Adverse Childhood Experiences

Madison County Department of Health - July 2019

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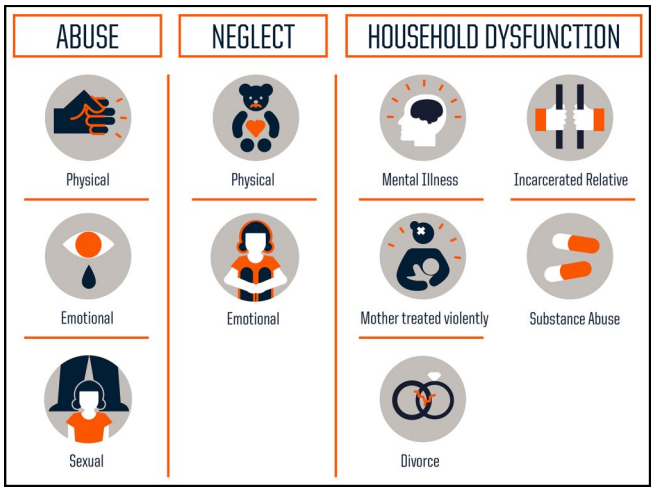
Definition

The term *adverse childhood experiences* (ACEs) refers to a wide range of stressful events that can cause negative, long-term effects on well-being.[1,2] ACEs are categorized into three types: abuse, neglect, and household dysfunction. Abuse includes physical, emotional, and sexual, while neglect can be either physical or emotional. Household dysfunction encompasses exposure to domestic violence, family member with mental illness, family separation/ divorce, substance abuse, and incarceration (Figure 1).[2]

Long-term exposure to one or multiple ACEs can significantly affect child development and is linked to a disruption in biological functions, engagement in risky health behaviors, poor health outcomes, and shorter life expectancy.

In 1998, the Centers for Disease Control and Prevention (CDC) and Kaiser Permanente supported the first study to evaluate the relationship between chronic stress in childhood and adult health status.[2] Data was collected on 17,000 adult participants, who completed medical examinations and self-reported surveys on health-related behaviors as well as negative childhood events. From the study, the term ACEs was coined and a conceptual framework for the health effects was developed (Figure 2). This framework outlines how early exposure to ACEs leads to emotional and cognitive impairment, which can perpetuate the adoption of health-risk behaviors. Subsequently, ACEs impact the onset of chronic disease, disability, and even premature mortality.[2]

Figure 1. Adverse Childhood Experiences (ACEs) characterized into three categories: abuse, neglect, and household dysfunction from SAMHSA.



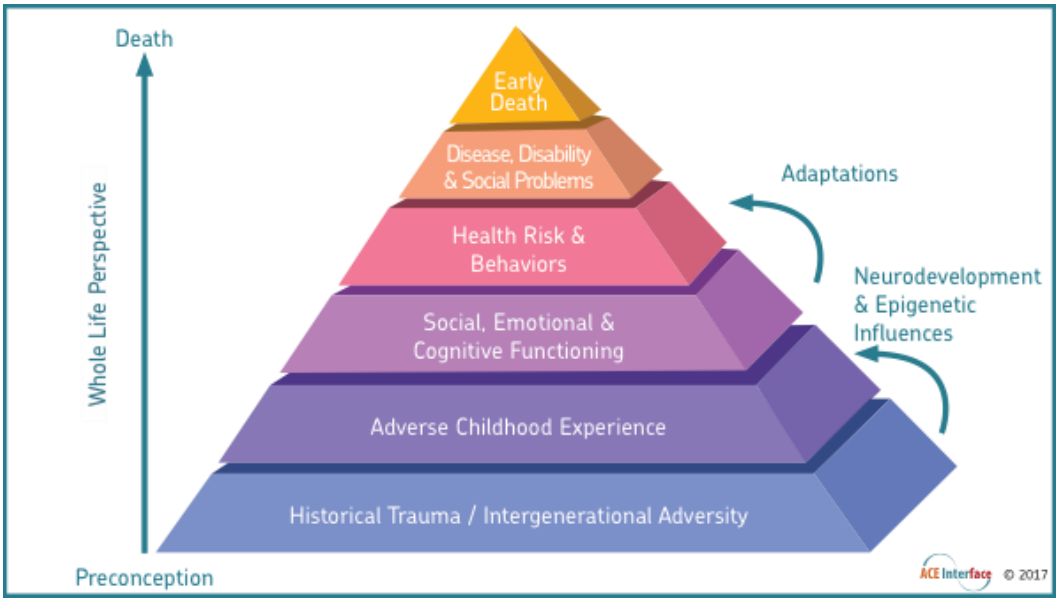


Figure 2. The ACEs Pyramid demonstrates the life perspective from preconception to death based on family and personal exposure. *Adapted by the ACE Interface, LLC.*

Adverse Childhood Experiences may also include:

1. Economic instability
2. Bullying (peer or adult)
3. Witness violence outside the home
4. Witness a sibling being abuse
5. Form of discrimination (e.g. racism, sexism)
6. Homelessness
7. Natural disasters
8. War

Figure 3. Expanded list of ACE types based on published journal articles.

This study and many others since then have supported the association of ACEs with numerous health outcomes. Since 2009, the CDC has collected data on ACEs through the Behavioral Risk Factor Surveillance System (BRFSS).[3] Today, 38 states, including New York, and the District of Columbia have adopted the ACEs module in their state-conducted BRFSS (Figure 13, page 13). Simultaneously, independent research has been conducted on the exposure to ACEs and specific health-related risk factors, chronic health conditions and utilization of medical services. More recently, the definition of ACEs was expanded to include living in unsafe neighborhoods, homelessness, bullying, racial discrimination, and economic insecurity (Figure 3). The growing body of literature reaffirms the association between ACEs and more than 40 health outcomes.[3]

Researchers developed a quantitative metric for explaining one's risk for potential affects, referred to as an *ACE score*. It is a tally of the different types of trauma an individual has been exposed; one point for each type of ACE. Higher ACE scores indicate higher risk of developmental, behavioral, and health issues.

This health issue profile outlines the conceptual framework of how exposure to ACEs affects childhood development as well as the health implications in adulthood. Following the literature review, the document contains data on ACEs in the United States, New York State, and Madison County. Lastly, the report identifies current initiatives and recommendations for addressing ACEs on a local level.

Health Impact

The exposure to ACEs is associated with multiple behavioral risk factors and health problems such as alcohol and substance abuse, violence, poor mental and physical health, as well as poor quality of life.[4] The mechanism in which childhood trauma can affect health outcomes in adulthood has been explained through the research of toxic stress.

Toxic Stress

Although stress is a normal part of life, long-term or intensified exposure can have negative impact on the body. When we feel threatened, our body activates an alert system often referred to as the *fight or flight* response. The body increases the production of stress hormones, which causes an increased heart rate, blood pressure, and muscle tone (Figure 4).[5]

The Center for the Developing Child at Harvard University[4] identified three types of stress responses:

POSITIVE STRESS

is characterized by a brief increase in heart rate and stress hormones in response to day-to-day challenges, such as taking a test. This reaction is a normal part of healthy development and the body is able to return to its normal state.

TOLERABLE STRESS

is the response that results from a more significant event, like a car accident, and causes a greater activation of the body's alert function. Supportive adult relationships buffer negative effects and allow the body to return to baseline.

TOXIC STRESS

may occur when an individual experiences intense, frequent, prolonged and/or unpredictable trauma without the adequate support from trusted adults. The body adjusts by remaining in a high stress-response state at all times.

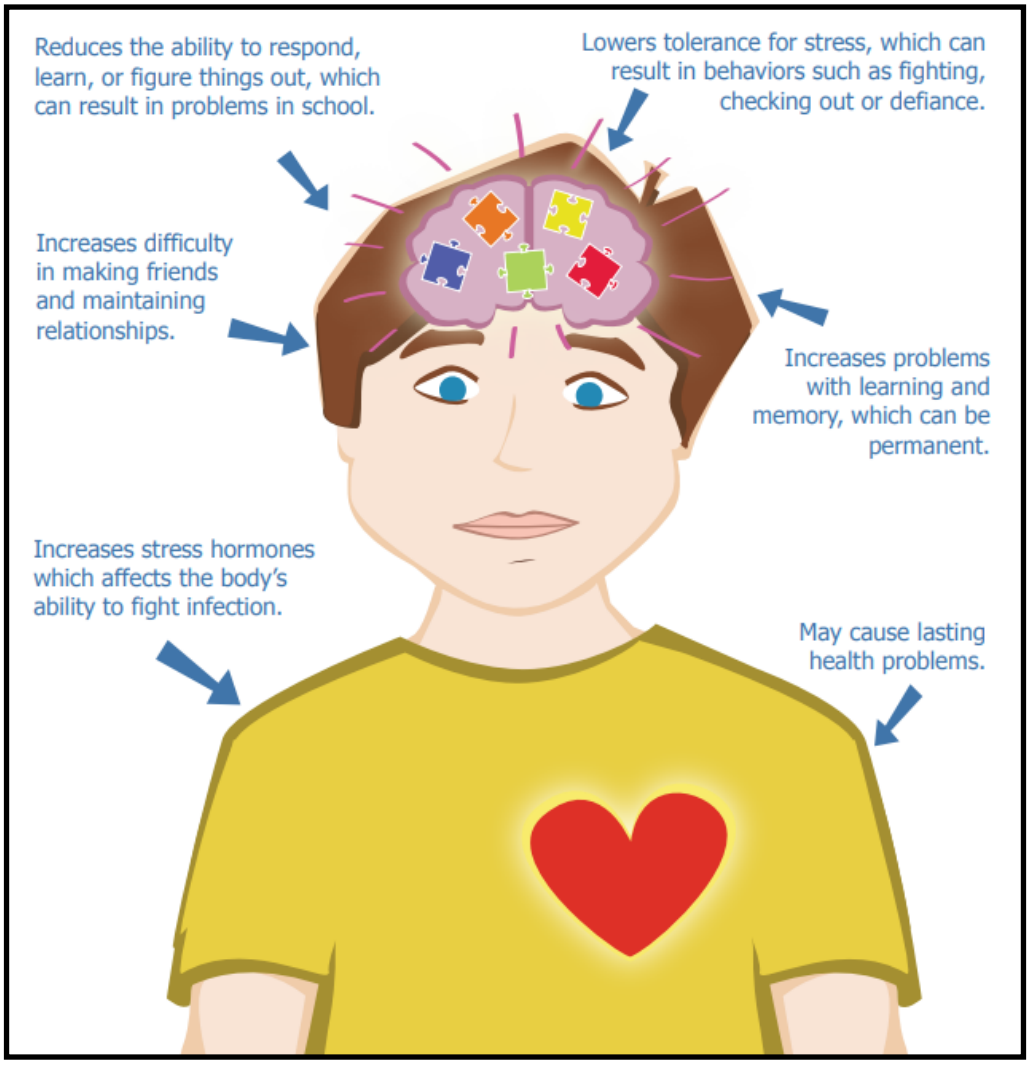


Figure 4.

The impact of frequent or prolonged exposure to ACEs on the developing brain of a child and overall health. *Resource from the Community & Family Services Division at the Spokane (WA) Regional Health District.*

The effects of tolerable and toxic stress can be buffered for children in a supportive environment with strong adult relationships. More importantly, a person's response to stress and the long-term impact is determined by both their genetics and environment in which they live and develop.

Family genetics can make certain people more vulnerable to their environment. As a result, many children are more susceptible to the effects of ACEs and less likely to exhibit resiliency. Moreover, early trauma can alter individual genes, which changes how they are expressed in those individuals and their offspring.[5–7] Changes from trauma can be passed from one generation to the next (Figure 2, page 1).

The mental health of parents and children are connected. If parents have a high number of ACEs, the child is at risk for a high ACE score as well. Children whose parents have an ACEs score of 4 or more are more likely to have behavioral health problems, including two times more likely to be hyperactive and four times more likely to have an emotional disturbance diagnosis than children of parents with none.[4] This intergenerational transmission of ACEs demonstrates the importance to identify parent ACE scores along with children. Lastly, this link between parent and child should be considered in the treatment plan; family intervention is more effective than treating a child individually.

Child Development

Prolonged activation of the stress response system without the necessary support from adults can lead to changes in the child's brain, both the architecture and function. This process is called *biological embedding.* The areas of the brain impacted by ACEs are responsible specifically for memory, attention, and inhibitory control. Additionally, these changes in the brain affect emotional and social regulation.[5,7]

Healthy brain development during 0-3 years provides a strong foundation for physical health, mental functioning, and overall well-being in the future. The first three years are particularly critical due to the rapid growth and increasing connectivity of pathways in the brain. During the first year of life, an infant's brain doubles in size and by age three, it is 80% of adult size. Early exposure to ACEs affects the structure of the brain and in turn, delays development and inhibits learning.

The more adverse experiences a child faces equates to a greater chance of a developmental delay. A child exposed to five ACEs during the first three years of life has a 76% likelihood of having one or more delays in their language, emotional or brain development.[5,6] Children exposed to six or more ACEs face a 90-100% likelihood of having at least one developmental delay.[8] In an average American classroom of 30 students, approximately one-third will experience 0-1 ACE, another third will experience 2-3 ACEs, and the last third will experience 4 or more ACEs (Figure 5).

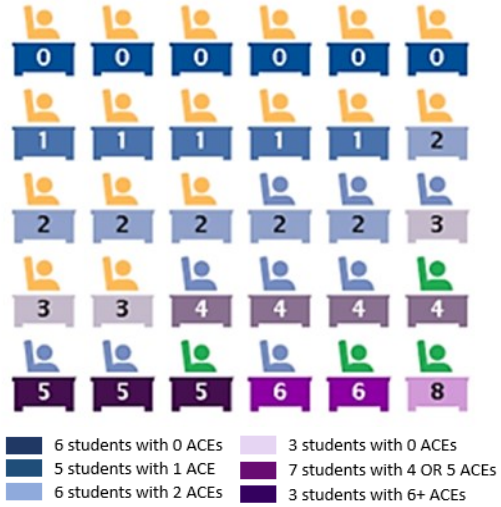


Figure 5. The prevalence of ACE scores in an average classroom, developed by Washington State Family

Parental neglect, in particular, represents the most significant impact on academic achievement. More specifically, ACEs contribute to a greater number of special education placements, poor grade retention, lower attendance rates, and worse test scores. In addition to learning difficulties, there is significant evidence that children exposed to ACEs are more likely to be aggressive and lack social skills, particularly among their peer group.[5] Young people who experience poor performance in school and

struggle with healthy relationships are more likely to develop mental health disorders.[9,10]

Educational difficulties foreshadow poor occupational outcomes as adults. People exposed to ACEs are more likely to have higher rates of absenteeism, poor financial management, and worse overall job performance. The relationship between ACEs and employment performance is mediated by interpersonal relationship problems, emotional distress, and substance abuse.[11] Lastly, exposure to ACEs can lead to unemployment and homelessness in extreme cases.[12]

Mental Health

Children with any number of ACEs are at greater risk of poor mental health, including mood and anxiety disorders.[9,10] In the original ACE study, 54% of depression in female participants could be linked directly to an ACE exposure. Furthermore, the prescription rate for psychotropic drugs (e.g. antidepressant, antipsychotic, and mood-stabilizing/ bipolar medications) increases as the ACE score increases.[13] For individuals with 5 or more ACEs, the likelihood of taking each of these classes of drugs increased by three-, ten-, and seventeen-fold, respectively.[13] Figure 6 demonstrates the prescription rate of antidepressant drugs relative to the number of ACEs.

Children who are abused or bullied are three times more likely to display psychotic symptoms than those who are not.[5] The risk nearly doubles for children who are exposed to both forms of violence. Changes in the brain caused by childhood trauma result in the heightened sensitivity to stress often found in people diagnosed with psychotic disorders, including schizophrenia. Lastly, there is a significant relationship between ACEs and hallucination experiences later on. The risk of hallucinations is five times greater for those with an ACEs score of 7 or higher compared to those with none.[15]

Poor mental health can contribute to suicidal idealization and increased risk of attempting suicide. ACEs are strongly associated with an increased likelihood of attempted suicide. The risk significantly increases with an increase in number or frequency of ACEs. Individuals with an ACE score of seven or higher are 31 times more likely to attempt suicide compared to those with none.[16]

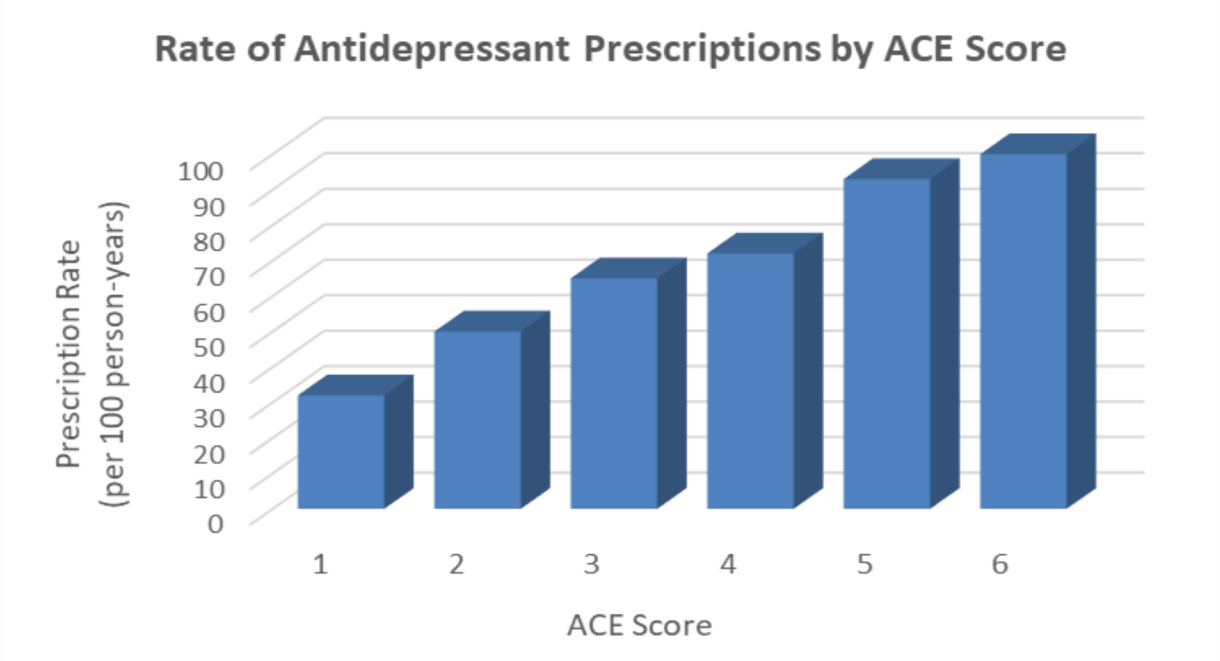


Figure 6. The rate of prescription antidepressants per 100 person years by ACE score.[14]

Risky Behaviors

There is a relationship between childhood adversity and risky behaviors.[5] This is not surprising given the connection to underdeveloped coping skills and poor mental health outcomes. For example, ACEs are linked with early initiation and high consumption of alcohol. With the exception of physical neglect, all ACE types significantly increase the risk of ever using alcohol. In fact, initiating alcohol use by age 14 years increased two- to threefold with every increase in ACE score.

In addition to alcohol use, ACE exposure influences tobacco use. Compared with those reporting no ACEs, individuals exposed to five or more had significantly higher risk of early smoking initiation, ever smoking, current smoking, and heavy smoking.[17]

Children exposed to ACEs begin substance use earlier and sustain higher lifetime rates of use. Like other risky behaviors, an individual's ACE score is associated with early initiation, increasing the likelihood by 2- to 4-fold per ACE. The ACE score is connected to illicit drug use, drug addiction, and injected drug use. One study attributed 56% of drug use, 64% of drug addiction, and 67% of parenteral drug use to ACEs exposure.[18] For each additional ACE, an individual's risk of opioid relapse during medication-assisted treatment is 17% higher.[19] Many studies have explored the effects on ACEs on prescription drug use as well. For every additional ACE score, the rate of number of prescription drugs used increased by 62%.[20] Figure 5 demonstrates the increase in use of antidepressant prescriptions by ACE score.

Substance abuse is related to risky sexual behaviors.[21] Individuals with ACEs exposure are more likely to have an increased number of sexual partners and start having sex at a younger age. In addition, this population is at greater risk for sexually transmitted diseases, including HIV. Engaging in risky sexual behavior is 4 times higher in individuals exposed to 4 or more ACEs compared to those with none.[21] Unintended pregnancy is related to ACEs exposure.[21] Lastly, children exposed to ACEs are more susceptible to human trafficking with sexual abuse being the strongest predictor.[22]

"ACEs are associated with several chronic conditions, including ischemic heart disease,[25] Type 2 diabetes, irritable bowel syndrome,[26] and hypertension.[9,10]"

Physical Health

Children exposed to a greater number of ACEs are at higher risk for poor physical health outcomes. Exposure to ACEs impacts the immune system by triggering an elevated inflammatory response,[23,24] such as those related to asthma, allergies, autoimmune diseases (e.g. rheumatoid arthritis and Crohn's disease). Individuals with two or more ACEs are also at an increased risk for hospitalizations for autoimmune diseases compared with persons with no ACEs.

ACEs are associated with several chronic conditions, including ischemic heart disease,[25] Type 2 diabetes, irritable bowel syndrome,[26] and hypertension.[9,10] Compared to people with an ACE score of 0, those with an ACE score of 5 or more had 2.6 times the risk of chronic obstructive pulmonary disease (COPD), 2.0 times the risk of hospitalizations, and 1.6 times the rates of prescriptions.[27] In some instances, the type of ACE influenced the likelihood of a disease affecting one sex over the other. Among women, there is a higher likelihood of COPD resulted from verbal abuse, sexual abuse, living with a substance abusing household member, witnessing domestic violence, and parental separation/divorce during childhood compared to those with no individual ACEs.[28]

Exposure to ACEs is associated with the development of cancers, such as lung cancer.[29] This association may be attributable to an increased risk in poor health behaviors, such smoking, and other factors associated with chronic diseases. Furthermore, certain ACEs, such as sexual abuse, are significantly associated with adulthood cancers.[30]

Other chronic diseases related to ACEs exposure include Alzheimer's, obesity, arthritis, fibromyalgia, both chronic fatigue and pain syndromes, and osteoporosis.[21] Physical and verbal abuse in childhood is significantly associated with being overweight or obese.[27] Body Mass Index (BMI) is a method of estimating a person's body fat levels based on a person's weight and height measurement. Individuals with a BMI score between 25 and 30 are considered overweight, with those over 30 categorized as obese. Individuals with physical abuse history are one and a half times more likely to have a BMI of 30 or more. Likewise, individuals who were verbally abused are almost twice as likely to have a BMI of 40 or higher.[31]

Child abuse in particular is most closely associated with adult musculoskeletal and neurological problems. This association is followed by respiratory issues, then cardiovascular diseases as well as gastrointestinal and metabolic disorders.[21]

Lastly, children who are exposed to ACEs are more likely to have poor dental health in adulthood. The presence of even one ACE in a child's life increased the likelihood of having poor dental health. Exposure to multiple ACEs had a cumulative effect on both teeth condition (i.e. decay, toothaches) and presence of dental cavities.[32,33]

Exposure to ACEs contribute to social, emotional, and cognitive dysfunction (Figure 2, page 1). As a result, individuals become more likely to engage in risky health behaviors, which can lead to disease, disability, and other social problems in adulthood. Collectively, exposure to ACEs can result in premature death among these individuals. Individuals with six or more ACEs died nearly twenty years earlier than their fellow participants with zero ACEs (Figure 7).[34]

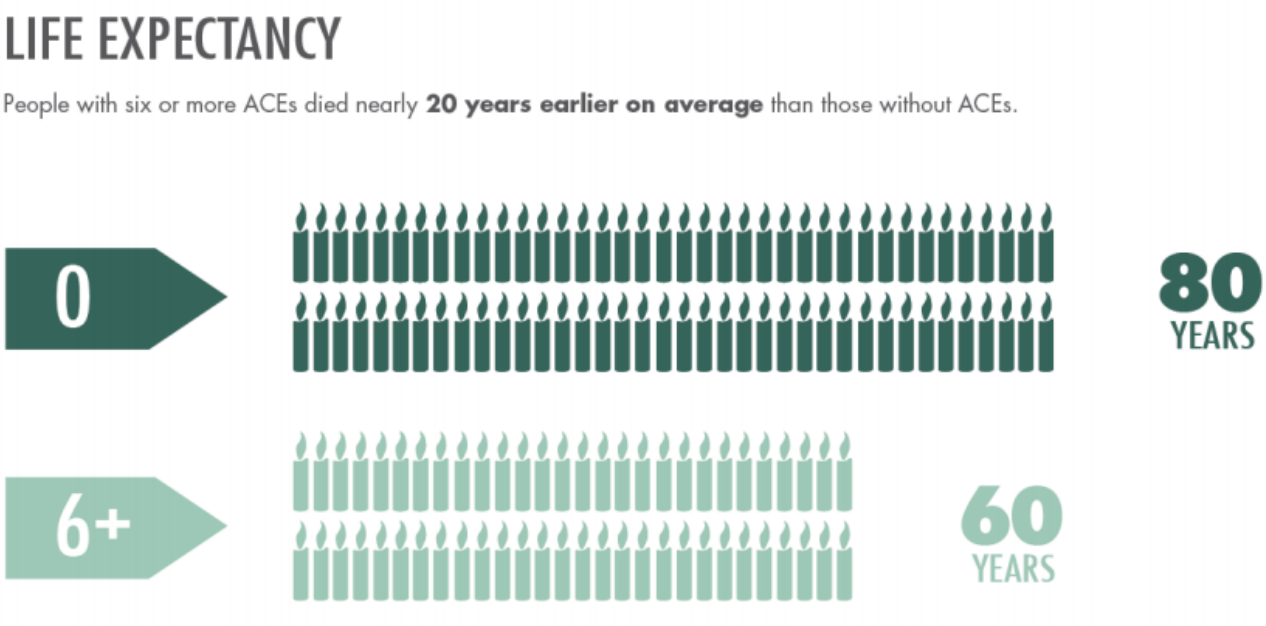


Figure 7. CDC-Kaiser Permanente Adverse Childhood Experiences (ACE) Study[34]

Overutilization of Healthcare

Adults exposed to ACEs have higher utilization of the healthcare system.[35] Women who reported sexual abuse in particular had higher primary care and total outpatient costs as well as more emergency room visits than those who did not.

Nationally, one year of confirmed cases of child maltreatment costs $124 billion over the lifetime of the traumatized children.[36] The average lifetime cost per victim of child maltreatment is $210,000. Figure 8 provides a breakdown of costs per child.[37]

Figure 8. The estimated cost in one year for every child exposure to maltreatment. Source: CDC

The breakdown per child is:

- $32,648 in childhood health care costs
- $10,530 in adult medical costs
- $144,360 in productivity losses
- $7,728 in child welfare costs
- $6,747 in criminal justice costs
- $7,999 in special education costs

Protective Factors

Children can counteract the negative effects of ACEs if they have nurturing relationships with adults, who create positive life experiences for them. The presence or absence of these supportive relationships dictates whether stress is tolerable or toxic. This concept is often referred to as *resiliency.* There was a time when social scientists believed that this was an innate competency; however, resiliency is a capacity that can be both developed and strengthened. Resiliency is influenced by the environment, genetic factors, and coping skills during the stages of development.

Healthy social and emotional development in children leads to the cultivation of intrapersonal skills such as self-regulation and self-confidence, along with interpersonal skills.[5,7] People have the ability to learn resilience and overcome adversity through protective relationships, skills, and experiences. For instance, children who overcome adversity to graduate high school are less likely to face challenges in employment and financial stability.

The benevolent childhood experiences (BCEs) scale quantifies these protective factors. Higher exposure to BCEs predict lower impact of ACEs in the participants.[38]

Several protective factors buffer the effects of ACEs and optimize resilience among young people:

Knowledge of Child Development:
Improving parenting skills can develop their ability to respond appropriately to a child's behavior and establish healthy, supportive relationships.

Parental Resilience: Improve parental capacity to cope with stressful situations through problem-solving skills

Children's Social and Emotional Competence: Assist children to develop and use self-regulating behaviors in stressful situations.

Social Support: Identify a network of family, friends, and community members who can provide support to the family, particularly in times of need.

Community Resources: Environmental and social factors include safe neighborhoods, prevention programs, affordable health services, economic opportunities, resourced schools as well as civic and spiritual organizations. Adequate community resources can provide basic needs for children.

United States

Exposure to ACEs is common. Approximately 64% of adults have an ACEs score of 1 or more (Figure 9).[2] In 2016, the National Survey of Children's Health (NSCH) identified economic hardship and parental separation or divorce as the two most common sources in the United States.[7]

Similarly, about 45% of children have been exposed to at least one ACE. Across the USA, 11% of children are considered high risk with three or more ACEs.[3]

ACEs disproportionately affect certain populations, with significant inequities found between racial groups. On a national level, 61% of black non-Hispanic children and 51% of Hispanic children have experienced at least one ACE. This is compared to white non-Hispanic children (40%) and only 23 percent of Asian non-Hispanic children.[39]

Table 1 displays the percentage of ACEs experienced by each racial group, categorized into individual ACE types. For instance, the most common ACE among all children is parent separation or divorce; however, the percentage among children, who identify as Non-Hispanic (NH) Black, NH Other, and Hispanic, is significantly higher than their White counterparts. In contrast, children who identify as NH Asian experience significantly lower exposure to parent separation or divorce when compared to White children.

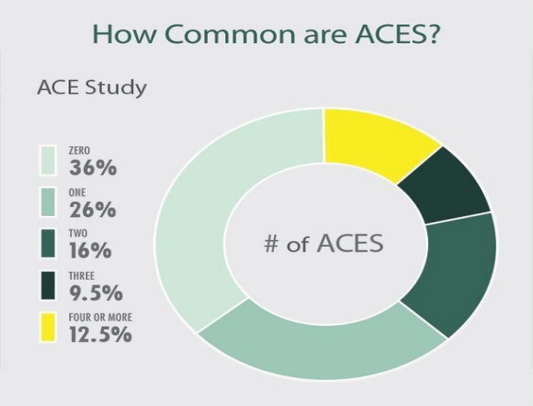


Figure 9. Prevalence of ACEs among CDC-Kaiser Permanente Adverse Childhood Experiences (ACE) Study

Furthermore, there are significant differences in exposure to ACEs among racial groups in different parts of the United States. Figure 10 demonstrates that ACEs disproportionately affects NH Black children in six out of the nine regions compared to NH White children (pg 12). This is most significant in the Mountain and West South Central regions, where respectively 46% and 48% of NH Black children have been exposed to at least 2 ACEs.

Table 1. Prevalence of Individual ACEs for Children by Racial and Ethnic Groups. Adapted from the Child Trends Research Brief.[39]

	Parent separation or divorce	Death of parent/ guardian	Parent/ guardian in jail	Domestic violence in home	Neighborhood violence	Family member with mental illness	Family member with substance abuse
United States							
White, NH	23	3	7	5	3	9	10
Black, NH	35	7	16	9	7	6	8
Asian, NH	7	2	1*	2	2*	2	1*
Other, NH	27	4	11	7	6	11	12
Hispanic	28	3	8	6	4	6	9
All children	**25**	**3**	**8**	**6**	**4**	**8**	**9**

Yellow highlight = Percentage is higher than white non-Hispanic children at a statistically significant level
Blue highlight = Percentage is lower than white non-Hispanic children at a statistically significant level
*Unstable value and should be interpreted with caution
NH=Non-Hispanic

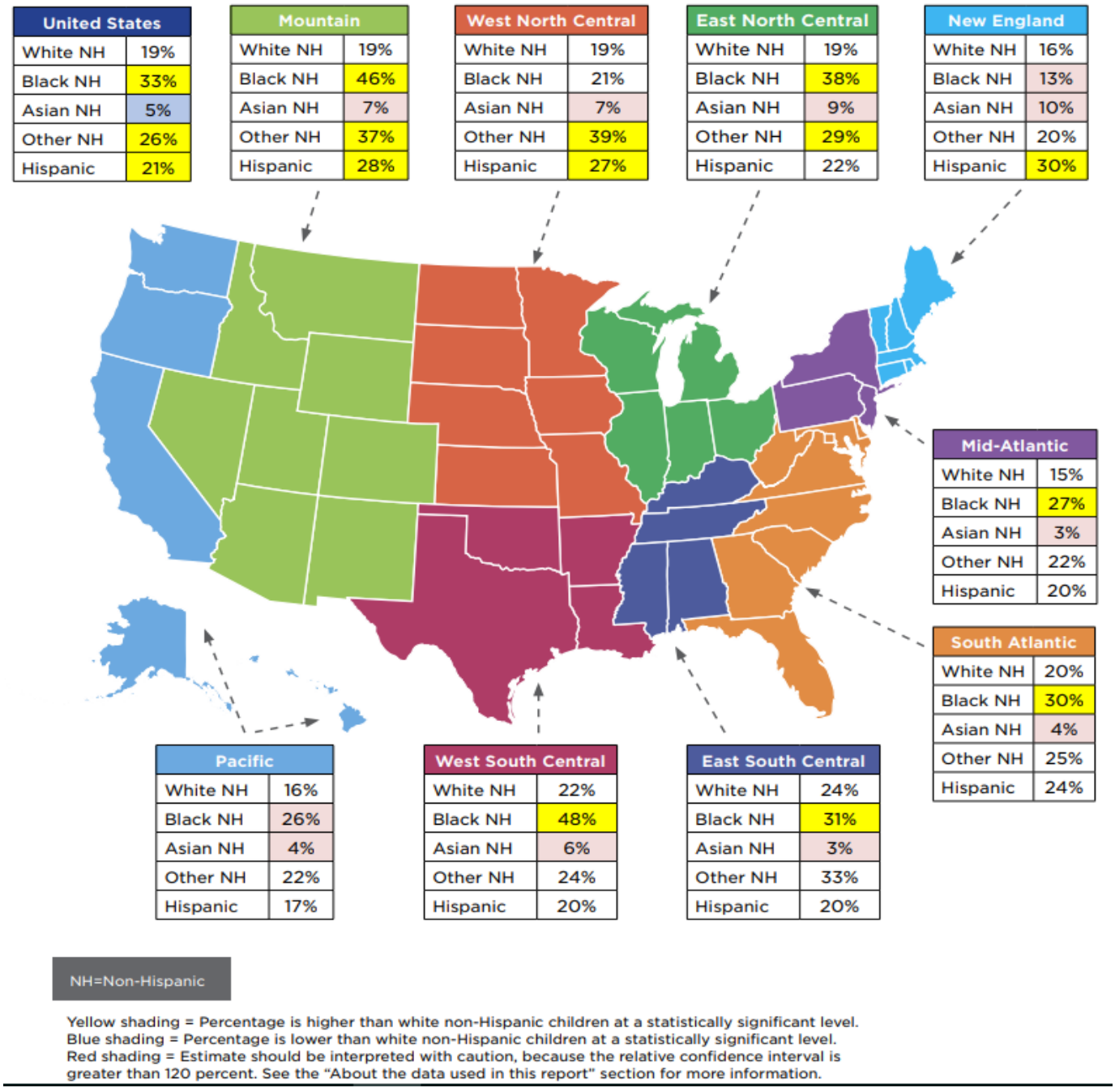


Figure 10. The prevalence of children exposed to 2+ ACEs, categorized by region of the United States and racial/ethnic groups.

Table 2. The prevalence of adverse childhood experiences (ACEs) in the United States by type and gender.[2]

Prevalence of adverse childhood experiences (ACEs) in the United States

ACE type	Women	Men	Total U.S. population
Emotional abuse	13.1%	7.6%	10.6%
Physical abuse	27%	29.9%	28.3%
Sexual abuse	24.7%	16%	20.7%
Emotional neglect	16.7%	12.4%	14.8%
Physical neglect	9.2%	10.7%	9.9%
Mother treated violently	13.7%	11.5%	12.7%
Household substance abuse	29.5%	23.8%	26.9%
Household mental illness	23.3%	14.8%	19.4%
Parental separation/divorce	24.5%	21.8%	23.3%
Incarcerated household member	5.2%	4.1%	4.7%

Source: CDC-Kaiser Permanente Adverse Childhood Experiences (ACE) Study

There are differences in the type and amount exposure of ACEs based on gender.[2] For example, emotional abuse and neglect along with household substance abuse, sexual abuse, and household mental illness were more common among women (see Table 2 above). ACEs in the following categories were relatively similar between genders: physical abuse and neglect, domestic violence, parental separation and incarcerated household member. Although similar percentages, physical abuse and neglect are the only two ACEs experienced more in men. The trends of exposure amount for 0-3 ACEs are relatively consistent between men and women; however, significantly more women have been exposed to four or more ACEs than men, 15.2% and 9.2% respectively.[2]

Socioeconomic status plays a significant role in the level of exposure to ACEs. Approximately 72.8% of individuals in the highest income bracket have never been exposed to an ACE compared to only 33.5% of the lowest income. Figure 11 displays the relationship between income and percentage of people impacted by ACEs. Income is measured using the federal poverty level (FPL). For a family of four, 0-99% of the FPL would make less than $25,100, 100-199% would earn between $25,100-51,499, 200-399% FPL would make between $51,500-102,999. Families of four, who exceed $103,000, would be part of the last group (400% FPL+). Children with the lowest income level are at the greatest risk for multiple ACEs exposure; 31.6% have an ACE score of 1, 15.3% have 2, 8.4% have 3, and 11.1% have 4 or more.[40] The graphic in Figure 11 emphasizes this relationship between income and percentage of people impacted by ACEs.

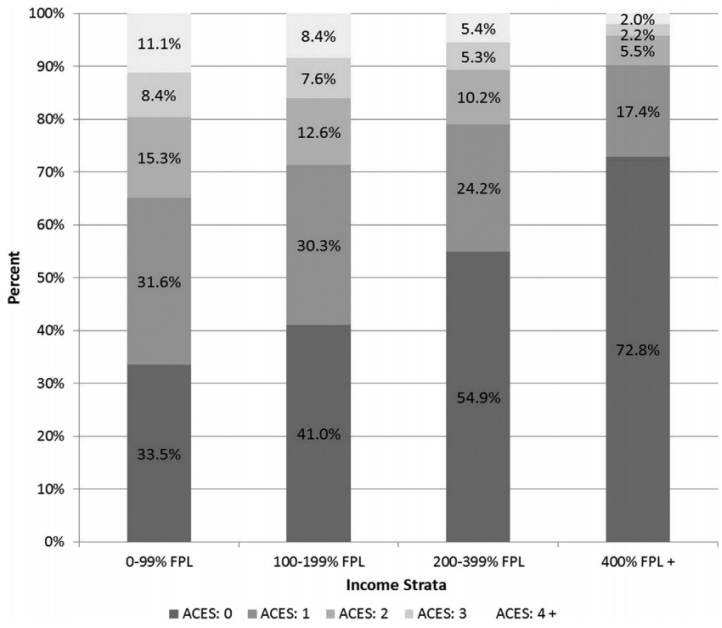


Figure 11. Percent distribution of children with number of ACEs, according to income strata. FPL indicates federal poverty level. Source: 2011-2012 NSCH.

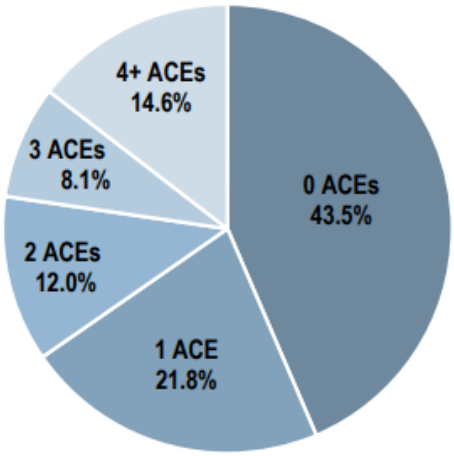


Figure 12. Prevalence of overall ACE exposure among rural adults. Source: BRFSS (2013)

More individuals living in rural communities experience ACES than their urban counterparts (28.9% to 21.3%, respectively).[41,42] Among rural adults, 21.8% reported one ACE and 14.6% reported 4 or more (see Figure 12). Among rural residents, those who report at least one ACE were more likely to report fair/poor general health and activity limitations. Individuals who are exposed to ACEs and live in rural areas are also at greater risk for chronic conditions, including diabetes and heart disease.[43] The prevalence of ACE types in rural and urban settings tends to be similar to one another (Figure 13). The population in rural areas is generally older in age and more likely to underreport exposure to ACEs.[41]

New York State

In 2016, the New York State (NYS) Department of Health incorporated eleven (11) ACEs questions into the State's Behavioral Risk Factor Surveillance System (BRFSS) (Figure 14, pg 15).[44] The study estimated that 59% of NYS adults have experienced at least one ACE. The most frequently reported ACE was emotional abuse (27%), followed by parental separation or divorce (25%), and substance abuse (24%). In addition, 13% of NYS adults surveyed have four or more ACEs.[44]

New York State residents with an ACE score of 3 or more are more likely to engage in risk behaviors and suffer from poor health outcomes. For instance, individuals with 3 or more ACEs were almost three times more likely to use tobacco products and one-and-a-half times more likely to binge drink compared to those without exposure to ACEs. They also were six times more likely to have depression, almost three times more likely to have arthritis, and one-and-a-half times more likely to be obese (Figure 15, pg 15).[44]

The NYS BRFSS categorized income into five groups and found that the majority of participants exposed to at least one ACE were in the lowest income group (68%), followed by the highest income group (62%) (Figure 16, pg 15).[44]

In New York State, ACE scores are significantly lower in the 65 years and older age group. ACEs tend to be higher among women as well as Hispanic and multiracial participants (Figure 17).[44]

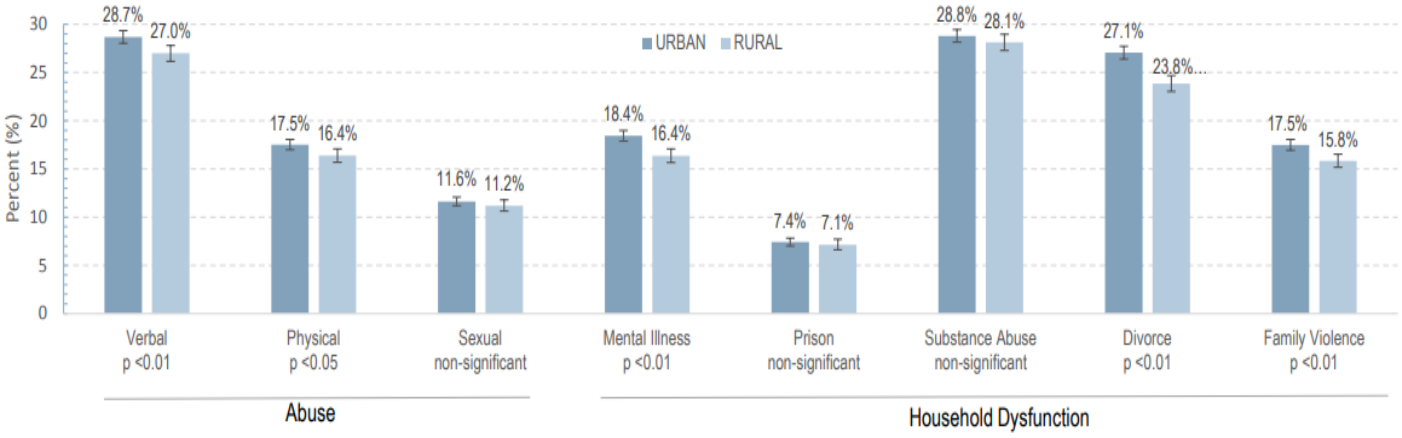


Figure 13. The prevalence of ACE Types in Rural and Urban Adults, divided by abuse and household dysfunction categories. Source: Behavioral Risk Factors Surveillance System, CDC

Household Dysfunction

Mentally ill household member

1. Did you live with anyone who was depressed, mentally ill or suicidal? [Yes/No]

Substance abuse in household

2. Did you live with anyone who was a problem drinker or alcoholic? [Yes/No]

3. Did you live with anyone who used illegal street drugs or who abused prescription medications? [Yes/No]

Incarcerated household member

4. Did you live with anyone who served time or was sentences to serve time in a prison, jail, or other correctional facility? [Yes/No]

Parental separation/divorce

5. Were your parents separated or divorced? [Yes/No]

Violence between adults in household

6. How often did your parents or adults in your home ever slap, hit, kick, punch or beat each other up? [Never/Once/More than Once]

Childhood Abuse

Physical Abuse

7. Before age 18, how often did a parent or adult in your home ever hit, beat, kick, or physically hurt you in any way? Do not include spanking [Never/Once/More Than Once]

Emotional Abuse

8. How often did a parent or adult in your home ever swear at you, insult you, or put you down? [Never/Once/More Than Once]

Sexual Abuse

9. How often did anyone at least 5 years older than you or an adult touch you sexually? [Never/Once/More Than Once]

10. How often did anyone at least 5 years older than you or an adult, try to make you touch them sexually? [Never/Once/More Than Once]

11. How often did anyone at least 5 years older than you or an adult, force you to have sex? [Never/Once/More Than Once]

Figure 14. Questions on ACE on the 2016 NYS BRFSS, Module 14A.

ACEs lead to increased risk for negative health behaviors.

A PERSON WITH 3 OR MORE ACES IS:

- 3.7 times more likely to engage in risky sexual behaviors
- 2.6 times more likely to use tobacco
- 1.5 times more likely to binge drink

ACEs lead to increased risk for serious health conditions.

A PERSON WITH 3 OR MORE ACES IS:

- 6.2 times more likely to have depression
- 3.6 times more likely to have a vision impairment
- 2.9 times more likely to have arthritis
- 2.7 times more like to have kidney disease
- 1.8 times more likely to ever have asthma
- 1.7 times more likely to be obese

Figure 15. The likelihood of risk behaviors and health outcomes based on individuals with 3+ ACE score compared to 0 ACEs.

Figure 16. Prevalence of ACEs by income group from the 2016 NYS BRFSS.

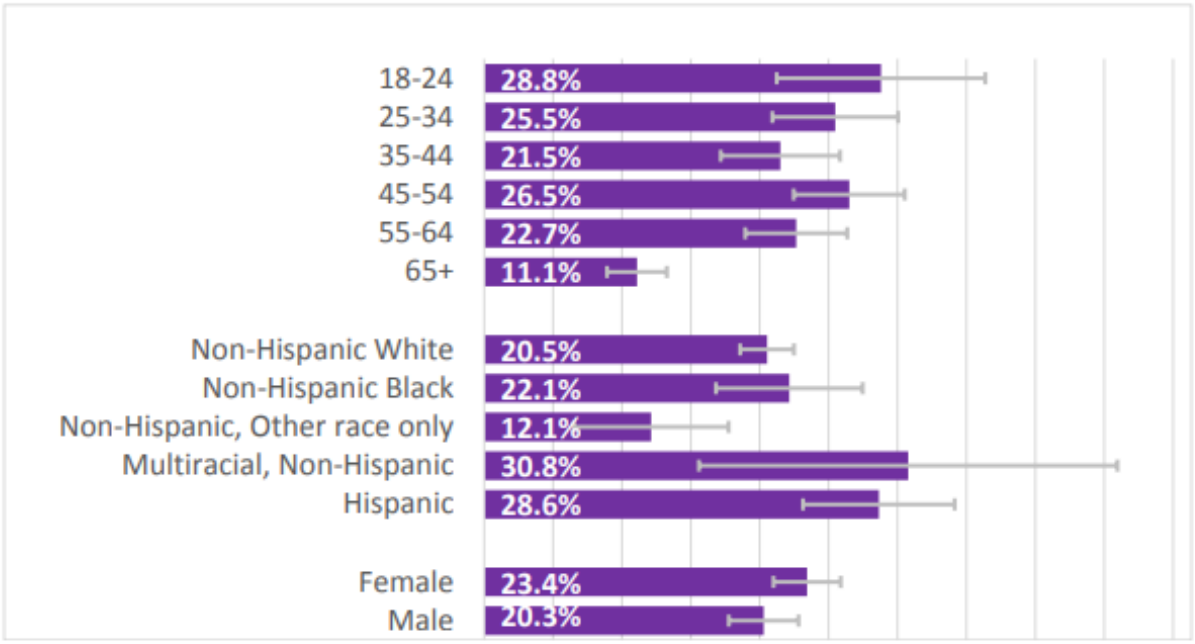


Figure 17. Prevalence of NYS residents with an ACE score of 3 or higher by age groups, ethnic/racial identity, and gender.

ACE scores were lower among participants who completed college or technical school. Adults in households with children are more likely to have reported ACEs than households that had no children.[44]

Lastly, 37% adults who identify as lesbian, gay, bisexual, or transgender (LGBT) reported an ACE score of 3 or more compared to 22% of heterosexual adults (Figure 18).[44]

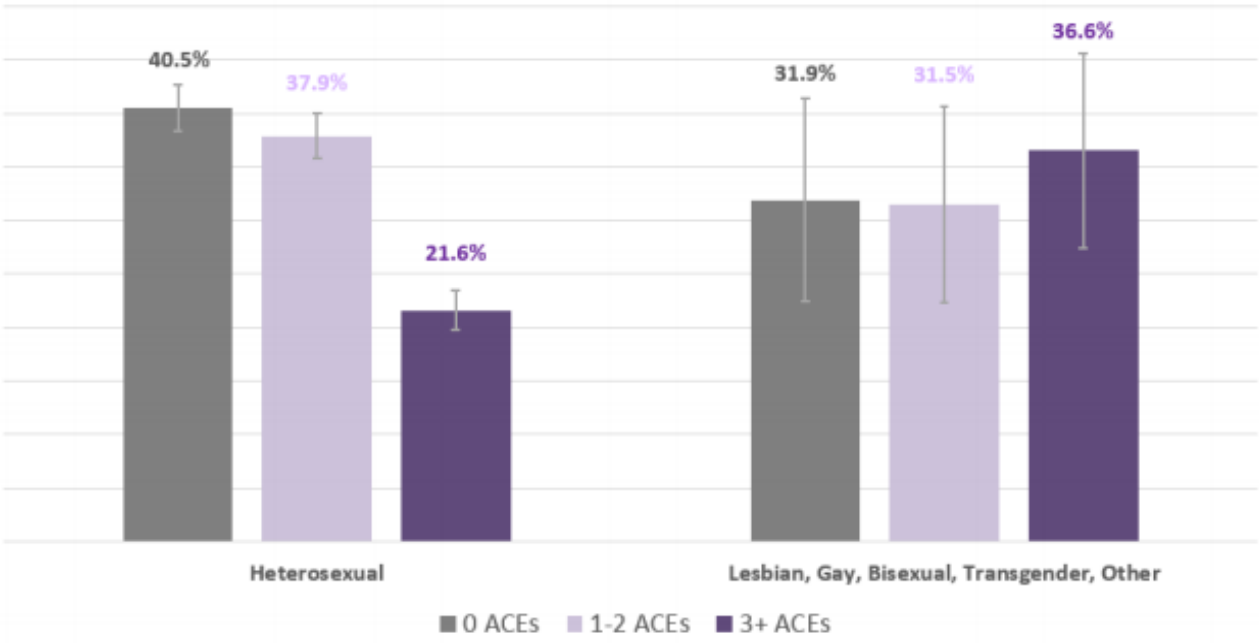


Figure 18. Prevalence of ACEs by sexual orientation/transgender status in the 2016 NYS BRFSS.

Madison County

New York State Department of Health categorized the BRFSS data into regions, including Central New York. In the CNY region, approximately 32% of respondents demonstrated a low ACE score (1-2), while 23.5% have a high ACE score (3+). About 28% of rural participants reported 3 or more ACEs compared to 23.7% of urban counterparts.[44] Unfortunately, the report did not provide county-level data on ACE exposure.

Potential ACEs Exposure

Given the limited ACE data available at the local, county level, we turn to secondary indicators that can provide insight into the potential exposure to ACEs in Madison County. There are community factors, including rural and low socioeconomic status, that are strong predictors of ACEs exposure in children.[41,42]

Madison County is predominantly rural, agricultural community, accounting for nearly 59% of the area. This is significantly more than the rest of New York State (excluding New York City), which is only 12% rural.[45] In Madison County, families with children have higher rates of poverty (14.1%) compared to the general population (12.9%). The poverty rate increases to 26.7% for families with children under five years old and nearly 50% for female head of house families with children less than five years.[45]

To assess the potential exposure to ACEs, we evaluated indicators associated with each type of ACE. For a family member experiencing mental illness, the percentage of poor mental health days and emergency department (ED) visits due to mental health were evaluated. In Madison County, 15.9% of adults experience at least 14 poor mental health days per month, while only 10.7% of adults statewide experienced the same. That said, the rate of ED visits due to mental health illness is lower in the county than NYS (Table 3).[46]

Type of ACE	Indicator(s)	Madison County Rate or Percentage	New York State Rate or Percentage
Mental Illness in Household	Percentage of poor mental health days among adults	15.9%	10.7%
	ED visits due to mental health	67.5 per 100,000	108.9 per 100,000
Substance Abuse in Household	Percentage of binge drinking adults	25%	18.3%
	ED visits involving any opioid overdose	57.5 per 100,000	49.0 per 100,000 *
Incarcerated Household Member	Violent crime	146.2 per 100,000	214.9 per 100,000 *
	Jail incarceration rate	193.9 per 100,000	182.3 per 100,000
Parental Separation/Divorce	Divorce cases with children (<18 years)	124.0 per 100,000	119.0 per 100,000 *
Violence between Adults in Household	Domestic violence reports	267.7 per 100,000	242.3 per 100,000*
Child Abuse (emotional or physical)/Neglect	Admissions to foster care system	52.1 per 100,000	79.7 per 100,000
	CPS reports of child abuse/maltreatment	324.1 per 100,000	248.7 per 100,000
	Physical harm by adult household member	11%	--
Sexual Abuse	Unwanted sexual contact by adult	5%	--

Table 3. The rate or percentage of indicators representing ACEs exposure for Madison County and New York State.
*Statistic does not include NYC in rate

There are higher rates of substance abuse in Madison County compared to the state. Of adult residents, 25% binge drink in Madison County compared to 18.3% of statewide adults. The rate of ED visits involving any opioid overdose in Madison County is 57.5 per 100,000 compared to 49.0 per 100,000 people at the state level.[46] Another ACE is having am incarcerated family member. Although the rate of violent crime is lower in the county, there is a higher rate of jail incarceration compared to NYS (excluding NYC) (Table 3, pg 17).[44]

Parental separation or divorce is the most common ACE among children. The rate of divorce with children (under 18 years) is slightly higher in Madison County compared to the rest of New York State (excluding NYC), 124 and 119 per 100,000 respectively.[47] Another type of ACE is exposure to violence in the household. In 2017, the rate of domestic violence cases was higher in Madison County than NYS, even excluding NYC (Table 3, pg 17).[48]

For the ACEs of child abuse, both emotional and physical, the admissions to foster care and child protective services (CPS) were used as proxy variables. Although the rate of foster care admissions is lower in Madison County compared to the whole state, the number of CPS reports submitted is dramatically higher (Table 3, pg 17).[49] In 2014, the Youth Bureau of Madison County conducted a Teen Assessment Survey with students. During that year, 11% of students reported physical harm by an adult in the household. Of the same students, 5% had experienced unwanted sexual contact from an adult within the past year.[50]

Although we can estimate the amount of exposure to ACEs in our community, we cannot predict the number of children affected. We need to conduct further analysis to better understand the prevalence of ACEs exposure as well as protective factors in our community that may buffer the impact.

Health Outcomes

ACEs are linked to delayed development in childhood as well as poor health outcomes in adulthood. Although we do not have data on ACEs exposure, we sought to evaluate the impact of ACEs in Madison County by exploring health statistics related to child development, risky behaviors, mental health, and physical health. Given the health indicators selected, we can postulate that Madison County has been impacted by the effects of ACEs.

"Madison County's suicide mortality rate is 2 times higher than New York State"

Poor academic performance is an outcome of ACEs exposure. The high school graduation rate is 84% in Madison County compared to 80% at the state level. ACEs are also associated with chronic absenteeism, which is defined as missing 10% or more instructional days of school. The percentage of Madison County high school students is similar compared to NYS, 19.5% and 23.2% respectively. Among economically disadvantaged high school students, 29.6% of Madison County and 31.8% of NYS were considered chronically absent from school.[51]

Individuals exposed to ACEs are more likely to engage in risky behaviors, including tobacco use, driving while intoxicated, and unsafe sex practices. Madison County residents have a higher rate of tobacco use (22.5%) compared to only 14.2% of state residents. The percentage of driving deaths related to alcohol use is 31% in Madison County compared to only 22% in NYS.[52]

One indicator of risky sexual behavior is sexually transmitted infections (STIs); the County Health Rankings & Roadmaps tool uses new chlamydia cases as a measure for STIs. The rate of new chlamydia cases is slightly lower for Madison County residents compared to the state (Table 4, pg 19).[52]

In terms of physical health, the selected indicators for Madison County are worse than those of the state. There is a higher percentage of obesity (>30 BMI) and premature death in the county. The premature death indicator represents the portion of all deaths that occurred before age 75. The percentage in Madison County is slightly higher than NYS.[38] Among 3rd graders in Madison County, 74.4% have experienced dental cavities compared to only 45.4% of all NYS 3rd graders (Table 4, pg 19).

Table 4. The rate or percentage of indicators representing ACE-related outcomes for Madison County and New York State.
*Statistic does not include NYC in rate

ACE-Related Outcomes	Indicator(s)	Madison County Rate or Percentage	New York State Rate or Percentage
Poor Academic Performance	High School Graduation Rate	84%	80%
	Chronic Absenteeism All high school students Economically disadvantaged	 19.5% 29.6%	 23.2% 31.8%
Risky Behavior	Tobacco use	22.5%	14.2%
	Alcohol-impaired driving deaths	31%	22%
	Newly diagnosed chlamydia cases	228.0 per 100,000	363.8 per 100,000*
Poor Physical Health	Obesity	28%	25%
	Percentage of 3rd Graders with Dental Caries	74.4%	45.4%
	Premature Death Percentage	43.8%	40.7%
Poor Mental Health	Overall Suicide Mortality Rate	14.0 per 100,000	8.5 per 100,000
	Suicide Mortality Rate among Young People 10-19 years 20-24 years	 9.5 per 100,000 16.9 per 100,000	 3.2 per 100,000 8.8 per 100,000
	Self- Harm Hospitalization Rate 10-19 years 20-24 years 25-34 years 35-44 years 45-54 years	 112.3 per 100,000 166.5 per 100,000 79.4 per 100,000 132.0 per 100,000 96.9 per 100,000	 63.8 per 100,000 87.4 per 100,000 64.7 per 100,000 55.7 per 100,000 58.2 per 100,000

In 2016, nearly 16% of adults reported at least 14 bad mental health days per month, while 11.7% stated that they experience frequent distress. The number of emergency room (ER) visits due to self-harm and the suicide mortality rate is 2 to 3 times higher in Madison County than New York State depending on the age group (Table 4).[46]

Although we do not know the specific rate of ACEs among Madison County residents, we can speculate risk from the factors outlined above. Given that for the statistics cited above, we would anticipate that ACEs pose an underlying threat to the health and wellbeing of our community. Future research on the topic is necessary to have a comprehensive understanding of the issue.

Current Initiatives

There are several community organizations, who are currently addressing this issue.

ProjectTEACH:

This program aims to strengthen and support the ability of New York's pediatric primary care providers (PCPs) to deliver care to children and families, who experience mild-to-moderate mental health concerns [https://projectteachny.org/].

Suicide Prevention Coalition:

This collaborative, led by BRiDGES, hopes to raise awareness and reduce the rate of suicide through trainings, resource materials, support groups, and speaker events [https://www.bridgescouncil.org/suicide-prevention].

Family Counseling Services of Cortland County, Inc.:

In addition to regular services, this organization hosted a training for local community partners on ACE Response Training with Dr. Heather Larkin [https://fcscortland.org/ACE+Response].

Fatherhood Connection of Madison County

This 14-week program is designed to help increase men's self-sufficiency, self-awareness, and to provide skills to fathers and father figures in the areas of parenting, communication, discipline, anger management, domestic violence, problem-solving, and establishing/maintaining healthy relationships. Phone: 315-366-2385

- Educate father/father figures on ACEs
- Develop skills for appropriate responses to child behavior and healthy, supportive relationships
- Improve parental capacity to cope with stressful situations through problem-solving skills
- Instruct father/father figures to model appropriate self-regulation behaviors
- Guide father/father figures to community resources available to them

Liberty Resources Help Restore Hope Center:

The center provides services for survivors, education, and prevention efforts (e.g. domestic violence, child abuse, dating violence) [http://www.victimsofviolence.org/]. Free services and programs offered:

- 24 Hour Hotline 1-855-966-9723
- Emergency Housing Assistance for Survivors
- Short-Term Crisis Counseling and Therapy
- Information & Referrals
- Sexual Assault Nurse Examiner (SANE) Project
- Support, Accompaniment, and Advocacy with Legal/Medical Proceedings
- Support Groups
- Community Education & Professional Training
- NYS Office of Victims' Services, Crime Victims Assistance Provider

NYS Early Childhood Advisory Council:

Comprised of experts in education, health care, child welfare and mental health, this group provides strategic direction and advice to the State of New York on early childhood issues [http:// www.nysecac.org/].

Co-Creating Well-Being: Supporting Children and Families Through Trauma

Health Foundation for Western & Central New York [https://hfwcny.org/program/co-creating-well-being/]

- Provide training, skill development and technical assistance to increase the knowledge, the number and range of providers informed on ACEs and trauma-informed care
- Introduce and train human-centered design to providers to support new and effective ways to engage with community and to "design with and not for" intended customers
- Increase type and number of available interventions and programs that address the impact of ACEs

Madison County Mental Health Department

The County's Mental Health Department provides the following related services:

- Child / Adolescent Group Services—focus on improving skills to cope with stress, emotions, and interpersonal conflict
- Mental Health Clinic—The Outpatient Clinic provides the single entry point for persons requesting any type of Mental Health services
- Children's Single Point of Access

Recommendations

The awareness of the negative effects of ACEs has increased dramatically over the last 10 years; however, there is still great need to address the issue. This section outlines recommended strategies by level of prevention. Primary prevention aims to reduce exposure to ACEs on a community level, while secondary prevention identifies high-risk individuals. Finally, tertiary prevention aims to address the needs of individuals already exposed to ACEs and prevent negative outcomes in the future (Figure 19).

Whole Population	At-Risk Populations	People with Conditions Requiring Treatment
Primary Prevention	Secondary Prevention	Tertiary Prevention
Prevent child maltreatment and promote healthy family functioning	Early detection and intervention for at-risk people	Active treatment for individuals to restore functioning and prevent long-term negative outcomes

Figure 19. Primary, secondary, and tertiary approach to addressing the impact of ACEs within a community.

Primary Prevention

Reduce Sources of Stress: Reduce barriers to families accessing basic supports, such as nutritious food, safe shelter, medical care, and mental health services, with special attention to the needs of children during periods of severe hardship or homelessness.[53]

Suggested Collaborators: Nonprofit organizations, local government agencies
Resource: Center on the Developing Child, Harvard University https://developingchild.harvard.edu/resources/three-early-childhood-development-principles-improve-child-family-outcomes/

Implementation of Parent Screenings: Research demonstrates that the children of parents with ACEs are more susceptible to the effects of toxic stress themselves.[54] Administering an ACEs questionnaire to pregnant women or young parents gives providers the opportunity to assess, educate, and make treatment referrals for both adults and children.

Suggested Setting: Home visiting programs, prenatal and well-child visits
Resources:

- American Academy of Pediatrics, Patient Cover Letter and Questionnaire for Health Center, https://www.aap.org/en-us/Documents/resilience_ace_screening_parents.pdf
- Olmsted County Public Health Services, ACEs Parent Screening Protocol for Home Visiting Program, https://www.health.state.mn.us/communities/practice/conference/docs/2018sessions/concurrentA8protocol.pdf

Improve Home Visiting Programs through Evidence-Based Techniques: Strengthen parenting practices, home environment, and child development, all of which can buffer the potential effects of ACEs. The majority of programs target high-risk families and provide the necessary resources and skills to parents. Research demonstrates that home visiting programs can prevent ACEs and yield positive impact on both maternal and child health.

Suggested Clients: Pregnant women/families with newborns
Resources:

- Health Resources & Service Administration, Trauma-Informed Approach to Home Visiting https://mchb.hrsa.gov/sites/default/files/mchb/MaternalChildHealthInitiatives/HomeVisiting/Creating_a_Trauma_Informed_Home_Visiting_Program_Issue_Brief_January_2017.pdf
- NEAR@Home Program, http://www.nearathome.org/downloads/NEARatHome.pdf

Parent Training Program: Parent training programs outside the home have shown reduced number of child maltreatment reports, instances of psychological aggression, harsh discipline, and neglect.[41] These programs can begin to reduce sources of stress in addition to developing supportive relationships that can buffer harmful effects of ACEs. Children who observe responsive adult behavior are more likely to become healthy, responsive parents themselves.[8] Lastly, parents can facilitate the development of a child's self-regulation and executive function skills by modeling behavior and establishing routines. If children learn and practice these skills prior to experiencing toxic stress, they will be better equipped to perform them alone.

Suggested Settings: School, Community Organizations, Social Services Department, Online
Resources:

- Triple P – Positive Parenting Program (online, in-person), https://www.triplep-parenting.com/us/triple-p/
- Incredible Years, http://www.incredibleyears.com/

Implement School-Based Interventions: There is evidence that school-based interventions improve youth development, decrease behavioral problems, increased academic achievement and attainment.[5]

Suggested Settings: Elementary school, Head Start, Preschool/Pre-K programs
Resources:

- Good Behavior Game, http://goodbehaviorgame.air.org/
- Positive Behavior Intervention and Supports Program, https://www.pbis.org/

Establish a Community Task Force on ACEs: Establishes a task force to identify evidence-based and evidence informed solutions to reduce children's exposure to adverse childhood experiences.

Resource: Schoharie County ACEs Team, https://www.ruralhealthinfo.org/project-examples/1020

Promote Early Intervention Funding: Research demonstrates that economic investment during early childhood is the best way to increase economic productivity and promote equity (Figure 20). On a local scale, professionals can conduct a cost-benefit analysis to understand the economic costs associated with ACEs and the benefits gained from prevention efforts.

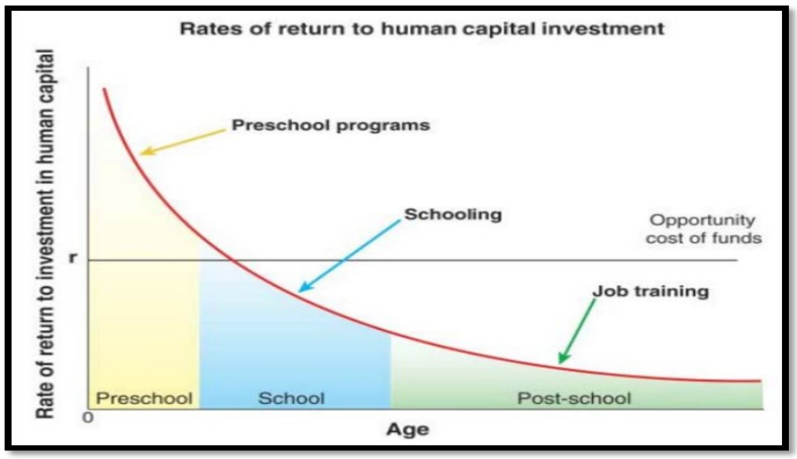


Figure 20. Heckman Curve below depicts investments made in early childhood produce the highest economic rates of return in human capital.[55]

Secondary & Tertiary Prevention

Implementation of Child Screenings: Develop a community-wide system for comprehensive screening and early intervention[56] with the goal to increase referral rate of community services.[57] Research demonstrates that parents approve of person-centered approach to ACEs screening in the pediatrician's office; it can be a needed bridge to services.[58]

Suggested Settings: Pediatric visits, school-based health centers
Resource: Center for Youth Wellness, User Guide for Health Professionals & ACEs Questionnaire based on age group - http://centerforyouthwellness.org/wp-content/uploads/2018/06/CYW-ACE-Q-USer-Guide-copy.pdf

Collect, analyze, and disseminate Madison County-specific data on the relationship ACEs and health outcomes: ACEs data can be collected in a variety of ways (e.g. developmental histories) and reported for analysis/trends over time. Local data will allow organizations to better understand the scope of this issue, identify at-risk populations, and inform effective strategies in the future. Research indicates that patients are comfortable with screening and inclusion on medical records.[59]

Suggested Settings: Local department of health, nonprofit organizations
Resources:

- See Child Screenings recommendation
- Administer ACEs BRFSS module questions to local students:
    - NYS BRFSS questionnaire, https://www.health.ny.gov/statistics/brfss/reports/docs/adverse_childhood_experiences.pdf (page 7)
    - Minnesota Student Survey, https://www.health.state.mn.us/docs/communities/ace/acereport.pdf (page 19)

Trauma-Informed Medical Care: Train medical providers on how to assess for the presence of ACEs and build skills to provide appropriate response. This approach aims to engage people with histories of trauma, recognize the presence of trauma symptoms, and acknowledge the role that trauma has played in their lives.[60] Figure 21 demonstrates the ways to incorporate trauma-informed care in organizational and clinical practices.

Settings: Primary care and behavioral health providers, school-based health centers, hospitals
Resources:

- Substance Abuse and Mental Health Services Administration's (SAMHSA), National Center for Trauma-Informed Care - http://www.samhsa.gov/nctic
- National Council for Behavioral Health - https://www.thenationalcouncil.org/areas-of-expertise/trauma-informed-behavioral-healthcare/

Figure 21. Trauma-Informed Care Implementation Resource Center, Center for Health Care Strategies, Inc.

Develop Interdisciplinary Network of Community Providers: Identify community organizations that are working to combat the effects of ACEs and facilitate a collaborative effort.

Potential Collaborators: Schools, pediatricians, mental health support, and social workers
Resource: Help Me Grow system provides assistance to states and communities to leverage existing resources, ensuring they can identify vulnerable children, link families to services, and empower families to support healthy development
Local Example: HMG Onondaga, Early Childhood Alliance https://helpmegrownational.org/

Build Resilient Communities: Invest in evidence-based prevention programming, trauma interventions, and increasing access to needed mental health and substance abuse services.

Resources:

- Community Resilience Cookbook, http://communityresiliencecookbook.org/your-body-brain/
- Finger Lakes ACEs Connection promotes a collaborative approach to raise awareness of adverse childhood experiences and drive sustainable systems change to impact community resiliency - www.acesconnection.com
- Trauma-Informed Community Initiative of WNY, https://ticiwny.com/

Increase Mental Health Services: Families at-risk for ACEs should have access to mental health services in their community.

Settings: School-based health centers (parental involvement), integrative medical and behavioral health providers, telehealth
Resources: Project Teach – provides free training and resources to pediatricians on providing care to children and families with mental health concerns (CE available), https://projectteachny.org/

Increase Number of School-based Health Centers: In rural areas, SBHCs increase access to integrated primary and behavioral health care services. SBHCs should have access to telehealth, particularly for mental health support.[42] School-based health centers should involve parents in the treatment to improve outcomes.

Local Example: DeRuyter School District

Implementation of Healthy Steps Specialist: This evidence-based program promotes positive parenting and healthy development for children 0-3 years during well-child visits by adding a specialist into the pediatric provider setting. The specialist can provide the following services:

- Child Development, Social-Emotional & Behavioral Screening
- Screening for Family Needs (i.e., maternal depression, other risk factors, social determinants of health)
- Child Development Support Line (e.g., phone, text, email, online portal)
- Child Developmental & Behavioral Consults
- Care Coordination & Systems Navigation
- Positive Parenting Guidance & Information

Settings: Pediatric providers, hospitals
Resource: HealthySteps Specialist, www.healthysteps.org

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