ACE RESEARCH BRIEF: 9

Adverse Childhood Experiences in South Carolina:

The Interrelatedness of Adversity

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Children's Trust of South Carolina has produced a series of research briefs on adverse childhood experiences (ACEs). Research brief topics include the data collection process, an overview of ACEs, the prevalence of ACEs in various populations, and the relationship between ACEs and health and social outcomes.

In 2014, Children's Trust of South Carolina (herein Children's Trust) partnered with South Carolina's Department of Health and Environmental Control (SC DHEC) to collect data from South Carolina adults on exposure to adverse childhood experiences (ACEs). This partnership developed because, as the state leader in prevention of child abuse and neglect, Children's Trust values data-driven decision-making to improve the environments of vulnerable children and families. Currently, ACE data is being collected annually via the Behavioral Risk Factor Surveillance System (BRFSS; Centers for Disease Control and Prevention [CDC], 2014a).

Children's Trust has developed a series of research briefs to outline the ACE data collection process and to highlight important findings from the data collected. Ninth in the series, this brief provides an analysis of the interrelatedness of childhood adversity. First, an overview of ACEs in South Carolina is provided (e.g., prevalence [yes or no to any ACE], cumulative ACE [0, 1, 2, 3, or 4+ ACEs reported], and ACE type [abuse: physical, emotional, sexual; household dysfunction: household mental illness, substance use, domestic violence, incarceration, parental separation/divorce]). Then, the degree to which childhood adversities co-occur and the nature of their co-occurrence is presented.

ACE Survey Items

In 2014-2016, ACE Survey items were collected via the BRFSS in South Carolina and modeled the original ACE Study survey questions (see Morse & Strompolis, 2016a, 2016b for additional information). Eight ACE types were assessed (abuse: physical, sexual, emotional; household dysfunction: mental illness, substance use, incarceration, divorce, domestic violence). Table 1 outlines the 11 survey items administered to South Carolina adults (18 or older). Two items assessed household substance use (alcohol, drugs), and three items assessed contact sexual abuse (inappropriate touch, involuntary sexual intercourse). Items in these categories were collapsed for analytic purposes and are consistent with previous ACE research (e.g., Anda et al., 2006; Felitti et al., 1998). Item responses only indicated whether a participant had experienced a particular ACE. The survey does not capture intensity or frequency of ACE exposure—but does measure cumulative exposure to ACEs.

Table 1

ACE Types and Survey Items	
ACE TYPE	**SURVEY ITEM(S)**
Household Mental Illness	Did you live with anyone who was depressed, mentally ill, or suicidal?
Household Substance Use	Did you live with anyone who was a problem drinker or alcoholic? *or* Did you live with anyone who used illegal street drugs or abused prescription medications?
Household Incarceration	Did you live with anyone who served time or was sentenced to serve time in a prison, jail, or other correctional facility?
Parental Separation/ Divorce	Were your parents separated or divorced?
Household Domestic Violence	How often did your parents or adults in your home ever slap, hit, kick, punch, or beat each other up?
Physical Abuse	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.
Emotional Abuse	How often did a parent or adult in your home ever swear at you, insult you, or put you down?
Sexual Abuse	How often did anyone at least 5 years older than you or an adult ever touch you sexually? *or* try to make you touch them sexually? *or* force you to have sex?

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ACEs and other BRFSS data are weighted by the CDC so that the data is representative of the adult population of South Carolinians who have land line and cellular telephones. Weighting ensures that groups who are underrepresented in the data can be accounted for during data analysis. BRFSS data is weighted to ensure unbiased population estimates by accounting for complex sampling, nonresponse, and noncoverage (e.g., landline versus cell phone data collection; CDC, 2014b). Thus, a weight is assigned to every survey respondent. Under-represented respondents have a higher weight, whereas oversampled or represented respondents have a lower weight (Kish, 1990). See Weighting of BRFSS Data (CDC, 2014b) for more information.

Prevalence of ACEs

Sixty percent of South Carolinians reported experiencing at least one ACE. At the individual level, parental divorce or separation, emotional abuse, and household substance use were the most frequently reported by South Carolina adults. Additionally, 35% of South Carolinian adults reported experiencing two or more types of adversity during childhood (see Table 2). For more information regarding the prevalence of ACEs in South Carolina see Morse, Strompolis, Priester, and Wooten, 2016a, 2016b.

Interrelatedness of ACEs

A wealth of research has documented the relationship between exposure to adversity in childhood and negative health and social outcomes in adulthood (Anda et al., 2006; Anda et al., 2009; Anda, Tietjen, Schulman, & Felitti, 2010; Felitti et al., 1998). Early studies that examined these relationships tended to focus on the long-term health and social impacts of a single type of adversity (e.g., physical abuse; Bensley, van Eenwyk, & Simmons, 2000; Brown, Cohen, Johnson, & Smailes, 2000; De Bellis et al., 2002; Liebschutz et al., 2002; Walsh, MacMillan, & Jamieson, 2002). Additional research has suggested that the health and social impact of childhood adversity may best be understood by examining the co-occurrence of types of adversity compared to a single type of adversity, as adversities tend to be related to one another (Caron & Rutter, 1991; Dong et al., 2004). Given that a large number of South Carolinians report at least one ACE, this information has important implications for both prevention efforts and intervention and treatment of adversity.

To examine the co-occurrence of childhood adversities in South Carolina, a series of analyses were performed to examine two areas of inquiry: 1) the prevalence of each individual ACE and co-occurrence of ACEs and 2) the prevalence and odds that exposure to an individual ACE was associated with exposure to another individual ACE. For more information regarding the ACE Score, see Morse et al., 2016a.

Table 2

South Carolinians' ACE Exposure	
ACE	**PREVALENCE**
Any ACE	60%
Parental Separation/Divorce	31%
Emotional Abuse	30%
Household Substance Use	28%
Household Domestic Violence	19%
Household Mental Illness	16%
Physical Abuse	14%
Sexual Abuse	12%
Household Incarceration	9%

South Carolinians' ACE Exposure					
Cumulative ACEs	**0**	**1**	**2**	**3**	**4+**
	40%	25%	14%	9%	12%

Table 3

Prevelance of ACE and Additional ACEs			Additional ACEs (%)				
ACE TYPE	**N**	**%**	**0**	**≥1**	**≥2**	**≥3**	**≥4**
Any ACE	14815	60	39.5	25.5	14.0	8.9	12.1
Parental Divorce/Separation	6864	31	29.5	19.5	15.3	11.4	24.3
Emotional Abuse	7721	30	16.8	18.9	18.4	15.7	30.2
Household Substance Use	7469	28	14.5	19.4	19.9	15.1	31.0
Household Domestic Violence	4909	19	7.5	14.7	19.1	18.2	41.4
Household Mental Illness	3815	16	10.8	15.5	16.7	15.1	41.2
Physical Abuse	3548	14	4.8	10.1	15.3	19.4	50.4
Sexual Abuse	3329	12	12.3	15.7	16.4	15.0	40.6
Household Incarceration	1792	9	5.3	14.9	16.8	13.9	49.0
		Median	11.6	15.6	16.9	15.1	40.9
		Range	4.8-29.5	10.1-19.5	15.3-19.9	11.4-19.4	12.1-50.4

Prevalence and Additional ACEs

The prevalence of each individual ACE and the associated prevalence of additional ACEs were examined with BRFSS data from South Carolina adults. Of those who reported any ACE, approximately 26% reported at least one additional ACE, 14% reported at least two additional ACEs, 9% reported three additional ACEs, and 12% reported 4 or more (4+) additional ACEs (see Table 3). Astoundingly, half of South Carolinians who reported physical abuse also reported 4+ ACEs. The data show that adversity in childhood is not a singular or isolated event; rather, adversity is likely to take multiple, co-occurring forms.

Prevalence and Odds Ratio of Individual ACEs

For South Carolinians with at least one ACE, odds for an additional ACE ranged from 2.3 to 17.4, meaning that individuals with a particular ACE had double to almost 18 greater odds of having a second particular ACE. For example, when examining the co-occurrence of child abuse, persons reporting emotional abuse had 17.4 (95% CI: 15.4-19.8) greater odds of also reporting physical abuse compared to persons who did not report emotional abuse (see Figure 1 for odds ratios, Table 3 for odds rations and prevalence, and Appendix A for chart of odds ratios with confidence intervals). Additionally, those reporting physical abuse had 11.2 greater odds of also reporting household domestic violence compared to those who did not report physical abuse. Similar analyses were conducted to examine the co-occurrence of household dysfunction (see Figure 2 for odds ratios, Table 4 for odds rations and prevalence, and Appendix B for chart of odds ratios with confidence intervals). For example, South Carolinians who reported household substance use had 9.9 greater odds (95% CI: 8.5-11.4) of also reporting household incarceration compared to those who did not report household substance use. Furthermore, persons exposed to household domestic violence had 11.2 greater odds (95% CI: 10.1-12.5) of also being exposed to physical abuse compared to persons who did not report household domestic violence. Appendix A and B contain charts that display odds ratios for each of the household dysfunction ACEs and abuse ACEs. They also include 95% confidence intervals to indicate precision of measurement.

What is an Odds Ratio?

An odds ratio is used to compare the relative odds that an outcome of interest will occur given exposure to a variable of interest. The odds ratio gives the odds that an outcome will happen (e.g., child abuse) given a particular exposure (e.g., household dysfunction) and can be compared to the odds of that outcome happening in the absence of that exposure (Szumilas, 2010). The 95% confidence interval is a parameter indicating the precision of the estimate's (e.g., odds ratio) representation of the population (i.e., South Carolina) from which the sample was selected. Thus, if repeat samples were taken in South Carolina, 95% of the intervals computed would contain the population mean, or estimated average for the state.

Figure 1
Odds Ratios for Child Abuse by Presence or Absence of an Adverse Childhood Experience

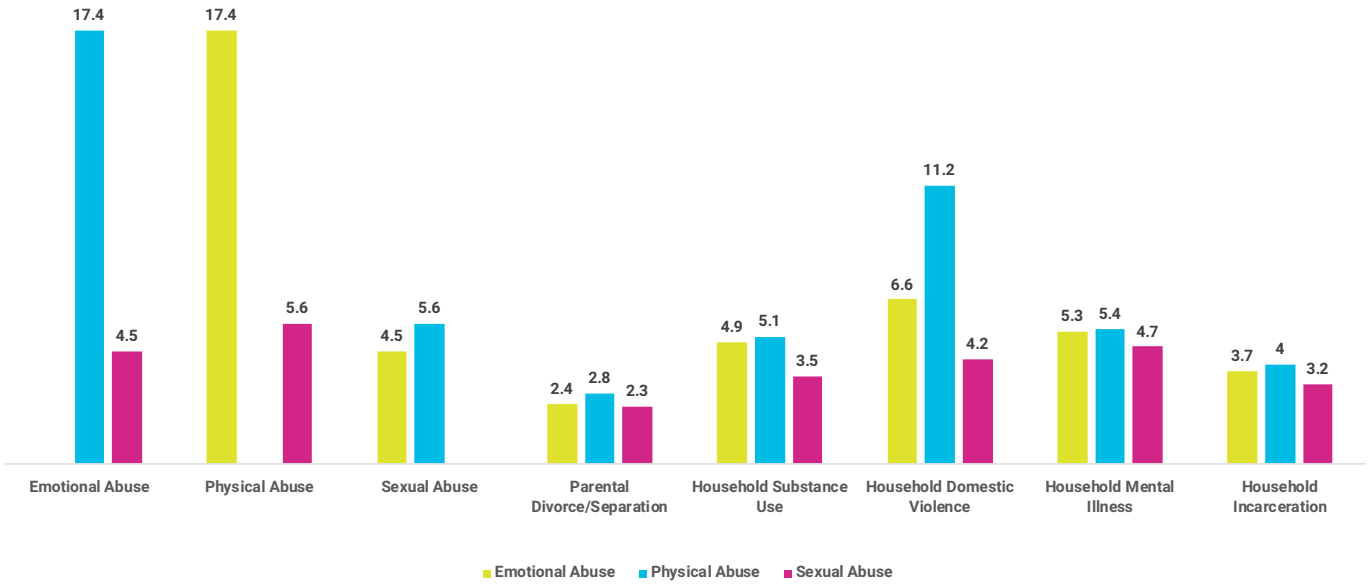


Figure 2
Odds Ratios for Household Dysfunction by Presence or Absence of an Adverse Childhood Experience

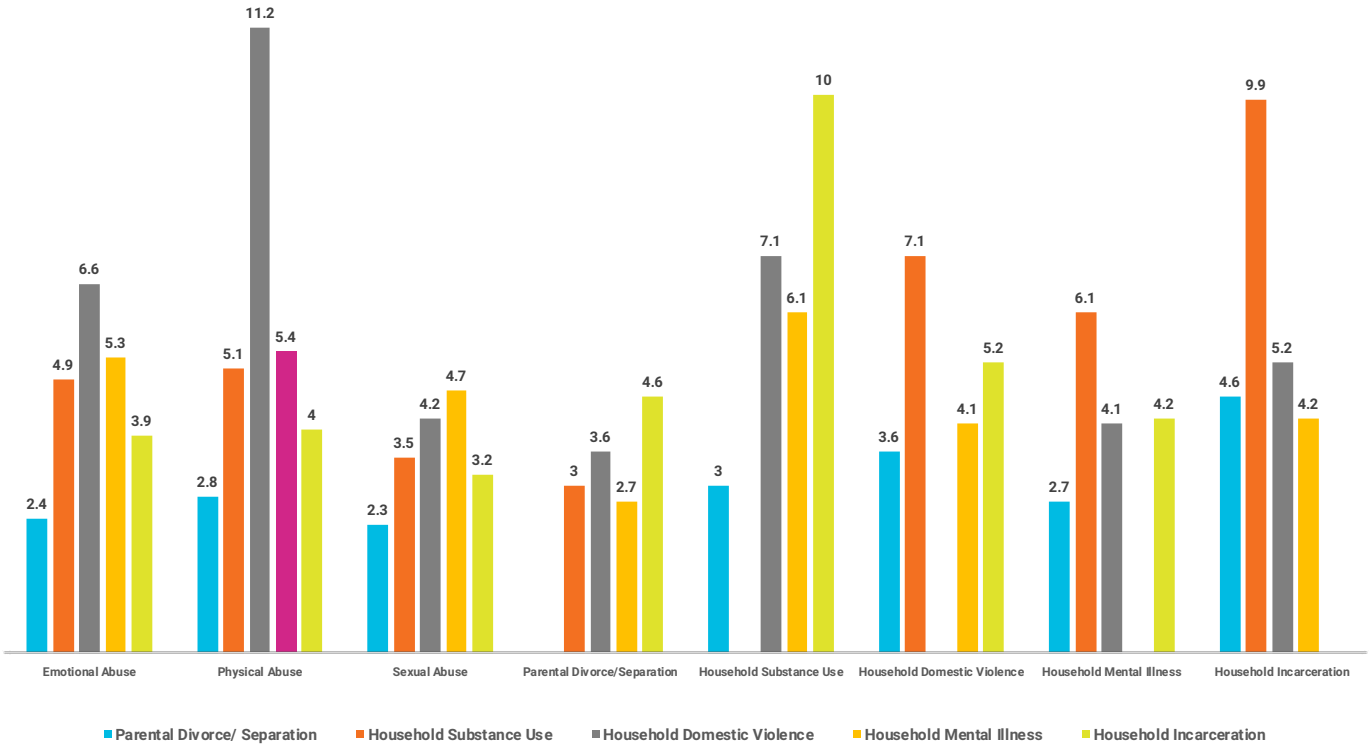


Table 4

Prevalence and Odds Ratios for Child Abuse by Presence or Absence of an ACE								
ACE TYPE	Y/N	N	Emotional Abuse		Physical Abuse		Sexual Abuse	
			%	OR[a]	%	OR[a]	%	OR[a]
Emotional Abuse	No	21343	-	-	21.6	1.0b	25.8	1.0
	Yes	7721	-	-	82.8	17.4	61.0	4.5
Physical Abuse	No	25790	3.5	1.0	-	-	10.3	1.0
	Yes	3548	38.6	17.4	-	-	39.3	5.6
Sexual Abuse	No	25818	7.0	1.0	8.8	1.0	-	-
	Yes	3329	25.3	4.5	35.1	5.6	-	-
Parental Divorce/Separation	No	21915	25.3	1.0	27.9	1.0	28.7	1.0
	Yes	6864	45.2	2.4	52.3	2.8	48.0	2.3
Household Substance Use	No	21924	18.1	1.0	23.1	1.0	24.6	1.0
	Yes	7469	51.8	5.9	60.6	5.1	53.6	3.5
Household Domestic Violence	No	24123	9.7	1.0	12.5	1.0	15.7	1.0
	Yes	4909	41.5	6.6	61.5	11.2	43.7	4.2
Household Mental Illness	No	25532	8.7	1.0	11.9	1.0	12.6	1.0
	Yes	3815	33.5	5.3	42.4	5.4	40.4	4.7
Household Incarceration	No	27718	5.2	1.0	6.8	1.0	7.3	1.0
	Yes	1792	17.7	3.7	22.6	4.0	20.1	3.2

Note: ap < .001, bthe referent group for all analyses are persons with a "No" response.

Table 5

Prevalence and Odds Ratios for Household Dysfunction by Presence or Absence of an ACE												
ACE TYPE	Y/N	N	Parental Divorce/ Separation		Household Substance Use		Household Domestic Violence		Household Mental Illness		Household Incarceration	
			%	OR[a]	%	OR[a]	%	OR[a]	%	OR[a]	%	OR[a]
Emotional Abuse	No	21343	24.0	1.0b	20.4	1.0	21.8	1.0	24.0	1.0	27.4	1.0
	Yes	7721	43.4	2.4	55.5	4.9	65.0	6.6	62.6	5.3	59.8	3.9
Physical Abuse	No	25790	9.6	1.0	7.7	1.0	6.6	1.0	9.6	1.0	11.9	1.0
	Yes	3548	23.1	2.8	30.0	5.1	44.2	11.2	36.7	5.4	35.0	4.0
Sexual Abuse	No	25818	9.3	1.0	8.1	1.0	8.6	1.0	8.9	1.0	10.9	1.0
	Yes	3329	19.0	2.3	23.7	3.5	28.2	4.2	31.3	4.7	28.0	3.2
Parental Divorce/Separation	No	21915	-	-	24.2	1.0	25.3	1.0	27.5	1.0	28.1	1.0
	Yes	6864	-	-	49.2	3.0	54.8	3.6	50.4	2.7	64.4	4.6
Household Substance Use	No	21924	20.7	1.0	-	-	19.7	1.0	21.7	1.0	23.8	1.0
	Yes	7469	44.2	3.0	-	-	63.5	7.1	62.7	6.1	75.5	10.0
Household Domestic Violence	No	24123	12.5	1.0	9.8	1.0	-	-	14.9	1.0	16.2	1.0
	Yes	4909	33.9	3.6	43.6	7.1	-	-	42.0	4.1	50.3	5.2
Household Mental Illness	No	25532	11.6	1.0	8.4	1.0	11.6	1.0	-	-	13.8	1.0
	Yes	3815	26.0	2.7	35.9	6.1	35.2	4.1	-	-	40.3	4.2
Household Incarceration	No	27718	4.4	1.0	3.1	1.0	5.5	1.0	6.4	1.0	-	-
	Yes	1792	17.7	4.6	34.0	9.9	23.2	5.2	22.5	4.2	-	-

Note: ap < .001, bthe referent group for all analyses are persons with a "No" response.

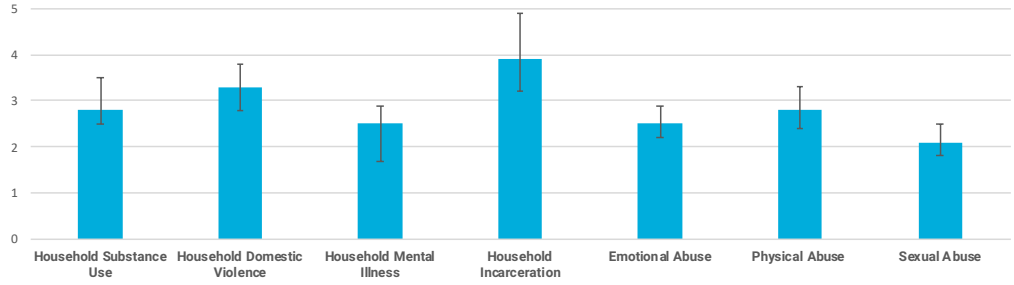
Conclusion

The data presented in this research brief provide evidence for the notion that childhood adversity is multifaceted and complex. For South Carolinians with at least one ACE, odds for an additional ACE ranged from 2.1 to 17.5, meaning that individuals with a particular ACE had double to almost 18 greater odds of having a second particular ACE. Alarmingly, 25-52% of adults in South Carolina who experienced any one type of adversity in childhood also reported 4+ ACEs. Clearly, there are a large number of individuals who have experienced more than one ACE and delineating this information has important implications for prevention and intervention efforts. For example, knowing that the probability of physical abuse is almost 18 times greater for those who experienced emotional abuse compared to those who did not, practitioners would benefit from knowing that children who are exposed to emotional abuse are also likely to experience physical abuse. While knowing that a specific type of ACE is likely to co-occur with a second specific ACE can be useful information, the interrelatedness among all of the ACEs provides a very complex picture of childhood adversity (i.e., exposure to any ACE in South Carolina increased the risk of exposure to at least one additional ACE). To that end, efforts to mitigate the effects of ACEs would benefit from, when an ACE is present, assessing exposure to other types of ACEs (Dong et al., 2004). Practitioners could then provide supportive services to prevent additional exposure and/or provide treatment services to address the range of exposure. Given the co-occurrence of ACEs, prevention efforts that target a specific ACE are likely to impact additional ACEs. ACE prevention efforts would benefit from a collaborative, multidisciplinary approach that targets multiple levels (e.g., prevention of all ACEs and prevention of cumulative exposure). For example, Triple P – Positive Parenting Program – is an evidence-based intervention that includes implementation at multiple levels and has been successful preventing child maltreatment (Prinz, Sanders, Shapiro, Whitaker, & Lutzker, 2009). An important next step in understanding the co-occurrence of ACEs is to examine multiple exposures to specific health and social outcomes (e.g., smoking, heart attack, educational attainment) in specific populations (e.g., rural vs. urban, race/ethnicity). Next in the series, ACEs will be examined within the population of veterans in South Carolina. within the population of veterans in South Carolina.

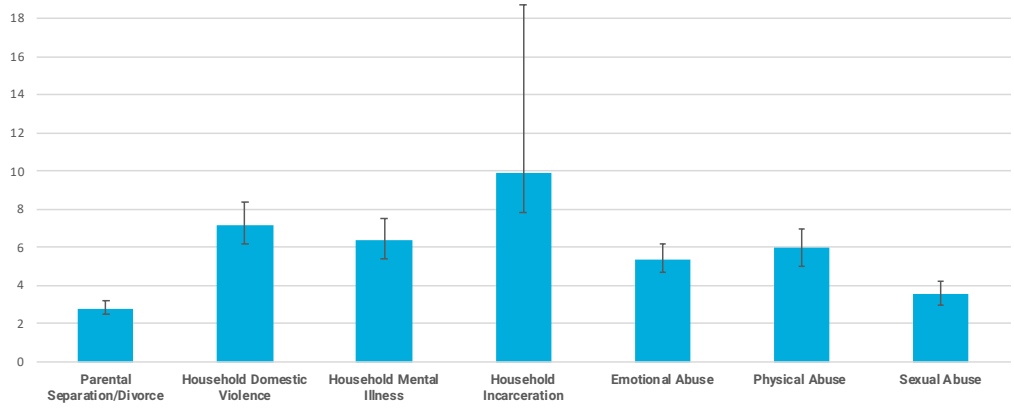
Appendix A: Odds Ratios for Household Dysfunction ACEs

These charts display the odds of having other ACEs given the presence of a household dysfunction ACE. Confidence intervals are displayed to indicate precision of estimates.

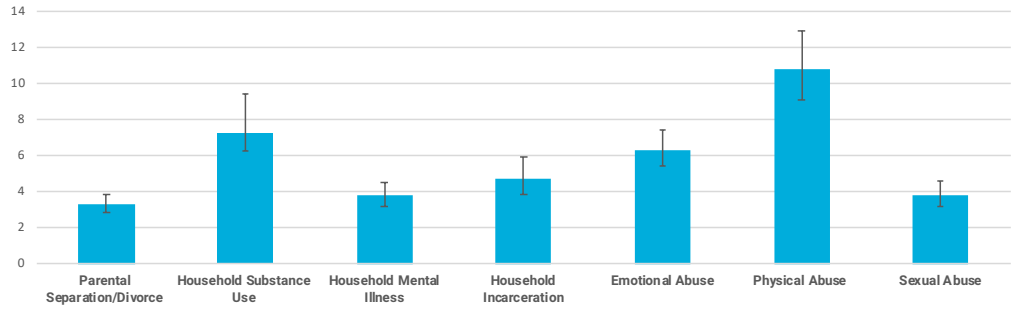
Parental Divorce/Separation Odds Ratio



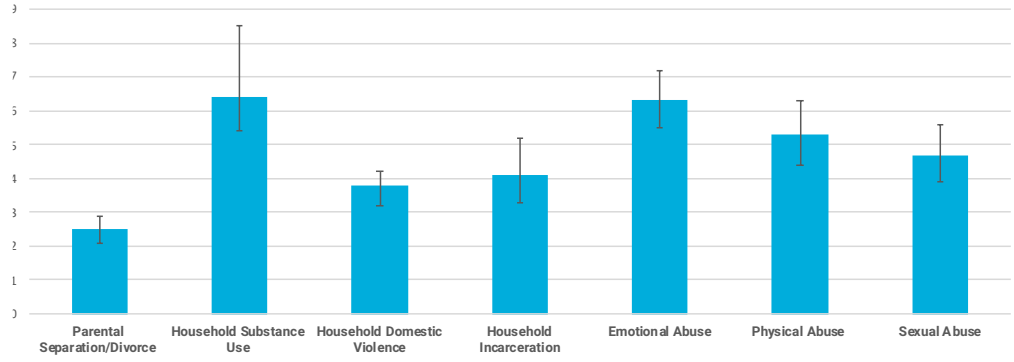
Household Substance Use Odds Ratio



Household Domestic Violence Odds Ratio

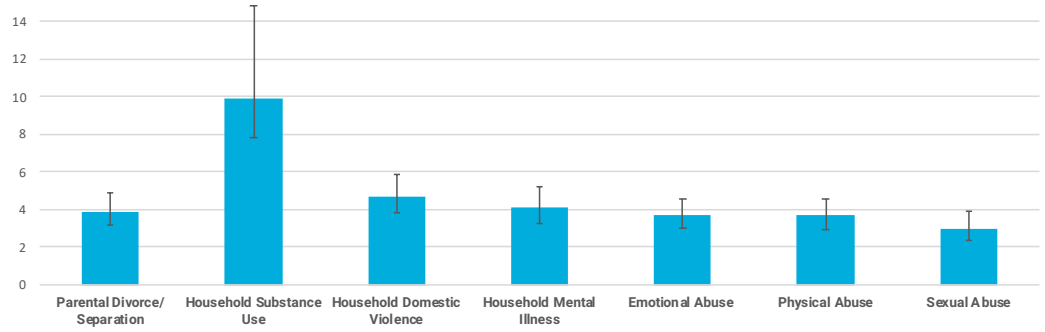


Household Mental Illness Odds Ratio



Appendix A Continued

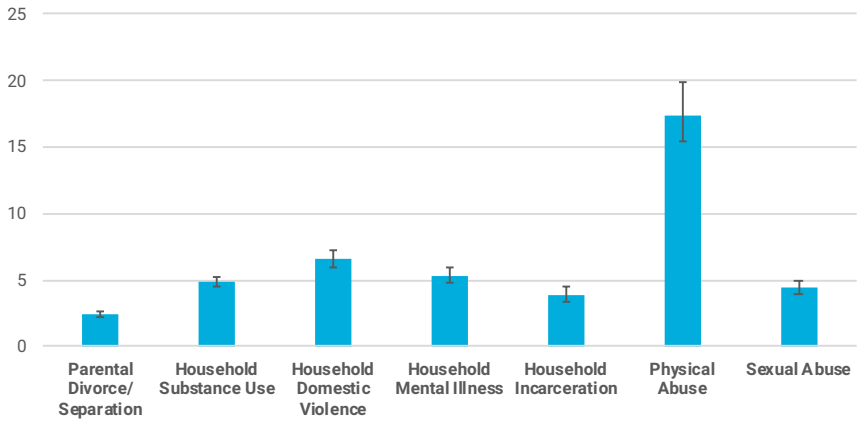
Household Incarceration Odds Ratio



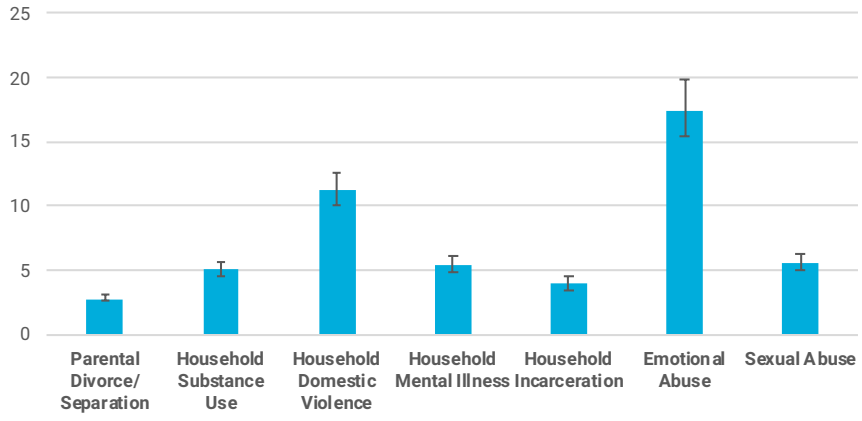
Appendix B: Odds Ratios for Child Abuse ACEs

These charts display the odds of having other ACEs given the presence of an abuse ACE. Confidence intervals are displayed to indicate precision of estimates.

Emotional Abuse Odds Ratio

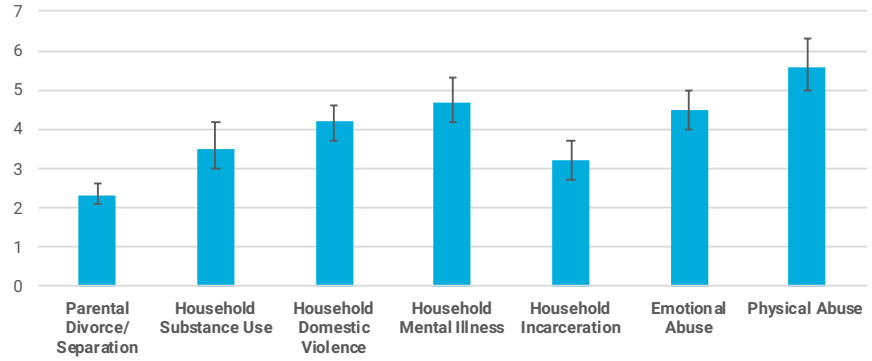


Physical Abuse Odds Ratio



Appendix B Continued

Sexual Abuse Odds Ratio



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