

Primary, Secondary, and Tertiary Prevention Strategies in Education

Among the most direct and profound effects of Adverse Childhood Experiences (ACEs) and toxic stress is their impact on learning and school success.^{222,1056,1354-1357} The **toxic stress response** is defined by the National Academies of Science, Engineering, and Medicine (NAEM) as “prolonged activation of the stress response systems that can disrupt the development of brain architecture and other organ systems, and increase the risk for stress-related disease and cognitive impairment, well into the adult years”; it involves neuro-endocrine-immune-metabolic and genetic regulatory dysfunction, and occurs when severe or prolonged stress is experienced without sufficient buffering sources.²³

The biological stress response has been characterized as falling into three types: positive, tolerable, and toxic.^{6,78} Not all stress is bad. Some stress is a necessary and even essential part of growth and development; it can help us transiently mobilize energy and increase focus to perform better at the task at hand, such as an upcoming test, the big game, or a presentation at work. The **positive stress response** is characterized by brief elevations in stress hormones, heart rate, and blood pressure in response to a routine stressor.^{6,78}

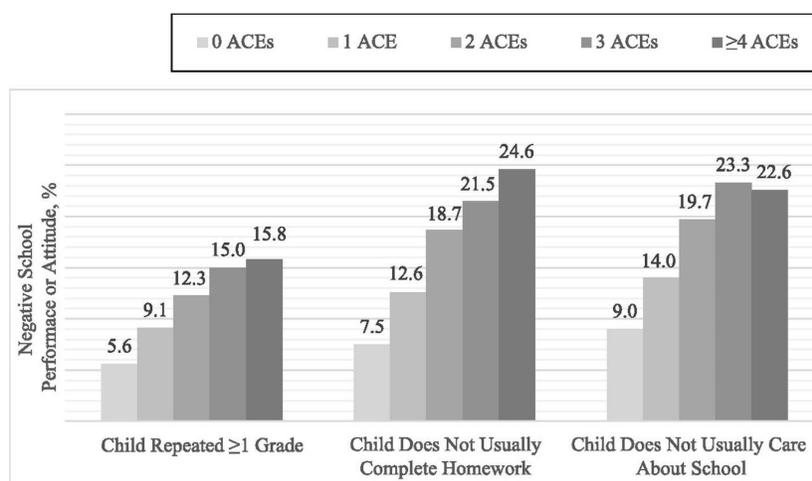
The **tolerable stress response** “activates the body’s alert systems to a greater degree as a result of more severe, longer-lasting difficulties, such as the loss of a loved one, a natural disaster, or a frightening injury. If the activation is time-limited and buffered by relationships with adults who help the child adapt, the brain and other organs recover from what might otherwise be damaging effects.”⁶⁷⁴

The biological embedding of the **toxic stress response** is key to understanding how ACEs can impact learning, relationships, and other aspects of school functioning. The toxic stress response can result in impairments to the brain’s developing limbic system, including the amygdala and hippocampus, which are the areas of the brain responsible for learning, memory, threat detection, and emotional regulation, making these tasks more difficult.^{147,1358} Furthermore, the toxic stress response inhibits higher-order decision-making in the prefrontal cortex, which is responsible for impulse control and executive functioning.^{125,304,330,1359} The immune, metabolic, and inflammatory changes that result from the toxic stress response

lead to increased risk of infections, asthma and other atopic conditions, poor dental health, and somatic complaints, such as headache and abdominal pain, which can contribute to school absenteeism and impair the ability to engage fully when present.^{222,449,1357,1360,1361}

Extensive research has linked ACEs to several relational, educational, and learning difficulties. In school, effects of ACEs and toxic stress include trouble concentrating in class, lack of school engagement, not completing homework, school failure and noncompletion, learning disabilities, impaired executive and relational functioning, and increased need for special education.^{37,696,703,1056,1354-1356,1362,1363} Robles and colleagues examined ACEs and school performance measures among over 65,000 children and reported that as the ACE score increased, the risk of repeating a grade, reporting lack of school engagement, and not completing homework increased in a graded manner (**Figure 20**).⁶⁹⁶ Neuropsychiatric manifestations of toxic stress are associated with increased school-based victimization and perpetration of interpersonal violence, executive dysfunction, attention-deficit/hyperactivity disorder (ADHD), learning disabilities, and suicidality, which can

Prevalence of negative school performance and attitude outcomes by number of ACEs among children ages 6 to 17 (2011–2012 NSCH).



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PEDIATRICS

Figure 20. There is a graded (dose-response) impact of the number of ACE categories experienced on various school outcomes: the need to repeat a grade, not completing homework, and school disengagement. Reproduced with permission from the journal *Pediatrics*, Volume 144, page 4, ©2019, American Academy of Pediatrics.⁶⁹⁶

result in school absenteeism, suspensions, failure, repeating a grade, or the need for special education.^{2,125,304,330,703,1359,1364} Burke and colleagues reported that compared to children with no ACEs, children with four or more ACEs are approximately 32 times more likely to experience learning and behavioral problems.³⁷ ACEs and toxic stress also increase the risk of poor self-regulation, suicidality, and excessive school absenteeism related to physical and mental health concerns, or behavioral difficulties.^{37,696,703,1056,1354-1356,1362,1363}

ACEs and toxic stress can also affect later learning and success among those who attend two- or four-year higher educational institutions.¹³⁶⁵⁻¹³⁶⁹ Late adolescence and early adulthood constitute an under-appreciated period when the biological consequences of toxic stress may lead to dropping out of college, depression, anxiety, or suicidal ideation, among many other health problems.¹³⁶⁶⁻¹³⁷⁰ Adults who have experienced a greater number of ACEs and other adversities report lower levels of educational attainment.^{1371,1372}

Education is about more than receiving a diploma; it includes learning, which is the process of acquiring skills that can help shape lifelong health through three interrelated pathways: 1) health knowledge and behaviors; 2) employment and income; and 3) psychosocial factors.¹³⁷³ Children spend the better part of their lives in K-12 school settings, making experiences in these settings instrumental in promoting not only learning, but also immediate and longer-term well-being. In California, compulsory-education laws require children between the ages of six and 18 years to attend school full-time; thus, a child spends more than 1,000 hours per year in school.¹³⁷⁴ Consistent school attendance is an evidence-based factor for academic success.¹³⁷⁵ Yet, chronic absenteeism is currently a critical national problem that puts school children and youth at risk for academic failure and dropping out of school,¹³⁷⁶ as well as worse longer-term health and social outcomes. Overall, the rate of chronic absenteeism in California, defined as being absent 10% or more of the school days in the school year,¹³⁷⁷ has steadily increased, from 10.8% in 2016-2017 to 12.1% in 2018-2019, a relative increase of 12%.¹³⁷⁸

Subgroup analyses indicate that economically disadvantaged students, English learners, foster youth, and students with disabilities have experienced disproportionate increases in chronic absenteeism during the same period. Racial and ethnic disparities in absenteeism rates also exist, with Black (22%) and American Indian or Alaska Native (21%) students having substantially higher rates than White students (10%).¹³⁷⁸ The reasons for the increases in chronic absenteeism observed in California are complex and are still being elucidated, but family challenges and students' acute and chronic health problems requiring time away from the classroom contribute.¹³⁷⁹⁻¹³⁸²

Rates for overall school suspensions in California have slightly decreased from 2016 (36.5 per 1000) to 2019 (34.7 per 1000).¹³⁸³ Yet, as with chronic absenteeism, subgroup analysis of suspension rates indicate significantly greater rates among economically disadvantaged students, homeless youth, foster youth, and students with disabilities (**Table 8**).¹³⁸³ Suspension rates were between two to three times higher for economically disadvantaged students, homeless youth, foster youth, and students with disabilities. Racial and ethnic disparities in suspension rates also exist, with Black (92.2 per 1000) and American Indian or Alaska Native (73.1 per 1000) students having substantially higher rates than White students (29.8 per 1000).¹³⁸³

PRIMARY PREVENTION STRATEGIES

The impact of ACEs on learning and education calls for school settings to build capacity to implement evidence-based interventions for the primary, secondary, and tertiary prevention of toxic stress in the educational sector. Primary prevention strategies use interventions that target the general population rather than a specific risk group, with the goal of reducing the total dose of adversity experienced and increasing the total dose of buffering factors. A consensus of scientific evidence demonstrates that adequate doses of safe, supportive, nurturing relationships and environments, and other interventions can prevent development of the toxic stress response and its physical and behavioral sequelae.¹³⁸⁵⁻¹³⁸⁹ Within school settings, adults can proactively model behaviors of kindness, empathy, and compassion, which promote supportive, safe, and nurturing learning environments and buffering for toxic stress.¹³⁹⁰ This makes stressors more likely to be experienced

| Category | Rate per 1,000 |
|--|----------------|
| Foster youth | 151.7 |
| Non-foster youth | 34.0 |
| Students with disabilities | 66.0 |
| Students without disabilities | 30.3 |
| Homeless students | 59.6 |
| Non-homeless students | 33.8 |
| Socioeconomically disadvantaged | 44.5 |
| Non-socioeconomically disadvantaged | 18.6 |

Table 8. Subgroup analysis of California suspension rates, 2018-2019.

Data source: kidsdata.org, California Department of Education suspension data (through December 2019)¹³⁸³

as tolerable, rather than as toxic.⁶ Models that enable universal positive school climates that emphasize safety, inclusiveness, and predictable rules and routines, are also very important for setting up trauma-informed and universal supports for all children.¹³⁶⁵

Another integral component of primary prevention in schools is ensuring staff wellness through the use of evidence-based health-promotion interventions, such as exercise, mind-body practices, proper nutrition, and employee assistance programs.⁹²² The primary prevention of toxic stress for children in schools relies on ensuring the well-being of adult mentors and caregivers, including school personnel.^{635,1391,1392} The ability of adults to proactively model kindness and empathy to promote supportive, safe, and nurturing learning environments is greatly reinforced

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by their understanding of the impacts of ACEs and toxic stress on school functioning, and also on their own resilience to vicarious trauma and burnout.

Well-integrated communication with and active inclusion of parents and caregivers in school activities in a proactive way is also vital, in order to

knit together buffering sources at school and at home. Engaging parents and families to raise awareness of ACEs and their impact on learning, through health communication campaigns can foster increased understanding, and empower families to be instrumental in preventing and addressing ACEs and toxic stress and their impacts, including by partnering with healthcare providers.¹³⁹³ Important adaptations to all these features have had to be made in the context of the coronavirus disease 2019 (COVID-19) pandemic (see [COVID-19 PANDEMIC IMPACTS ON EDUCATION](#)).

In general, there is substantial evidence that even before children enter the formal school system, access to high-quality early education and care is an important primary prevention tactic.^{23,31} Early education and care for children from birth to five years also counts as primary prevention of ACEs and toxic stress because it targets a particularly critical period for healthy development and lays the foundation for long-term preventive health and education benefits.^{1227,1245,1278-1280,1394,1395}

The Carolina Abecedarian intervention is one of the oldest and best studied early childhood programs.¹²²⁷ This childhood educational intervention includes on-site pediatricians, and four key components: language, conversational reading,

COVID-19 PANDEMIC IMPACTS ON EDUCATION

The abrupt and sustained school closures and transition to remote learning due to the coronavirus disease 2019 (COVID-19) pandemic is exacerbating challenging conditions for many students and families and creating new situations that place more children at risk of ACEs and toxic stress.^{354,355,1421} Federal data show that in 2018, 20.5% of reports of suspected child abuse nationwide came from education personnel.¹⁴²² In March 2020, during the first week of school closures in San Diego County, the child abuse hotline received nearly 60% fewer calls than average.¹⁴²³ The decrease is most likely not indicative of fewer cases of abuse or neglect, but of the diminishment of educators' time with children and ability to detect signs of abuse and neglect.

Schools recognize their roles beyond academic education, such as providing meals and counseling, but have so far struggled to continue these critical services as remote instruction supplants the classroom. Guidance from the CDE, "Stronger Together: A guidebook for the safe reopening of California's public schools," addresses the physical, emotional, health, and financial strains from the pandemic, which can cloud student and staff experiences and hinder academic and social achievement. In partnership with communities, local educational agencies are tasked with addressing social-emotional well-being more than ever, while also handling logistical requirements. For example, the

necessary move to remote learning has shone a light on the digital divide: not all families can access the technology needed to fluidly shift children to virtual learning spaces. When approximately one in five students and half of all low-income families in California are unable to participate in online lessons due to lack of a device or high-speed internet, achievement gaps and educational disparities are likely to grow.¹⁴²⁴

For many children, the school is a bedrock of community belonging. The pandemic has not only disrupted children's academic opportunities and connections with their peers and educators, it has also surfaced new and difficult experiences in the home: fear, anxiety, financial distress, food and housing insecurity, and countless other challenges. Economic uncertainty is associated with increases in harsh parenting, which increases risk for child abuse and neglect, and the loss of friends and family through illness and isolation can also increase the total dose of acute stress and adversity and reduce the dose of buffering supports available from caregivers, educators, and other adults.³⁵⁶

Educators are faced with an unprecedented test to adapt trauma-informed practices to distanced settings, especially since learners are separated from person-to-person instruction. As outlined in the *Vibrant and Healthy Kids* report from the National Academies of Sciences,

COVID-19 PANDEMIC IMPACTS ON EDUCATION

Engineering, and Medicine, children need to feel safe, both physically and psychologically.²³ Whereas the classroom provides a controlled environment characterized by routine, encouragement, and safety, home settings introduce a host of variables that may be less conducive to learning. For students who are in home settings that are less than optimal—where caregivers are under extreme stress, for example—supporting both student and caregiver becomes a core trauma-sensitive practice. To build and maintain a trusting relationship, educators must amplify culturally responsive teaching practices by

valuing and respecting students and their families, purposefully escalate opportunities for Positive Childhood Experiences and other protective factors, and model healthy emotional regulation and coping strategies for both students and caregivers.⁴¹ With children learning from a distance during a pandemic, educators may need to prioritize social-emotional resilience over the academic goals stated in a typical year's curriculum. Such trauma-informed elements of an online learning program can help students return to school feeling connected, supported, and ready to reengage with academic learning.

enriched caregiving, and learning games. Campbell and colleagues found that among adults 30 years and older who received the intervention, the Framingham 10-year risk score for total coronary heart disease (stable and unstable angina; myocardial infarction; coronary heart disease death) was 2.15 ($p < 0.05$) lower for treated men and 0.34 ($p < 0.05$) lower for women, compared to the control group, who did not receive the intensive interventions. Also, for men, a mean difference of 13.5 for diastolic blood pressure and 17.5 for systolic blood pressure was reported, compared to the control group.¹²²⁷ In the High/Scope Perry Preschool Program, in the 1960s, at-risk Michigan children were randomly assigned to receive this intensive preschool intervention. Nores and colleagues examined data available for participants aged 40 years, which included educational attainment, criminal activity, earnings, and welfare receipt. The treatment group had higher lifetime earnings, by +\$111,719 for men and \$132,406 for women. They also report that costs due to criminal activity were reduced, by \$732,894 for men and \$23,985 for women. For every dollar invested, the program repays \$12.90, when a 3% discount rate is applied.¹³⁹⁵

In addition to the long-term health and societal benefits, sufficient evidence exists that high-quality early childhood education provides a strong start to educational success across the life span.^{1396,1397} Using the Early Development Instrument, Duncan and colleagues¹³⁹⁶ longitudinally studied 3,000 children in seven school districts in Orange County, California. They saw a 100% to 300% increase in proficiency in

third-grade mathematics and language arts in at-risk children.¹³⁹⁶ In the Fast Track study, Jones and colleagues examined associations between social competence, including pro-social behaviors in kindergarten, and on-time high school completion, completing a college degree, stable employment, and full-time employment 13-19 years later. Kindergarten social competence predicted a 54% higher probability of graduating from high school, 100% higher of completing a college degree, 66% higher of having stable employment, and 46% higher of full-time employment.¹³⁹⁸

SECONDARY PREVENTION STRATEGIES

Secondary prevention strategies utilize selective interventions that target groups of individuals who are at higher-than-average risk for toxic stress, due to prior exposure to ACEs or other risk factors, and who are potentially showing early signs of toxic stress impacts

Access to natural environments such as school playgrounds and other outdoor spaces can also improve outcomes associated with toxic stress.

on learning, relationships, or health in school (such as absenteeism and behavioral or learning difficulties). These can include small-group or one-on-one mentorship or supports, close family engagement, or coordination

with community-based resources, such as those that provide supports to families experiencing challenges such as poverty, addiction, intimate partner violence, housing insecurity, or mental illness.¹³⁸⁴ These supportive strategies are best levied in consultation and coordination with the student's primary pediatric provider.

As mentioned earlier under Primary Prevention, buffering sources include adults who can provide compassion, safety, nurturance, and support, and can turn the experience of a stressor into tolerable stress, rather than toxic stress. Additionally, exercise, nutrition, mindfulness, interacting with nature, and sleep are associated with reduced stress reactivity, reduced inflammation, and enhanced neuroplasticity.^{817,927,928,962,1399} These strategies can be employed in the school setting and at home, in coordination with families and healthcare providers.

Enhancing sleep hygiene and quality is effective in buffering toxic stress, which is also critical for effective learning. Children and adolescents who do not get sufficient or high-quality sleep are at greater risk for attention and behavioral problems, which are known to contribute to poor academic outcomes in school.¹⁴⁰⁰ Improving sleep requires a consistent bedtime routine and is associated with better child mood, emotional behavioral regulation, mother's self-reported mood, school readiness, and literacy outcomes (especially when reading is part of the bedtime

routine).^{805,813,814} Bedtime routines can include feeding (for infants and children), bath, massage, reading books, rocking, prayer, singing, and listening to music.

Physical activity is associated with improved memory and attention, cognition, academic achievement, and psychosocial functioning; however, studies are not uniform in the type, intensity, or frequency of exercise needed to achieve these outcomes.^{581,754} Exercise training increases hippocampal perfusion and hippocampal volume, specifically the anterior, left, and right hippocampus.⁸⁶⁴⁻⁸⁶⁶ Physical activity increases hippocampal white matter volume, new neuron growth (neurogenesis), positive changes in the connections between neurons (synaptic plasticity), and blood flow.⁵⁸¹ Physical activity may also help metabolize the increased energy associated with anxiety or perceived (but not actual) threats. For example, a child who has experienced ACEs and is hyper-aroused and hypervigilant at school may be more activated by perceived threats and have trouble sitting still. Brief physical activity breaks may help the child release the excess energy and regulate the threat-response system.⁸⁸⁰ In one study, team sports participation during grade 7-12 (involving strong coach and peer relationships and exercise) among 9,668 adolescents exposed to ACEs was associated with lower odds of adulthood (at ages 24-32 years) depression (aOR 0.76, 95% CI 0.59-0.97) among men and anxiety (aOR 0.70, 95% CI 0.56-0.89 among men and women).⁸⁸⁰

Mindfulness is increasingly being utilized in schools as an intervention to decrease arousal and promote coping and resilience. The known impacts of mindfulness includes adaptive alterations in brain function, such as increased blood flow and brain activity in regions such as the prefrontal cortex and hippocampus.^{1401,1402}

Diets with greater fruit, vegetables, fish, and whole grains have also been associated with decreased inflammation and improved health.^{843,850} National school nutrition programs include the School Breakfast Program, the National School Lunch Program, and the Special Milk Program. The first two are federally assisted meal programs operating in public and nonprofit private schools and residential childcare institutions. It provides nutritious, low-cost or no-cost breakfasts and lunches on each school day. The Special Milk Program provides milk to children in half-day pre-kindergarten and kindergarten programs without access to the school meal programs.¹⁴⁰³

There is sufficient evidence to demonstrate that recess and play time during school benefits students' memory, attention, and concentration and reduces disruptive behavior in the classroom, while improving social-emotional development.^{1404,1405} Attention and learning are best optimized with breaks, since the brain has difficulty maintaining attention for extended periods and requires new stimuli to regain focus.¹⁴⁰⁶ Recess and play can take place inside or outside, but are enhanced in the

presence of nature.

Importantly, access to natural environments such as school playgrounds and other outdoor spaces can also improve outcomes associated with toxic stress. Interacting with nature is associated with decreased diabetes, depression,⁹⁴⁷ heart rate and blood pressure,⁹⁴⁸ heart disease,⁹⁴⁹ and mortality.^{948,950-952} Adding green spaces in low-resourced communities has been associated with reduced crime and violence, improved perception of safety, increased social connections, and reduced depressive symptoms.^{947,956,957} By contrast, losing trees has been associated with increased crime and worse health, including increased cardiovascular and respiratory deaths.^{952,957,958} Nature most likely improves health for children and adults with toxic stress by directly calming the stress response system, as well as by increasing healthy behaviors such as physical activity, mindfulness, and relational health. Parks and exposure to nature have been shown to increase play and physical activity, as well as to decrease screen time.⁹⁵⁹ Nature may also increase opportunities for relationship and connection and improve sleep.^{757,758} Studies also document improvement in family functioning and attachment,^{757,960} and increased social ties.⁷⁵⁸

After-school programs can also play an important role in the secondary (and tertiary) prevention of toxic stress by providing focused skill-building activities and important mentorship with peers and adults for students. In 2019-20, the Governor's budget included \$50 million for after-school and safety programs.¹¹³¹ All of these efforts support building school capacity for students exposed to ACEs to learn in a safe, supportive environment with the promotion of nurturing relationships both inside and outside school.

TERTIARY PREVENTION STRATEGIES

Tertiary prevention targets those students who are already exhibiting signs of toxic stress—such as ACE-Associated Health Conditions (AAHCs), high-risk learning or relational behaviors, and/or other downstream sequelae of toxic stress—and require specific therapeutics to address and prevent worsening health problems, chronic behavioral or learning difficulties, school suspension, expulsion, or dropping out. Such interventions enact tertiary prevention or seek to minimize future risks in those who already have signs and symptoms that suggest they are experiencing significant toxic stress physiology.^{6-10,704} The interventions outlined for primary and secondary prevention apply to the tertiary prevention of AAHCs and children exhibiting signs of toxic stress. School-based health services can also provide students focused healthcare interventions. In many cases, such services may not be available; in these scenarios, school personnel should work closely with the child's family and healthcare provider to ensure that all aspects of school

and health are well coordinated with the child's primary medical provider. Needed resources may include therapeutic counseling and wraparound services that include healthcare, social services, and trauma-specific therapy.

Restorative justice techniques that emphasize redirection and de-escalation tactics, and prioritize time in the classroom, can minimize re-traumatization and mistrust and better support students' long-term growth.

Disciplinary strategies that are not overly harsh or punitive, but instead, are restorative, emphasizing de-escalation and redirection when disruptive behaviors occur, are also vital to prevent re-traumatization and escalation of acute behavioral and/or other disruption. This can help prevent the "school-to-prison pipeline."¹⁴⁰⁷⁻¹⁴¹⁰ This phrase refers to children

having their first encounters with the criminal justice system while still in school, often after punitive disciplinary actions are taken, including suspensions that take them out of school. Children of color are disproportionately affected.¹⁴⁰⁸⁻¹⁴¹⁰ Between 2005-2006 and 2017-2018, there was a 47% relative increase in the number of public schools nationwide with one or more security staff with the authority to arrest students.¹⁴¹¹ When public schools increasingly rely on school resource officers to discipline students at school, school-based arrests go up.¹⁴¹² Combating these systems using restorative justice techniques that emphasize redirection and de-escalation tactics, and prioritize time in the classroom, can minimize re-traumatization and mistrust and better support students' long-term physical, social-emotional, and cognitive growth.¹⁴⁰⁸⁻¹⁴¹⁰

Sometimes targeted health and mental health interventions are needed, including ones that involve family-based treatment. In some cases, these can happen in school settings (when there are trauma-trained health professional staff), and in others, schools may recommend that students and families seek such treatment in healthcare contexts. Ideally, schools and child-serving health providers such as pediatricians and family practitioners would closely coordinate on any school-based and external health resources for students displaying toxic stress symptoms. For example, coordination of a student's Individualized Education Program (IEP) for a health condition such as asthma, ADHD, a learning difficulty or disability, depression, or anxiety, is one example. School personnel may connect families in need with a local healthcare provider trained in ACE screening, identifying signs and symptoms of toxic stress and trauma-informed care through the [ACEs Aware provider directory](#).¹¹⁵³

The introduction of the federal Handle with Care Act of 2018 was intended to strengthen the infrastructure to promote trauma-informed schools and prevent repeated traumatization impacts. It illustrates the important opportunity to bridge between the justice system and the education system.¹⁴¹³ The proposed act is based on a pilot program in West Virginia that supports coordination between law enforcement and educational professionals to provide additional supports to students present at the site of a traumatic event. Law enforcement personnel who are called to the scene and observe that a child is present are trained to gather information about where the child goes to school in a trauma-informed manner and send a notification to the school, without revealing any confidential information. For example, when law enforcement is called to a home for an episode of intimate partner violence, the school of any affected child is notified that the child should be “handled with care” so that school personnel can be prepared to respond by providing extra precautions in promoting safety and nurturance for the student in the days to come.¹⁴¹³ West Virginia first piloted Handle with Care in 2013, and to date, 527 notices involving 959 students have been provided.¹⁴¹⁴ School interventions have helped up to 90% of the identified children, and about 130 children received counseling service on-site at school. In addition, observed relationships between education and law enforcement have shown improvements.¹⁴¹⁴

Another example of an allied tertiary prevention approach between justice and education is an after-school program for juvenile offenders called Project Back-on-Track, which included a comprehensive multi-modal treatment program emphasizing family and group interventions for youth violent offenders; the control group received a community intervention. The Back-on-Track intervention group had a 90% non-arrest rate after 12 months following enrollment, compared with 69% of the community control group.¹⁴¹⁵

CASE STUDIES

Project Cal-Well of the California Department of Education (CDE)¹⁴¹⁶ and the Healthy Environment and Response to Trauma in Schools (HEARTS) program of the University of California, San Francisco (UCSF),¹⁴¹⁷ are two case studies in California that are presented to provide a snapshot of how primary, secondary, and tertiary prevention of toxic have been translated into school settings.

Both programs utilize the Multi-Tiered System of Supports (MTSS) model, which operationalize a three-level prevention and intervention approach (**Figure 21**). More specifically, CDE’s Project Cal-Well uses RtI² (Response to Intervention and Instruction) to help prevent students from falling behind by using data-driven decisions that support a team-based problem-solving approach to meet California’s Common Core State Standards. The UCSF HEARTS framework is a prevention and



Figure 21. Examples of primary, secondary, and tertiary prevention strategies to address toxic stress employed in the education sector. Reproduced with permission of Corwin, from Romero, Robertson, and Warner, *Building Resilience in Students Impacted by Adverse Childhood Experiences: A Whole-Staff Approach* (Thousand Oaks, CA: Corwin, 2018); permission conveyed through Copyright Clearance Center, Inc.¹³⁸⁴

intervention approach that utilizes the MTSS framework to address adversity at the student, staff, and school organizational levels.

Project Cal-Well

Project Cal-Well: Primary prevention of ACEs and toxic stress

Since 2014, the CDE has been involved in Project Cal-Well, a federally funded project to promote mental health awareness and wellness among California’s K-12 students. The CDE received two, five-year grants from the Substance Abuse and Mental Health Services Administration to implement Project Cal-Well in two cohorts. In Cohort 1 (2014-19), Project Cal-Well was a consortium of the CDE, ABC Unified School District, Garden Grove Unified School District, and San Diego County Office of Education. **Figure 22** provides an overview of the project’s three-component model. Component 1 utilizes primary prevention to promote and improve school climate across the full population. The ultimate goal is to increase school connectedness over time. To accomplish this, Project Cal-Well utilizes intervention strategies such as [Positive Behavioral Interventions and Supports \(PBIS\)](#), trauma-informed care, Restorative Practices in Schools, Youth Mental Health First Aid, and suicide prevention policies and trainings. To increase student engagement and reduce problematic behaviors, PBIS uses evidence-

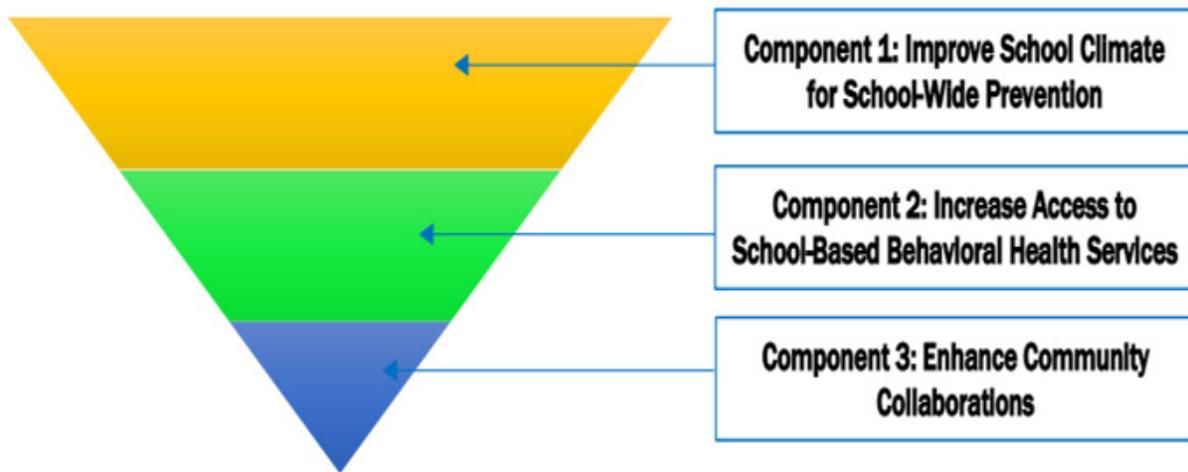


Figure 22. Project Cal-Well employs a primary prevention approach to enhance school environments and success for all children, and targeted and interventions for at-risk and high-risk youth. Reproduced with permission from Project Cal-Well.¹⁴¹⁹

based behavioral interventions like reward and positive reinforcement to promote desired behaviors and positive outcomes for all students.¹⁴¹⁸

Project Cal-Well: Secondary and tertiary prevention of ACEs and toxic stress

Component 2 aims to provide targeted school-based health services to students who show symptoms that suggest risk for or early toxic stress physiology, despite universal intervention practices and thus enacts secondary prevention of toxic stress. School-based health services include individual and group counseling to support such students, in addition to physical health services for AAHCs such as asthma and somatic complaints like headaches or digestive concerns, which contribute to school absenteeism.^{6,703,1420} Project Cal-Well schools successfully increased access to school-based mental health services in two ways: by hiring a variety of on-site mental health professionals, and through training to increase staff awareness of students' mental and physical health needs and how to refer students to needed health services. As a result, the proportion of school staff reporting that they referred students to school-based mental health professionals in the past 12 months increased from 75% in 2013-2014 to 85% in 2018-2019. In addition, 6,754 students were provided school-based mental health services in 2018-2019, compared to 2,664 students in 2013-2014, which was a relative increase of 154%.¹⁴¹⁶

Component 3 of Project Cal-Well, which enacts tertiary prevention of toxic stress, focuses on providing intensive mental health interventions to students with identified mental or behavioral health needs through strong community

collaborations. Schools liaise closely with community-based behavioral health and other organizations to develop referral pathways to ensure students receive needed interventions.

By the end of 2019, Project Cal-Well had improved access to and availability of mental health services in the three Cal-Well local educational agencies and had trained almost 6,000 educators, school staff, and parents in Youth Mental Health First Aid throughout the State (**Figures 23 and 24**). Additionally, among 9th graders, Garden Grove Unified School District saw a 6% decrease in suicidal ideation and a 5% increase in school connectedness. In the San Diego County Office of Education, there was a 30% increase in 9th and 11th graders reporting there was a caring adult in their lives, and an 11% increase in school connectedness.¹⁴¹⁶

HEARTS

HEARTS: Primary prevention of ACEs and toxic stress

HEARTS is largely aimed at supporting school climate and culture change by building capacity of school personnel. A key focus is training personnel on the effects of complex trauma and trauma-informed practices. Building school capacity also includes promoting staff wellness by addressing stress, burnout, and vicarious trauma. For staff to effectively implement trauma-informed practices, procedures, and policies, they must have the competency and skills to respond to behavioral, health, relational, and learning difficulties. School leadership and a team of key school staff meet regularly (e.g., coordinated care teams), along with the rest of the school community (e.g., administrators, credentialed and classified staff, students and their caregivers) to implement these supports and systems. Systems change in this model typically requires between two and five years, depending on a school body's level of need and the intensity of services provided.

Primary prevention goals of the HEARTS program include:^{1365,1417}

1. Increasing student wellness, engagement, and success in school;
2. Building school system capacities to support trauma-affected students by increasing knowledge and practice of trauma-informed strategies; and
3. Promoting staff wellness through addressing burnout and vicarious trauma.
4. HEARTS services that aid in these goals can include:
 - a. Professional development training and consultation for school personnel and community partners, and
 - b. Workshops for parents/caregivers.

HEARTS can be implemented as a full, site-based program or as the HEARTS Flex.

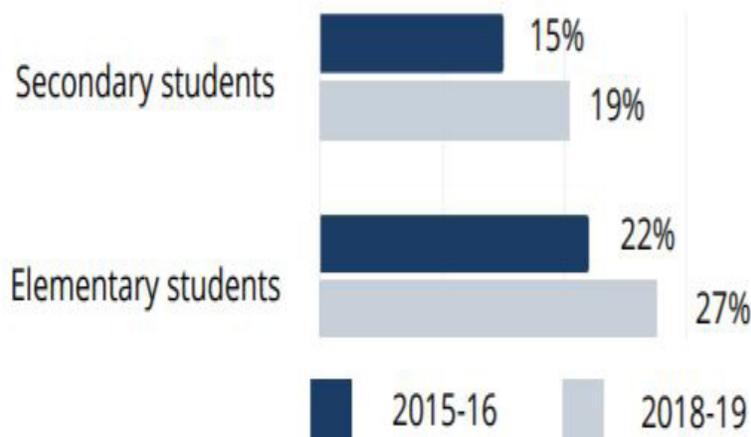


Figure 23. From 2015 to 2019, overall changes in the percentage of students reporting that they would seek help from a counselor, doctor, or therapist if scared, stressed, or depressed. Reproduced with permission from Project Cal-Well.¹⁴¹⁶

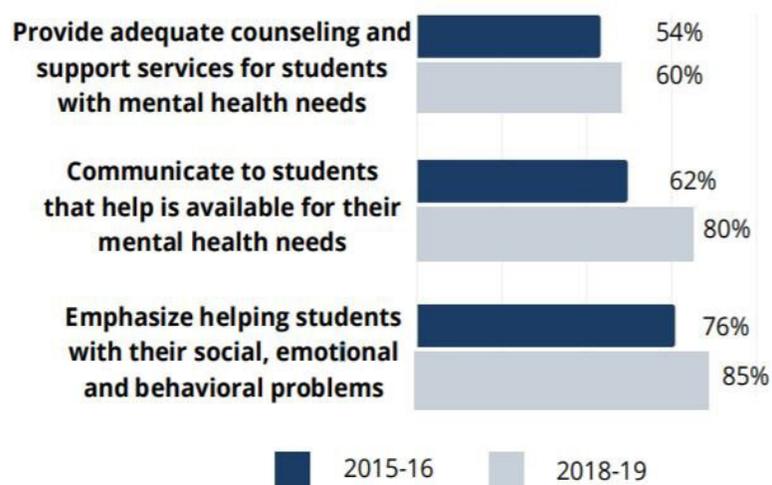


Figure 24. From 2015 to 2019, changes in the percentage of ABC Unified School District staff reporting that their schools were meeting the emotional and mental health needs of their students. Reproduced with permission from Project Cal-Well.¹⁴¹⁶

The full, site-based program includes a HEARTS consultant on-site at a school three to five days per week, who collaborates with school leadership and staff to provide the full range of support and services across all three MTSS tiers (Figure 25). In the Flex format, HEARTS implementation focuses on primary prevention (tier 1) and early/secondary prevention (tier 2), without direct therapeutic services

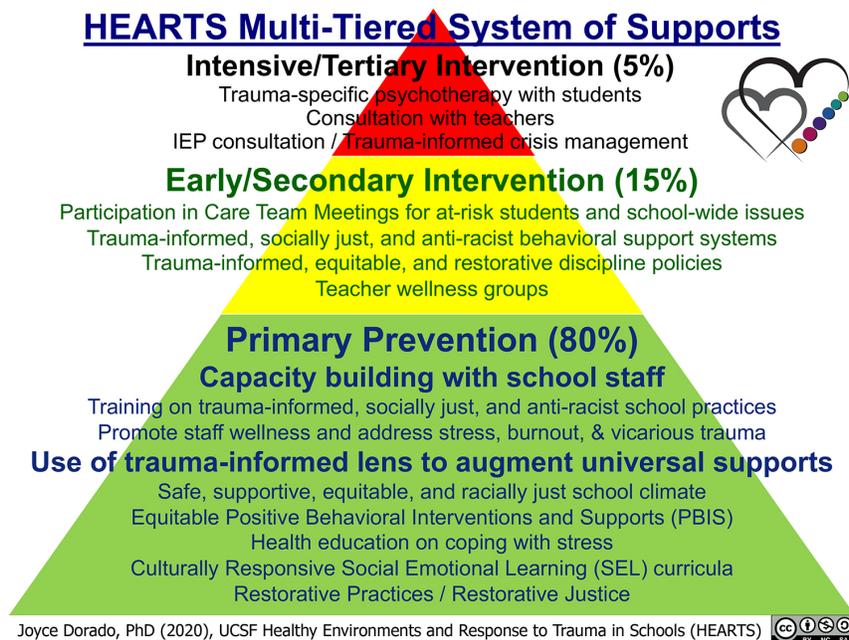


Figure 25. Three-level prevention framework for UCSF’s HEARTS (Healthy Environments and Response to Trauma in Schools). Reproduced with permission from Joyce Dorado, PhD (2020), “HEARTS Multi-Tiered System of Supports”, *Healthy Environments and Response to Trauma in Schools (HEARTS)*. Retrieved from <https://hearts.ucsf.edu/program-overview>¹⁴¹⁷

for students.

HEARTS: Secondary and tertiary prevention of ACEs and toxic stress

Secondary and tertiary prevention of ACEs and toxic stress include training and consultation for school and district staff, and on-site health services like psychotherapy for students with toxic stress. Frequency of training and consultation depends on needs and resources of a school site or district.

An important aspect of HEARTS is a focus on using restorative justice principles to prevent the “school-to-prison pipeline,”¹⁴⁰⁸⁻¹⁴¹⁰ and particularly, on reducing racial disparities in disciplinary office referrals, suspensions, and expulsions. The HEARTS site-based program aims to increase instructional time and decrease time spent on disciplinary actions.

After the full program had been implemented for two or more years, school personnel reported significant increases in understanding trauma, their use of trauma-sensitive practices, and in students’ ability to learn, time on task, and school attendance. At one school, after the first year of HEARTS, total disciplinary office referral incidents had dropped by 32%, and incidents involving physical aggression reduced by 43%.¹⁴¹⁷ After the fifth year of HEARTS, there was an 87% reduction

in total incidents, an 86% reduction in incidents involving physical aggression, and a 95% decrease in out-of-school suspensions.¹³⁶⁵ A nurturing school climate with more intensive services for at-risk and high-risk students promotes improved student learning, health, and relational success.

IMPLICATIONS AND FUTURE DIRECTIONS

Using multi-tiered, school-based interventions that incorporate assessment and response to toxic stress, California has witnessed greater school connectedness among students, reductions in suicidality, increased reports of caring adults, and reduced levels of aggression in school systems. These findings are promising.

Case Study

A Middle School Program in Antioch

At a middle school in Antioch, staff struggled to control student behavioral disruptions. Teacher morale was plummeting. In 2015, 19.2% of the student population had been suspended. The principal and staff took advantage of a trauma-informed program that Contra Costa County was implementing called the Sanctuary Model to essentially replace a “What’s wrong with you?” approach to dealing with kids who are having trouble with “What happened to you?” and then providing them with the evidence-based interventions that can help them.¹⁴²⁵

Using tools from the training, one teacher was able to make new inroads in building trust. “I have a student in class. When she’s angry, she will burst out cussing. She will walk out of class.” The student was also frequently tardy.

After talking with her, her teacher discovered that her anger stemmed from not being able to live with her mother, who struggled with drug use. The teacher acknowledged the student’s anger, but gently impressed upon her that she had to find another way to deal with it, prompting a discussion: “What’s your plan when you’re angry? Because you can’t be cussing like that in the middle of a classroom, in a library, in a courtroom, or anywhere. It doesn’t work.” The girl came up with a plan that if she was triggered, she would step outside the classroom until she calmed down. Not long after, a classmate said something that angered the student. “She looked at me. I looked at her,” the teacher recalled. “She left the classroom and came back a few minutes later when she felt calmed down.”

By integrating this trauma-informed approach into all parts of the school and rebuilding many of its practices from the inside out, suspensions dropped more than 50% in 2017. The method transitioned organizational culture from one that stigmatized students and increased stress to one that buffers stress and builds skills for resilience. The model has been implemented by hundreds of organizations and communities across the United States, including public and private schools, health organizations, residential treatment centers, domestic violence shelters, and drug and alcohol treatment centers.

Case Study

Middle School Program in Antioch

Similar to HEARTS (Healthy Environments and Response to Trauma in Schools) and other methods, the program embraces a whole-school primary prevention approach based on the science of ACEs and toxic stress. Part of the staff training, for example, highlighted how ACEs can lead to toxic stress, damaging the structure and function of kids' developing brains, and can cause them to be on high alert for danger, easily triggered into a state of fight, flight, or freeze, and less capable of rational thought in triggered moments.

The Sanctuary Model puts as much emphasis on teacher and staff self-care as on caring for students. Sometimes teachers need to step away. A buddy system allows teachers to ask one another to briefly take over their class, for example. Students and teachers are able to pay attention to what triggers them and pause and reflect. It has been made easier by a rich array of new practices—including mindfulness meditation, a staffed wellness center, individual student check-ins, restorative meetings after tangles between students, or between students and teachers, teacher safety plans, and yoga—that have been embedded in school to help both students and teachers.

The many students who need more than mindful moments can visit the wellness room housed in a modular structure, for up to 10 minutes, which is helpful for secondary and tertiary prevention—regulation of the toxic stress response. The room features a “talk” area and a “chill out” area with comfortable black armchairs, separated by dividers, and an open area for yoga poses. The room is staffed by a wellness counselor and a marriage and family therapy and school-counseling intern, who see students individually and in support groups. There, they can curl up under a weighted blanket or cuddle a weighted stuffed animal, listen to mindfulness music, squeeze stress balls, focus on iridescent water-filled wands, or just sit quietly and take deep breaths. If they need more time with a counselor or psychologist, the counselor can set up a longer appointment.

Administrators collected data on the use of the wellness room and found that 823 students made use of it in a single quarter. The next year, for the same time period, that number decreased to 710 visits. The data are still being analyzed, but educators are convinced that more suspensions would have occurred had those hundreds of visits not taken place. Many

Case Study

Middle School Program in Antioch

students also report using mindfulness at home and teaching the methods to their families, further amplifying primary, secondary, and tertiary prevention of toxic stress for multiple members of student households, especially those at risk of ACEs and toxic stress, and those already living with their consequences.

Case Study

An Elementary School Program in Suisun City

Three years after an elementary school in Suisun City began a trauma-informed training program called Collaborative Learning for Educational Achievement and Resilience (CLEAR), its suspension rate dropped from 18.5 percent to zero.¹⁴²⁶ Data from the [California Department of Education's School Dashboard](#) showed additional improvements, like a 5.5-point increase in English language arts testing from the previous academic year.¹⁴²⁷

The transition began when every staff member—custodians, front office staff, cafeteria workers, teachers, and the principal—began participating in a program that integrated the science of ACEs and toxic stress into their work and lives. This approach describes how childhood adversity can easily trigger a child's brain into fight-flight-or-freeze mode, stimulating the sympathetic nervous system; how recognizing triggers and creating safe spaces for students in the grip of an outburst can minimize interruptions in learning; and how building positive relationships between adults and children impacted by adversity can buffer long-term health, learning, and relational effects and build resilience. Instead of punishing students for outbursts and disruptions, teachers and staff learned to implement trauma-informed practices to spot and intervene with students when they're about to have a meltdown or other difficulty. The training explained to staff why a triggered child was physiologically unable to talk or learn. Teachers learned how to be proactive in preventing and responding to students' triggers. For a student who freaks out every time she gets a paper cut, for example, one could place a stack of Band-aids on her desk. Another example is awareness that if a kid is hungry, they may be more easily triggered, so teachers can keep snacks on hand in their classrooms.

In a corner of one classroom, a first-grader kneels on the carpet in an area known as a regulation station, repurposed from "time out" areas when the school moved to a strengths-focused model, using tenets from [Positive Behavioral Interventions and Supports](#) (PBIS), a federally funded program.¹⁴¹⁸ Regulation stations are in every classroom and

Case Study

Elementary School Program in Suisun City

feature kinetic sand, puzzles, pencils, paper, books, and Rubik's cubes, all tools that students can use to soothe and calm themselves. Other examples of that shift to PBIS are "welcome" cards instead of "tardy" cards for students to present to their teachers, to remove the sense of shame about being late.

A CLEAR consultant made monthly visits to the school, observed classes, answered questions, and helped reinforce the idea of looking at what drives the behavior of a student who is triggered. The consultant taught staff about self-regulation and co-regulation (how teachers can regulate themselves when they are stressed, and how to model regulation for their students); strategies to help students regulate when they are struggling with big emotions and behaviors; how to have empathy and compassion while holding kids accountable; how to increase safety, predictability and consistency across environments; what self-care is and how to integrate it; and how to understand triggers for children and adults. The consultant also showed staff how to help students restore their relationships with teachers or other students.

Other schoolwide practices were implemented to help keep students on an even keel, like morning meditation for second and third graders, from a mindfulness program known as [Inner Explorer](#).¹⁴²⁸ After the meditation and time for journaling, the students assemble in a circle on the floor for what is called their morning meeting. The teacher leads them through an exercise where each child is prompted to mention someone they admire and why they admire them.

And while all these measures may help the majority of kids as part of primary and secondary prevention strategies, some will need more assistance when they've hit a rough spot in their day, especially those who live with ACEs and other adversities. In other words, they need strategies for the tertiary prevention of toxic stress. That's where a behavioral technician may come in. For a student whose parents are both incarcerated, living with his grandma means living under strict discipline. When the behavioral technician learns that firmness makes the student shut down, he is intentional about using a tone of caring and concern to stimulate the parasympathetic nervous system to prompt calmness and emotional regulation.