6 7} In short, the science on ACEs has shown that severe stress and trauma in childhood convey lifelong health and mortality risks.

Despite all we know already about ACEs, this idea of a unified measure of cumulative adversity is a relatively recent development. Consideration of childhood adversity as a risk factor for worse health – especially mental health – later in life is not new (see Freudian psychoanalytic theories⁸, for instance), but our understanding of which adverse experiences have health impacts and how the stress they can create gets under the skin has been evolving over the last fifty years or more. This evolution will only continue as our ability to measure adversity and its consequences improves.



In fields such as pediatrics, a very distilled measure of adversity has emerged and taken hold: the ACE score. Much of the current discussion of childhood adversity and its health effects in pediatrics, child psychology, child welfare, and public health has focused on ACEs, which are subsumed under the umbrella of childhood adversity more broadly. Widespread adoption of ACEs and their binned count (the ACE score) as the accepted index of childhood adversity has taken place in the clinical literature, largely eclipsing theories, concepts, and constructions of adversity measures that came before. To understand how we got here, it is worth knowing the history of the science of childhood adversity and health.

History of Our Understanding of Childhood Adversity & Health

A substantial evidence base had linked stressful adverse life events to physical and mental health outcomes at least half a century before the first ACEs study was published.⁹ Research on stress examined the short- and medium-term effects of various stressors on acute physiologic events (e.g. cardiac events) and severity of chronic medical conditions, but little research focused on early stresses on children and their later health effects until longitudinal studies, such as the series of British Birth Cohort studies, measured early life conditions and environments that predicted later life mental and physical health. In addition to detailing relationships such as links between low birthweight, stunted early life height and weight velocity, and later hypertension, important associations were found between lower childhood socioeconomic position and worse adult health.¹⁰ The 1946 British Birth Cohort study investigators attempted to quantify childhood adversity using a summative adversity scale, compiling variables such as family socioeconomic status, school circumstances, parents' age, childhood health problems, household structure (including parental separation and parental death), and somewhat outdated concepts of neuroticism that may have represented parental mood disorder symptomatology. The overall childhood adversity scale and its components were found to have somewhat inconsistent overall relationships with later adult affective disorders and emotional disturbance, but parental separation and mothers' nervous symptoms showed strong links with children's later mental health, especially when the children who experienced them were female and younger at the time of exposure.¹¹ Those whose parents separated were also more likely to engage in unhealthy behaviors such as alcohol consumption and smoking, suggesting that they had adopted these behaviors as coping strategies for lingering emotional distress.^{12 13} Since the explosion of the ACEs literature, birth cohort studies subsequent to the first British Birth Cohort have aged up sufficiently to identify links between early adversity and mid-life risk of somatic pain, obesity, adult-onset diabetes, cancer, and other health outcomes.^{14 15 16}

Contemporaneous with longitudinal studies showing higher risk of mental health problems and unhealthy habits for adults who had grown up in low socioeconomic status households with greater parental dysfunction, literatures on the health effects of specific types of childhood adversity (such as sexual abuse, physical abuse, etc.) emerged in parallel over the three decades preceding the Felitti ACEs study, the watershed study largely credited for bringing ACEs to wider attention (see the next section). Mood disorder, other psychiatric illnesses, and behavioral health problems (including substance use) were each individually shown to be associated with childhood exposure to physical abuse,^{17 18 19} sexual abuse,^{20 21 22 23 24} and loss of a parent.^{25 26 27 28 29 30} Smaller literatures with consistent evidence suggested that similar adult psychiatric comorbidities were predisposed by exposure to intimate partner violence³¹ and parental substance abuse.^{32 33 34} Literature on the impact of divorce and parental separation showed more varied effects that depended largely on resilience factors and individual family coping styles.³⁵ By the mid-1990s and the years immediately preceding the Felitti ACEs study, it had become clear that the cumulative "social stress" of multiple adverse events experienced by children ought to be examined, rather than focusing on single adverse events, to better estimate the child's risk of later psychiatric illness.^{36 37 38} Other key concepts were also beginning to emerge shortly before the Felitti ACEs study, such as the capacity for resilience factors to buffer against mental health problems after childhood adverse events.^{39 40}

A Breakthrough: The Felitti ACEs Study

When Vincent Felitti's ACEs study⁴¹ grouped adverse child experiences across domains of abuse, neglect, and household dysfunction, it represented a key advance in the field of childhood adversity studies for multiple reasons. First, the study successfully bundled adverse childhood experiences into an easily-measurable ACEs scale *and* showed that the scale was related to a host of well-defined physical and mental health outcomes (including leading causes of mortality such as heart disease, cancer, and chronic lung disease). The notion that the health impact of multiple early adversity events could be cumulative had been proposed almost two decades earlier,⁴² but in that time period there had been no large study showing an association between cumulative adverse events of a wide variety (i.e. inclusive of abuse, neglect, and household dysfunction experiences) and physical health outcomes. While the Felitti study was not the first study to attempt to aggregate these sources of childhood adversity across domains,⁴³ prior studies (aside from the birth cohort studies) often had limited the length of retrospective recall (to "in the last year...", for example)⁴⁴ to minimize the risk of recall bias or omissions, which may have inadvertently masked the extent of associations between child adversity and adult health and that we now recognize has substantial lag time and impacts that emerge decades later. The Felitti ACE score gave equal weight to each of the adverse experiences it queried without a clear evidentiary rationale for this weighting scheme. In fairness, no clear evidentiary rationale for an alternative weighting existed either. In addition to the adverse event bundling innovation, the study took advantage of strong objective health outcome data and relied on a longer recall time to uncover substantially lagged health effects of adversity.

Since the Felitti study, the literature on ACEs has seen tremendous growth, with the number of articles indexed on by the U.S. National Library of Medicine containing the phrase "adverse childhood experiences" growing over fifty-fold between 1999 and 2019. New datasets measuring ACEs have emerged and different constructions of the individual ACEs have been developed. Large scale studies have been launched to measure ACEs prospectively from childhood, while other ACE measures have been adopted piecemeal in other studies. Currently, various versions of the ACE question items and their compilation have emerged in the literature. While the ACE scales differ to some extent in terms of ACE domains covered and ACE question phrasing, they all encompass multiple domains of childhood abuse, neglect, and household dysfunction. Despite the variation found in published ACE scales, what has emerged from the literature is a remarkably consistent pattern showing that a range of ACE score constructions yield similar patterns of association with long-term risks to health and well-being.

Since the organization of many domains of childhood adversity into the ACEs framework and its widespread adoption as a standard scale, one could say that the broader field of childhood adversity has been both advanced greatly and shoehorned by the ACE framework's success. While ACEs are the measure of choice for quantifying adversity in many current studies, consistent with the fungible nature of the biological stress in the face of various potential childhood stressors, we should recognize the ACE score's inability to quantify all of the sources of adversity children can (and often do) experience. Future work should build on this foundation to reconcile the simplicity of the ACE score with a more complex reality of how childhood adversity is experienced, managed, and lived. But we have to start somewhere, and the ACE score has proven itself a robust approach upon which we can build future advances in identifying childhood adversity.

What Comes Next

Like the science of the ACE score and ACEs' impact on health, our understanding of how to prevent and manage the harms of childhood adversity in clinical practice is imperfect, but the risks of continuing to do nothing are too great to maintain the status quo. We will have to start somewhere and learn as we go. The question becomes where the best place to begin might be for us in pediatrics, in health care more broadly,

and through other child health systems. We will explore this question and much more in future newsletter articles from the ACEs Committee.

If you are interested in joining the Committee or just learning more about our work, you can find more information [here](#).

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