



## Adverse Childhood Experiences in Wisconsin: 2011 - 2015 Behavioral Risk Factor Survey Findings

May 2018



## What Are ACEs?

Adverse Childhood Experiences (ACEs) are negative life events or experiences that occur during childhood and have the potential to impede healthy child development. While there are many adverse life events that people may experience, for the purposes of this brief, ACEs refer to items measured in the Wisconsin Behavioral Risk Factor Survey (BRFS).

### Why ACEs Have Such a Significant Impact

During the first few years of life, the brain builds the foundation for future learning, emotional regulation, and social interaction. It builds upon that foundation throughout adolescence and into young adulthood. While genetics provide the brain's basic layout, experiences develop and shape the brain. Early experiences impact the way people view themselves and their environment, the way they learn, how they cope with life's stressors, and how they form relationships.

ACEs can disrupt healthy development, causing changes in the brain which can result in diminished learning capacity, reduced ability to form relationships, and difficulty regulating emotions. This disruption increases the likelihood of engaging in behaviors or experiencing circumstances that compromise health and can lead to disease, disability, and social dysfunction. Individuals who have experienced a high number of ACEs are significantly more likely than individuals with fewer ACEs to experience impaired mental and physical health, poorer school and work success, and lower socioeconomic status in adulthood.

### The Kaiser Permanente ACE Study

The original ACE Study was conducted by Kaiser Permanente Health System in San Diego, California in the mid-1990s.<sup>1</sup> It examined the relationship between adverse experiences in childhood and adult behaviors and health outcomes.

The ACE Study measured three categories of adverse childhood experiences: abuse, neglect, and household dysfunction. To assess the presence of ACEs, adults were asked via survey to indicate if they had experienced each of the following:

- Physical abuse
- Emotional abuse
- Sexual abuse
- Emotional neglect
- Physical neglect
- Violence between adults in the home
- Household member substance abuse
- Parental separation or divorce
- Household member who was depressed, mentally ill, or suicidal
- Incarcerated household member

1. Felitti VJ, Anda RF, Nordenbert D, Williamson DF, Spitz AM, Edwards V, Koss MP, Marks JS. Relationship of childhood abuse and household dysfunction to many of the leading causes of death in adults: The Adverse Childhood Experiences (ACE) Study. *American Journal of Preventive Medicine* 1998; 14:245-258.

Each affirmative answer indicated an ACE. The number of ACEs for an individual was assessed by a simple count of the number of affirmative answers, resulting in a possible ACE score from 0 to 10.

Among the 17,000 primarily middle class, well-educated adults surveyed for the study, almost two-thirds or 64% reported experiencing one or more ACEs. More than 12% of those surveyed reported experiencing four or more ACEs. ACE scores were then compared to health histories, revealing that as the number of reported ACEs increased, the likelihood of adulthood depression, cancer, diabetes, sexually transmitted infections, alcoholism, drug use, smoking, ischemic heart disease, chronic bronchitis, skeletal fractures, suicidality, and homelessness increased as well.

The following findings from the original ACE study have been confirmed in numerous replication studies:

- ACEs are common within the existing adult population in the United States.
- ACEs are associated with a wide range of negative mental, physical, and socio-economic outcomes in adulthood.
- The higher the number of ACEs, the higher the likelihood of a negative health or well-being outcome.

## Considerations When Interpreting ACE Findings

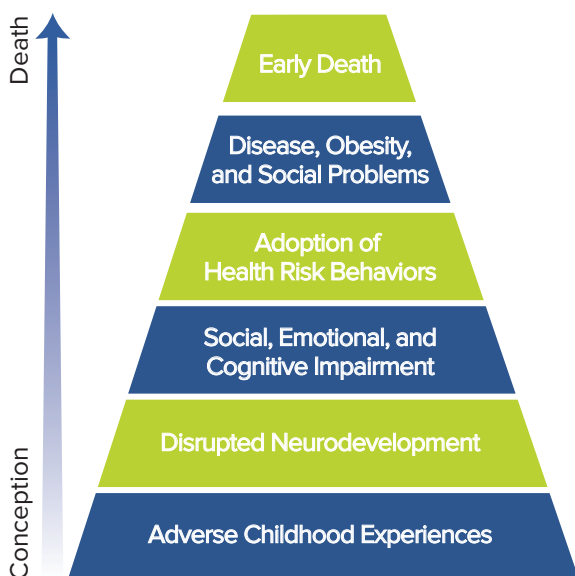
The ACE Study is widely considered to be one of the most consequential population health studies of our time. The ACE Study demonstrates the strength of the relationship between ACEs and a wide variety of negative mental, physical, and socio-economic outcomes in adulthood. As a population-based study, the findings are relevant to many general adult populations. However, ACE scores are not necessarily deterministic of any specific individual's life course.

Trauma and toxic stress are characterized by the mental and physiological reactions of an individual in response to a single or ongoing threat to life and safety. Whether exposure to a type of adverse experience results in trauma or toxic stress for a particular individual depends upon a variety of factors that are not measured in the ACE survey. These factors include the individual's temperament, adaptability, the level of intensity or duration of exposure to an adverse experience, and the co-existence of multiple types of adverse experiences. The number and types of supports and protective factors that a particular individual may have in place can also prevent or mitigate the impact of ACEs.

Creating standards of measurement for child maltreatment is extremely challenging. Research has identified proxies for maltreatment risk, but they do not necessarily equate to legal definitions of child maltreatment. The purpose of the ACE Study is not to validate legal definitions of maltreatment, but rather to understand whether various indicators of risk in childhood are correlated with poor outcomes in adulthood.

Additionally, the ACE Study is a retrospective study completed by adults who are reporting on their past experiences as children. Studies that rely on self-reporting of information from long ago can be affected by "recall bias," which can lead to under- or over-reporting the occurrence of events and circumstances.

**Figure 1:** The ACE Pyramid: Mechanisms by which ACEs Influence Health and Well-being Throughout the Lifespan





# Wisconsin ACE Study Overview

Wisconsin began collecting information about ACEs in 2010, when the set of ACE questions from the Centers for Disease Control and Prevention (CDC) were added to the Wisconsin Behavioral Risk Factor Survey (BRFS). The BRFS is a state-administered system of telephone surveys that collects information on health risk behaviors, prevalence of chronic diseases, use of preventative health practices, injury, and healthcare access. The BRFS was established by the CDC in 1984, and Wisconsin has participated since that time.

In Wisconsin, the ACE CDC questions are included in the BRFS. These questions ask respondents if they have experienced any of the following events or circumstances prior to the age of 18:

- Physical abuse
- Emotional abuse
- Sexual abuse
- Household member substance abuse
- An incarcerated household member
- A household member who was chronically depressed, mentally ill, or suicidal
- Violence between adults in the household
- Parental separation or divorce

While neglect was assessed in the Kaiser Permanente ACE Study, the ACE CDC questions in the BRFS do not assess neglect due to the difficulty of capturing such information via a phone survey.

The Wisconsin BRFS has included the eight standard ACE CDC questions in each survey from 2011 - 2015. In an attempt to measure neglect, Wisconsin added five questions beginning in 2014 about child neglect and poverty. Then in 2015, six questions were added to measure childhood social support as a potential protective factor in the relationship between ACEs and poor adult health outcomes.

The 2010 survey results were reported in *Adverse Childhood Experiences in Wisconsin: Findings from the 2010 Behavioral Risk Factor Survey*, which detailed the frequency of ACEs in Wisconsin and identified linkages between ACEs and a number of adult health and well-being outcomes.

A second report, *Wisconsin ACE Brief: 2011 and 2012 Data*, highlighted the inverse correlation between the number of ACEs and adult income, as well as racial disparities in experiences of childhood adversity.

A third report, *The Influence of Adverse Childhood Experiences on the Health of Wisconsin Citizens in Adulthood*, used the ACE data from the 2011, 2012, and 2013 BRFS<sup>2</sup> and showed that a higher number of co-occurring ACEs were linked to the following adult health outcomes:

- Higher rates of depression
- Increased health risk behaviors, such as tobacco use, heavy drinking, and HIV risk behaviors
- Poor general health
- Poor chronic health conditions

This fourth and final report, *Adverse Childhood Experiences in Wisconsin: 2011 - 2015 Behavioral Risk Factor Survey Findings* focuses on the cumulative results from the data collected between 2011 to 2015 using the Wisconsin BRFS and replaces previous reports. Responses were collected via landline and cell phone interviews of 30,423 Wisconsin residents, age 18 or older, located in various geographical regions throughout the state. During the five-year period, 25,518 of the 30,423 individuals answered questions from the ACE module, two-thirds more than the original ACE study.

2. Data from the 2010 BRFS were not included in the 2015 analysis because only landlines were used to contact survey respondents. Beginning in 2011 both cell phones and landlines were used, improving the generalizability of the BRFS samples.

**Table 1: Characteristics of Adults who Answered ACE Questions**

Sample Size	25,518 Wisconsin adults answered the ACE module	
Average Age	48.2 years	
Education	57% some college 33% high school degree or equivalent 10% didn't complete high school	
Marital Status	55.4% married	
Income	53.8% less than \$50,000	46.2% greater than \$50,000
Race/Ethnicity	87.3% White 4.8% Black 3.7% Hispanic	2.6% Asian 1.0% American Indian .05% Other

## Analysis of 2011 - 2015 Wisconsin ACE Data

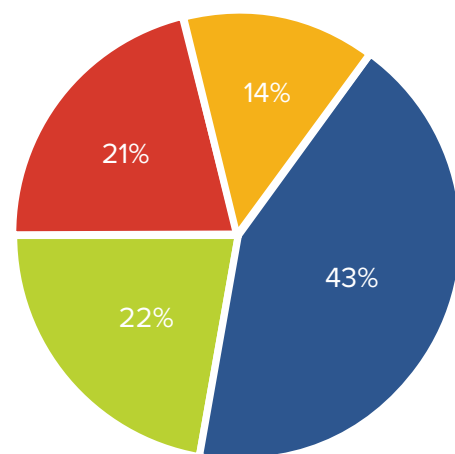
The results of the Wisconsin surveys parallel the findings from the original ACE Study and that of other state studies. The results are also consistent within and across all waves of Wisconsin data. The data show that ACEs are prevalent among Wisconsin residents, they often occur together, and they are associated with negative adult health and well-being outcomes.

The higher the number of ACEs, the greater the likelihood of an adverse impact on mental, physical, and socioeconomic well-being in adulthood. This is referred to as a dose-response relationship.

Figure 2 shows the distribution of ACE scores among Wisconsin adults who responded to the ACE module questions.

According to the 2011 - 2015 Wisconsin BRFSS data, approximately 57% of adults surveyed reported one or more ACEs. This percentage has remained consistent among Wisconsin adults since the first wave of data collection in 2010. ACEs are typically presented as a cumulative count, where each ACE is weighted equally. Previous research has determined that this simple count or "ACE Score" is highly predictive of poor outcomes in adulthood.

**Figure 2: Distribution of ACE Scores Among Wisconsin Adults**



Legend: 0 ACEs (dark blue), 1 ACE (light green), 2-3 ACEs (red), 4 or more ACEs (yellow)

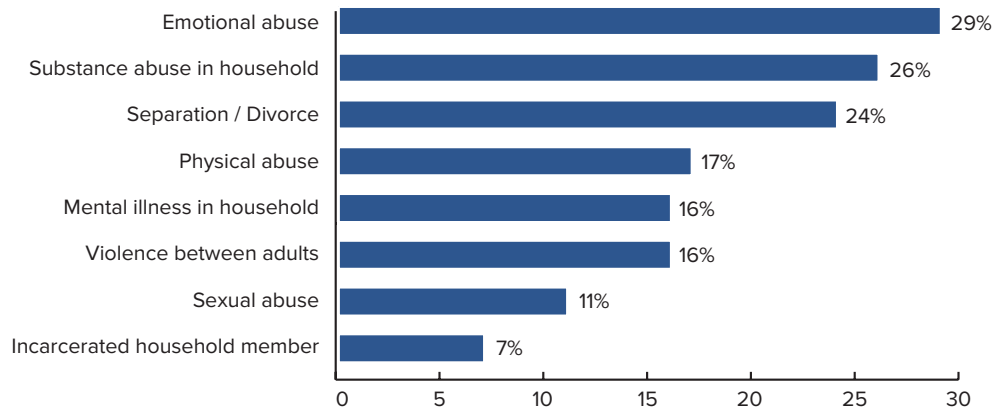
Figure 3 below shows the prevalence of each ACE reported by Wisconsin adults, from most to least common. Almost 30% of Wisconsin adults surveyed reported experiencing emotional abuse as a child. More than one-quarter of those who responded reported an adult in their childhood home with a substance abuse problem, and almost one-quarter reported that their parents separated or divorced during childhood.

Fourteen percent of those who responded to the ACE module of the Wisconsin BRFSS reported experiencing four or more ACEs. Figure 4 shows the percentage of those reporting four or more ACEs among those reporting each specific ACE. This illustrates

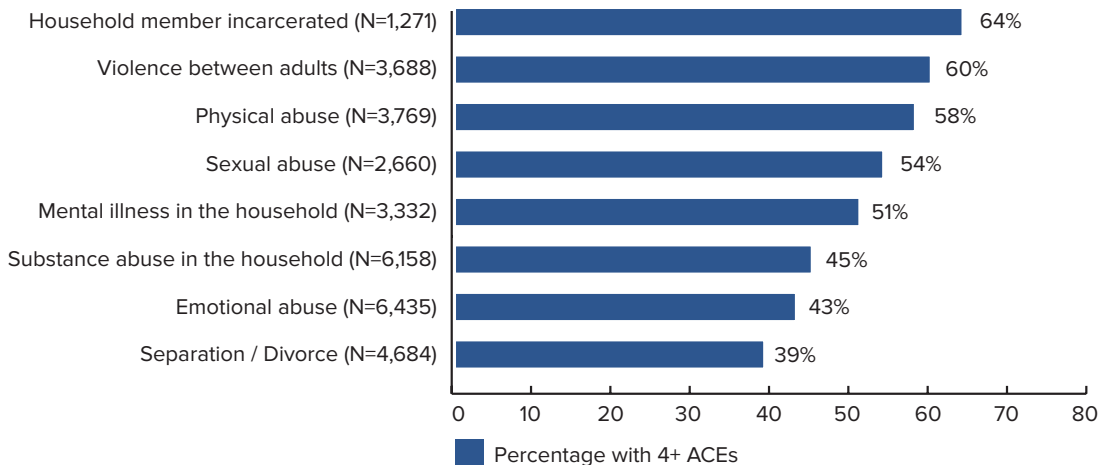
which ACEs are most likely to be associated with a high number of additional ACEs.

Higher ACE counts<sup>3</sup> are more common among individuals who report experiencing family member incarceration, violence between adults in the household, physical abuse, or sexual abuse during their childhoods. Although having an incarcerated household member is the least common ACE overall (see Figure 3), those who have experienced this ACE are most likely to have had numerous co-occurring ACEs during childhood. Almost two-thirds of people who reported that a household member was incarcerated during childhood experienced four or more ACEs.

**Figure 3: Prevalence of Specific Types of ACEs Among Wisconsin Residents<sup>4</sup>**



**Figure 4: Percentage of Wisconsin Adults Within Each ACE Type Who Experienced 4+ ACEs**



3. Defined as an ACE score of four or more.

4. Sample sizes vary due to different individuals and different numbers of individuals missing on each outcome. (N=25,070 - 25,471)

# Impact of ACEs on Physical and Mental Health

The original ACE Study and subsequent research has repeatedly shown that ACEs have a cumulative impact on health. Those with a higher number of ACEs are at significantly greater risk for neurobehavioral changes, social, cognitive, and emotional disorders, and health risk behaviors, all of which may predispose individuals to disease, disability, and early death.

In comparable fashion to the original ACE Study, physical health is divided into three categories within the Wisconsin Study: health risk behaviors, poor general health, and chronic health conditions. The Wisconsin Study also includes a fourth category, mental health indicator. Given that ACEs may have a unique relationship with adult mental health, diagnosed depression was analyzed separately from the other three categories. Table 2 (see page 7) presents the prevalence rate of each health condition or behavior in the four categories according to whether the survey respondents reported zero ACEs or four or more ACEs.

**Health Risk Behavior** is any behavior engaged in with a frequency or intensity that it increases the risk of disease or injury.<sup>5</sup> Survey respondents were identified as having a health risk behavior if they reported tobacco use, heavy drinking, or no exercise.

**General Health** refers to the quality of health in daily life. The Wisconsin BRFSS asks for self-reports on general health indicators, which have been shown to closely align with documented health status. Respondents who reported weight and height measurements consistent with obesity, fair or poor overall health, or 10 or more bad mental or physical health days in the past month were identified as having poor general health.

**Chronic Health Conditions** include chronic or severe illnesses, which have repeatedly been shown to have an association with adversity in childhood.<sup>6</sup> Those who reported any of the serious illnesses or health conditions listed were identified as having a chronic health condition.

**Mental Health Indicator** is a fourth health category assessed in relation to ACEs within the Wisconsin Study. Respondents were asked if they had ever been told they have a depressive disorder, including depression, major depression, or minor depression. Survey respondents who reported a diagnosed depressive disorder are identified in the last category on Table 2.

An asterisk following a health behavior or condition indicates a statistically significant difference between the percentage of individuals with zero ACEs who report the corresponding health issue and those with four or more ACEs who report the health issue. Statistically significant differences are unlikely to be due to chance.

Across all health behaviors and conditions, the prevalence rate of every adult health condition is higher for respondents reporting four or more ACEs, compared to respondents reporting no ACEs.<sup>7</sup>

Rates of tobacco use, self-reported “fair or poor” health, number of bad physical health days, number of bad mental health days, arthritis, asthma, and depression appear to be especially sensitive to ACEs.

5. Steptoe, A. & Wardle, J. (2004). Health-related behavior: prevalence and links with disease. In A. Kaptein, & J. Weinmen (Eds.), *Health Psychology*. BPS: Blackwell

6. Respondents who reported any of the individual indicators within the health risk behavior category were indicated as having a health risk behavior. This same strategy applied to the summary scores for poor general health and chronic health conditions, respectively. HIV risk behaviors are not included in the summary score for health risk behaviors due to the omission of these questions in the 2013 BRFSS survey.

7. Differences in prevalence rates for respondents reporting 1, 2, or 3 ACEs are not shown but generally follow a similar pattern—with each increase in the ACE count, the prevalence rate of the health outcome increases.

**Table 2: Health Behaviors, Conditions, and Indicators by ACE Prevalence (N=25,518)**

Health Risk Behaviors	0 ACEs <sup>i</sup>	4+ ACEs <sup>i</sup>	Total Population
Tobacco use <sup>*ii</sup>	13%	27%	20%
Heavy drinking <sup>*iii</sup>	6%	8%	7%
No exercise <sup>*</sup>	21%	23%	20%
General Health Indicators			
Obesity <sup>*iv</sup>	26%	33%	28%
Fair/poor health <sup>*</sup>	11%	21%	15%
Bad physical health days <sup>*v</sup>	8%	18%	11%
Bad mental health days <sup>*v</sup>	5%	20%	11%
Chronic Health Conditions			
COPD <sup>*</sup>	4%	10%	5%
Kidney disease <sup>*</sup>	2%	3%	2%
Angina	5%	7%	4%
Stroke <sup>*</sup>	2%	5%	2%
Cancer <sup>*</sup>	12%	17%	11%
Arthritis <sup>*</sup>	24%	40%	25%
Diabetes	7%	9%	6%
Asthma <sup>*</sup>	7%	16%	10%
Mental Health Indicator			
Diagnosed depressive disorder <sup>*</sup>	9%	37%	17%

\* Indicates that difference between 0 to 4 ACEs is statistically significant for that health factor.

<sup>i</sup> These estimates have been adjusted for demographic characteristics of race, age, income, education level, and relationship status.

<sup>ii</sup> Tobacco use (defined as smoking cigarettes some days or every day, or chewing tobacco every day)

<sup>iii</sup> Heavy drinking (defined as in the last 30 days having more than 2 drinks per day for men and more than 1 drink per day for women)

<sup>iv</sup> Obesity (defined as body mass index of 30 and above)

<sup>v</sup> Bad mental and physical health days (defined as having more than 10 bad health days in the past month)



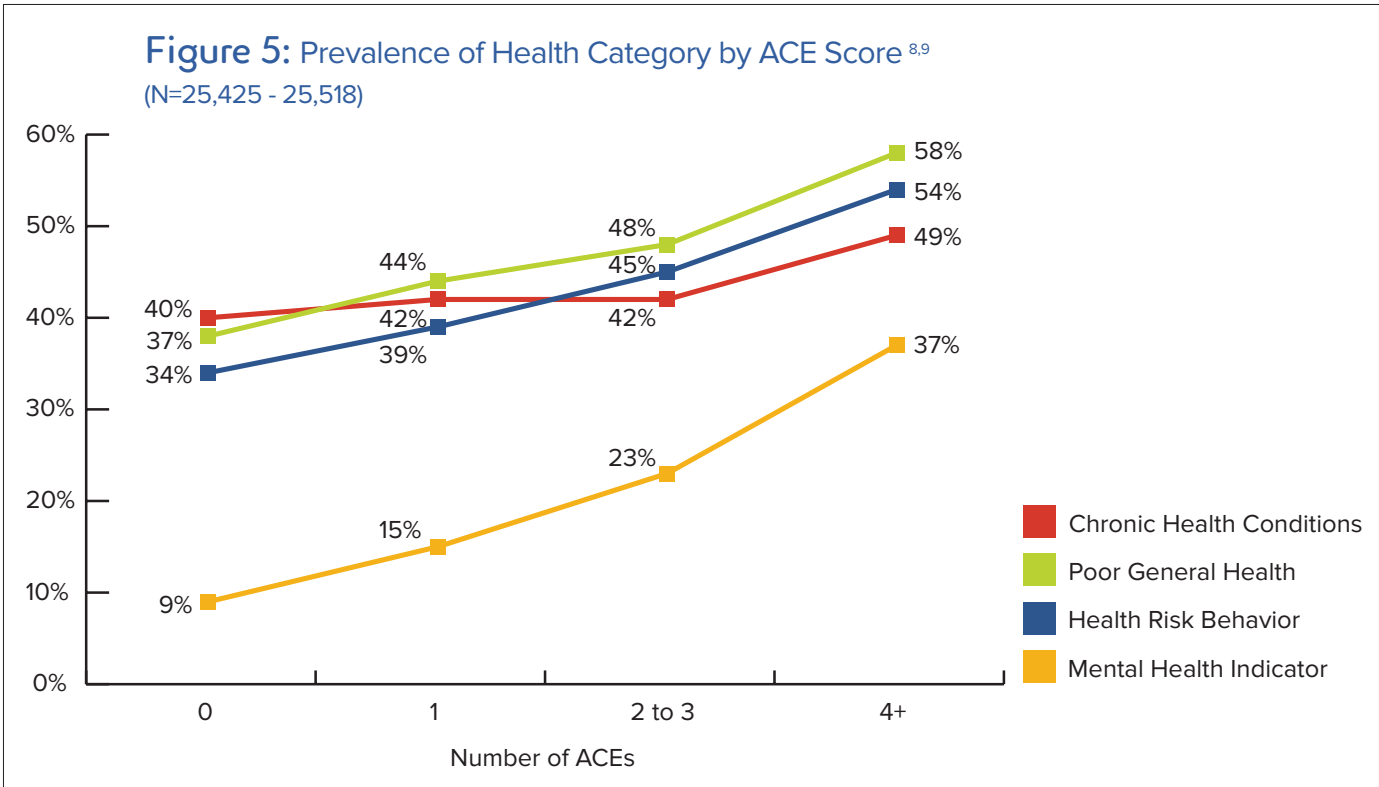


Figure 5 shows the percentage of those with different ACE scores who experience one or more health issues within each of the four categories of health problems.

For each health category, the percentage change between those with zero ACEs and those with four or more ACEs highlights the extent of the impact on health as the number of ACEs increases.<sup>10</sup> For the health risk behavior category, the percentage change between zero and four or more ACEs is 58%. For poor general health, it is 57%. Percentage change for chronic health conditions is 23%. The percentage change for mental health indicator, represented by those who indicated they had ever been diagnosed with a depressive disorder, is 311%, or over three times higher for those with four or more ACEs compared to those with zero ACEs.

## Relationship Between ACEs and Indicators of Well-being in Adulthood

Adults who experience four or more ACEs are also more likely to be unemployed, have lower incomes, and less education compared to adults who did not experience any ACEs.

These findings suggest that ACEs may affect other adult well-being outcomes beyond health status, or potentially explain in part why ACEs lead to later health problems.

Experiencing ACEs may elevate the risk of poor socioeconomic outcomes in adulthood, which, in turn, may create or exacerbate health issues.

8. An individual is counted as having a health risk behavior, poor general health, or a chronic health condition if they reported one or more health indicator in that category.  
 9. Sample sizes vary due to missing information on some measures of health.  
 10. Percentage change is calculated by subtracting the percentage associated with zero ACEs from the percentage associated with four or more ACEs and dividing this difference by the percentage associated with zero ACEs. Percentage point differences are raw difference scores whereas percentage changes reflect the degree of change as a percentage of the zero ACE category.

# Indicators of Child Neglect and Childhood Poverty

In 2014 and 2015, questions were added to the ACE module to assess neglect in childhood, both physical and emotional, as well as childhood poverty. In 2015, six questions assessing level and sources of social support in childhood and one item assessing social support in adulthood were also added.

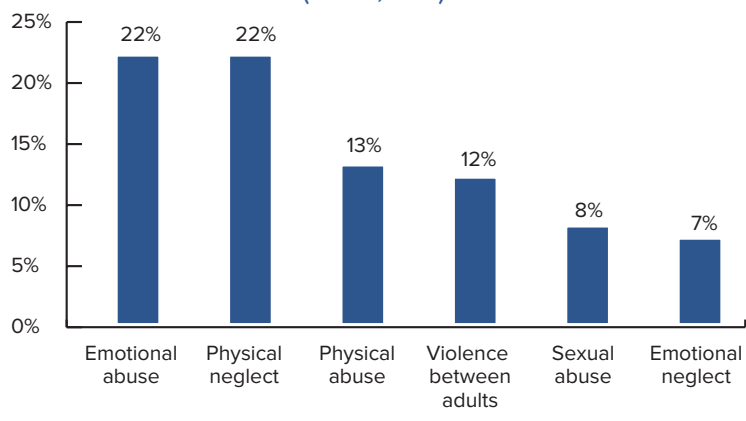
Over 40% of the respondents from the 2014 - 2015 surveys reported experiencing at least one form of childhood maltreatment. Almost 12% reported experiencing three or more forms of maltreatment.

Figure 6 shows the prevalence of each child maltreatment ACE among the 2014 - 2015 BRFSS respondents. The newly added physical neglect ACE was as prevalent as emotional abuse, which had the highest prevalence in previous years. Emotional neglect was the least common child maltreatment ACE reported by respondents, though just slightly lower than sexual abuse. Both, however, were still reported at nontrivial rates.

Reports of childhood poverty<sup>11</sup> from the 2014 - 2015 data and social support<sup>12</sup> from the 2015 data with child maltreatment ACE counts demonstrated associations with child maltreatment-specific ACEs. In particular, the incidence of childhood poverty and of low social support during childhood significantly increased as the number of child maltreatment ACEs increased.

Additionally, each child maltreatment ACE is statistically correlated with childhood poverty and low social support. Experiencing childhood poverty, three or more childhood maltreatment ACEs, and low social support each predict low levels of social support in adulthood.

**Figure 6:** 2014 - 2015 Prevalence of Child Maltreatment ACE Among Wisconsin Adults (N=13,233)



## Conclusion

The cumulative results of the five years of the Wisconsin ACE Study confirm the impact of ACEs on a wide spectrum of social, mental, and physical health outcomes among Wisconsin adults across all ages and social strata of the state.

However, ACEs can be prevented or, if they occur, the effects can be mitigated. Therefore, ACEs need to be addressed across the lifespan so that they do not continue to negatively affect the health and well-being of children into adulthood. Adults who have already been affected by childhood adversity and who have experienced trauma resulting in compromised health and well-being also need to be identified and supported.

On the state and local levels, efforts continue to increase education and outreach, which improve awareness and access to effective services. Institutions, agencies, programs, and communities each have the opportunity to use the findings from the Wisconsin ACE Study to mobilize their unique resources to prevent and mitigate the impact of ACEs.

11. Signified by reports of homelessness or hunger during childhood.

12. Measured with a series of questions asking how often survey respondents felt a sense of belonging and support from school, friends, and family during childhood.

# Acknowledgements

The project benefitted from the professional knowledge and expertise of numerous individuals and organizations.

The Wisconsin Behavioral Risk Factor Survey data referred to in this report were analyzed by the University of Wisconsin School of Social Work doctoral students Emma Kahle Monahan and Hana Lee in collaboration with Dr. Kristen Shook Slack.

This report was made possible with input and expertise from numerous partners and the support of the following organizations:

- Wisconsin Department of Children and Families
- Wisconsin Department of Corrections
- Wisconsin Department of Health Services
- University of Wisconsin School of Medicine and Public Health from the Wisconsin Partnership Program
- Wisconsin Coalition Against Sexual Assault

Produced by



Suggested citation: Adverse Childhood Experiences in Wisconsin: 2011 – 2015 Behavioral Risk Factor Survey Findings. (2018). Madison, WI: Child Abuse and Neglect Prevention Board.