

ADVERSE CHILDHOOD EXPERIENCES AMONG KANSAS ADULTS

2014-2015 Kansas
Behavioral Risk Factor
Surveillance System



Adverse Childhood Experiences among Kansas Adults 2014-2015 Kansas Behavioral Risk Factor Surveillance System

Susan Mosier, MD, MBA
Secretary, KDHE

Ryan Lester
Director, Bureau of Health Promotion, KDHE

Report Preparation:

Meagan Stabler, PhD, CHES
Advanced Injury Epidemiologist
Bureau of Health Promotion, KDHE

Ghazala Perveen, MBBS, PhD, MPH
Director of Science and Surveillance/Health Officer II
Bureau of Health Promotion, KDHE

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Contact Information: For additional information, please contact the Bureau of Health Promotion, Suite 230, Kansas Department of Health and Environment, 1000 SW Jackson, Topeka, KS 66612, or call (785) 291-3742, or visit online at www.kdheks.gov/brfss.

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Table of Contents

Executive Summary	1
Introduction	3
The ACE Study	3
The Kansas Behavioral Risk Factor Surveillance System	4
ACE Categories and ACE Scores	4
Findings	7
Prevalence of Adverse Childhood Experience	7
Prevalence of Health Risk Factors and Health Conditions by ACE Score	11
Associations between Health Risk Factors and Health Conditions, and ACE Score after Adjusting for Selected Demographic Characteristics	14
Conclusion	15
Appendix	16
References	20

Executive Summary

Researchers have demonstrated a link between adverse childhood experiences (ACE) of abuse, neglect and family dysfunction and health status later in life. This may be explained in part by a toxic physiological stress response, such as elevated stress hormone levels, to multiple stressors, which may have damaging effects on a child's developing brain. The Behavioral Risk Factor Surveillance System (BRFSS) introduced an optional module in 2008 to assess the relationship between ACE and health status at the population-level. The ACE optional module was included for the first time in the Kansas BRFSS in 2014 and then a second time in Kansas BRFSS 2015. This report combines data from both Kansas BRFSS 2014 and 2015 datasets.

The ACE module is comprised of 11 questions that assess the following eight categories of ACE:

- Childhood Abuse
 1. physical abuse
 2. sexual abuse
 3. emotional abuse
- Household Dysfunction
 4. presence of a mentally ill household member
 5. alcohol or drug abuse in the household
 6. incarcerated household member
 7. violence between adults in the household
 8. parental divorce or separation

Self-reported exposure to any single adverse childhood experience category is counted as one point toward the final ACE score (range: 0 to 8). SAS complex survey procedures were used to calculate overall and subpopulation prevalence estimates of each adverse childhood experience category and ACE score. Prevalence estimates of various health risk factors, perceived poor health indicators and chronic conditions were also examined by ACE score. In addition, logistic regression was used to examine the association between ACE score category and various health risk factors and conditions, while controlling for selected demographic characteristics.

Key Findings:

- ACE are prevalent: more than half of Kansas adults have at least one adverse childhood experience.
- In Kansas, high ACE scores (3+) are higher among women, non-heterosexual adults, those younger than 55 years old, non-Hispanic other/multiracial adults, those with lower levels of education and adults with lower annual household incomes.
- The prevalence of current smoking, binge drinking, no leisure time physical activity, obesity, poor/fair general health, 14 or more days of poor physical health and 14 or more days of poor mental health were higher among adults with high (3+) ACE scores compared with those with no ACE.
- After adjusting for selected demographic variables, positive associations remained significant between high ACE score category and current smoking, binge drinking, no leisure time physical activity, obesity, poor/fair general health, 14 or more days of poor physical health and 14 or more days of poor mental health.
- The prevalence of arthritis, asthma, chronic obstructive pulmonary disease, depression, disability and kidney disease were higher among adults with high (3+) ACE scores compared with those with no ACE.
- After adjusting for selected demographic variables, associations remained significant between high ACE score category and arthritis, asthma, cancer, chronic obstructive pulmonary disease, depression, disability, diabetes, heart attack, kidney disease and stroke.

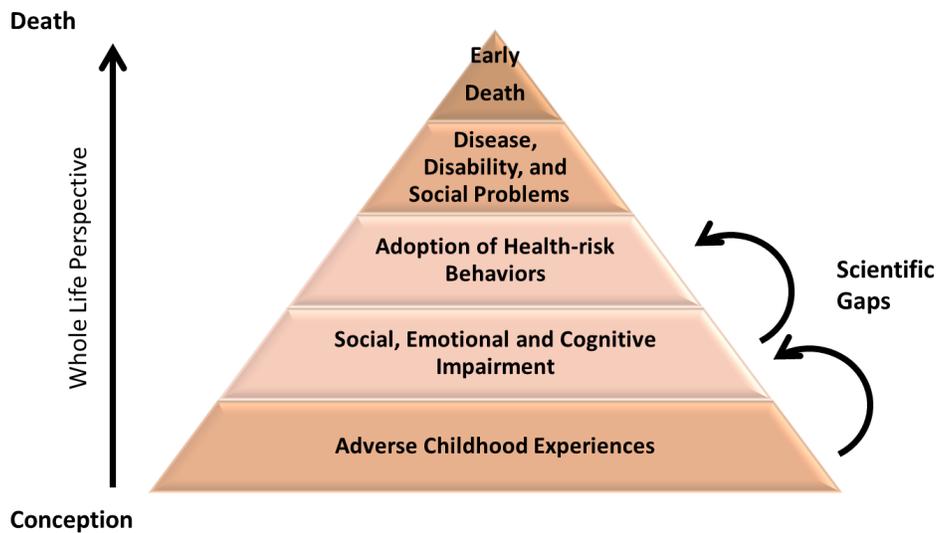
Kansas data highlight the need to increase awareness of ACE as a public health issue. Preventing ACE may have beneficial effects on the long-term health of Kansans.

Introduction

The ACE Study

Researchers have demonstrated a link between adverse childhood experiences (ACEs) of abuse, neglect and family dysfunction, and health status later in life.ⁱ This may be explained in part by a toxic physiological stress response, such as elevated stress hormone levels, to multiple stressors, which may have damaging effects on a child's developing brain.^{ii,iii} The ACE study, a collaboration between the Centers for Disease Control and Prevention (CDC) and Kaiser Permanente's Health Appraisal Clinic in San Diego, CA, is one of the largest investigations ever conducted to assess associations between childhood maltreatment and health and well-being later in life.^{iv} The initial phase of the ACE study was conducted from 1995 to 1997. At the time the study was conceptualized, the relationship between single types of abuse, primarily sexual abuse, and poor outcomes across the lifespan were well known, but the impacts of a broad range of childhood abuse and household dysfunction had not yet been assessed (Figure 1).^v Based on this knowledge, the study sought to examine multiple types of abuse and trauma and their cumulative effects on health outcomes in adulthood. ACE study findings suggest that certain experiences are major risk factors for the leading causes of illness and death as well as poor quality of life in the U.S.

Figure 1. Conceptual Framework for the ACE Study



Source: Centers for Disease Control and Prevention (CDC) - Kaiser Adverse Childhood Experience (ACE) Study conceptual model. ^v

Associations between ACE and health outcomes have since been examined using population-based surveys, including the Behavioral Risk Factor Surveillance System (BRFSS).

The Kansas Behavioral Risk Factor Surveillance System

The BRFSS is an ongoing, population-based, random-digit-dialed telephone survey of non-institutionalized civilian adults 18 years and older living in private residence or college housings with landline and/or cell phone service. The survey is coordinated by the Centers for Disease Control and Prevention (CDC) and is conducted annually by all 50 states, the District of Columbia and several U.S. territories. The Behavioral Risk Factor Surveillance System (BRFSS) introduced an optional module in 2008 to assess the relationship between ACE and health status at the population-level. The ACE optional module was included for the first time in the Kansas BRFSS in 2014 and for the second time in 2015.

The complex survey methodology and analytical procedures for BRFSS are designed to produce prevalence estimates that can be generalized to Kansas adults statewide. Prevalence estimates are estimates of a true value (population parameter) and are thus subject to random variation. Ninety-five percent confidence intervals are used to characterize this variability and can be thought of as a range of values that will contain the true value 95 percent of the time. Prevalence estimates are only reported when they are based on at least 50 denominator respondents and 5 numerator respondents and the relative standard error (RSE) is greater than 30 percent.

Following considerations should be taken into account when interpreting BRFSS estimates:

- BRFSS estimates do not apply to individuals without telephone service (approximately 2.9% of the population),^{vi} those who reside on military bases or within institutions or those who are unable to complete a telephone survey.
- BRFSS prevalence estimates are self-reported and are subject to bias due to respondents' inability or unwillingness to provide accurate information about their own behaviors or characteristics.

A more detailed explanation of the survey methodology used for the Kansas BRFSS is available at <http://www.kdheks.gov/brfss/technotes.html>.

ACE Categories and ACE Scores

The BRFSS ACE module is comprised of 11 questions that assess the following eight categories of ACE:

- Childhood Abuse
 1. physical abuse
 2. sexual abuse
 3. emotional abuse

- Household Dysfunction
 4. presence of a mentally ill household member
 5. alcohol or drug abuse in the household
 6. incarcerated household member
 7. violence between adults in the household
 8. parental divorce or separation

All questions refer to the time period before respondents were 18 years old.

Self-reported exposure to any single ACE category is counted as one point toward the final ACE score (range: 0 to 8) (Table 1). ACE scores were only calculated for respondents who answered all 11 questions in the BRFSS ACE module (n=29,686). Responses of “don’t know” or “refused” were coded as missing for all questions.

Table 1. ACE categories and scoring: KS BRFSS ACE module survey questions and response options

ACE Category	Survey Question*	Response Options	Scoring
Childhood abuse			
Physical abuse	"How often did your parent or an adult in your home ever hit, beat, kick, or physically hurt you in any way? Do not include spanking."	Never/Once/More than once	1= Once or More than once 0= Never
Sexual abuse	"How often did anyone at least 5 years older than you or an adult..." "...ever touch you sexually?" "...try to make you touch them sexually?" "...force you to have sex?"	Never/Once/More than once	1= Once or more than once of the three questions included in this category 0= Never to all three questions in this category
Emotional abuse	"How often did a parent or adult in your home ever swear at your, insult you, or put you down?"	Never/Once/More than once	1= More than once 0= Once or never
Household Dysfunction			
Mentally ill household member	"Did you live with anyone who was depressed, mentally ill or suicidal?"	Yes/No	1= Yes 0= No
Substance abuse in household	"Did you live with anyone who..." "...was a problem drinker or alcoholic?" "...abused prescription medications?"	Yes/No	1= Yes to one or more of the two questions included in this category 0= No to both questions in this category
Incarcerated household member	"Did you live with anyone who served time or was sentenced to serve time in a prison, jail or other correctional facility?"	Yes/No	1= Yes 0= No
Violence between adults in household	"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	1= Once or More than once 0= Never
Parental separation/divorce	"Were your parents separated or divorced?"	Yes/No	1= Yes 0= No

*All questions refer to the time period before respondents were 18 years old.

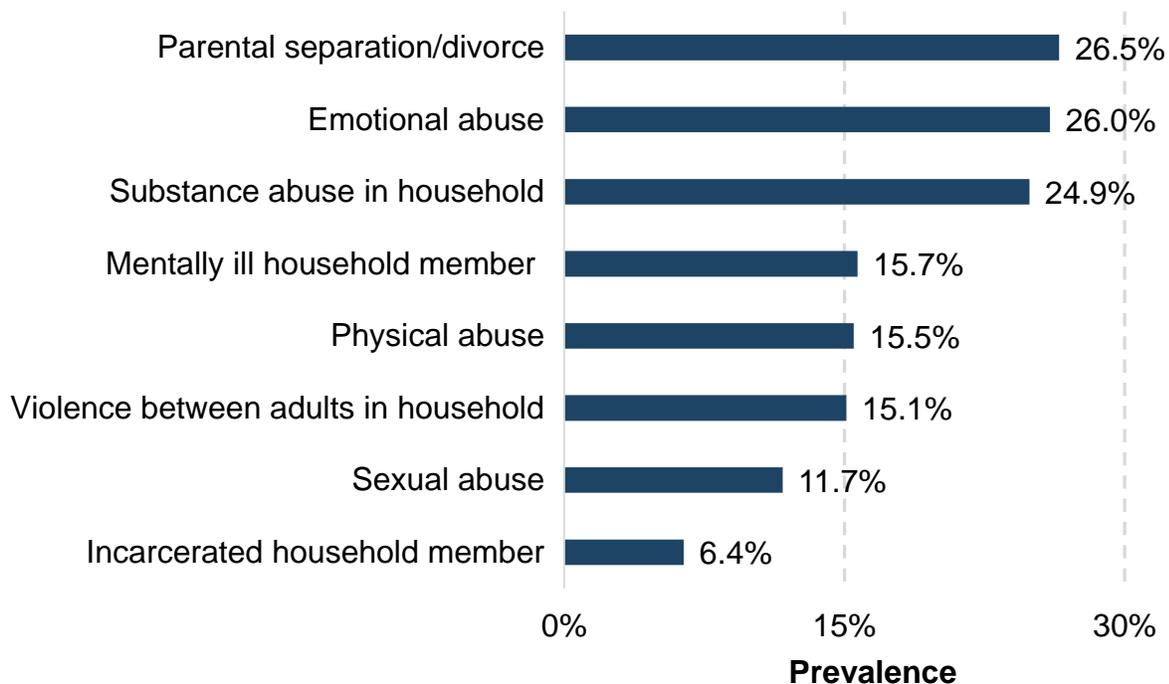
Note: Results disseminated by other states may differ slightly due to differences in categorizing emotional abuse. Some researchers have defined exposure to emotional abuse as a response of "Once" or "More than once" to the emotional abuse question indicated in the above table.^{vii} Kansas reports, define exposure to emotional abuse as a response of "More than once" to the indicated question.^{viii}

Findings

Prevalence of Adverse Childhood Experience

Parental separation/divorce, emotional abuse and substance abuse by a household member were the most common adverse childhood experiences reported by Kansas adults (Figure 2). Approximately 1 in 4 Kansas adults reported that their parents were separated or divorced (26.5%). Similar percentages of Kansas adults reported experiencing emotional abuse (26.0%) and substance abuse by a household member (24.9%).

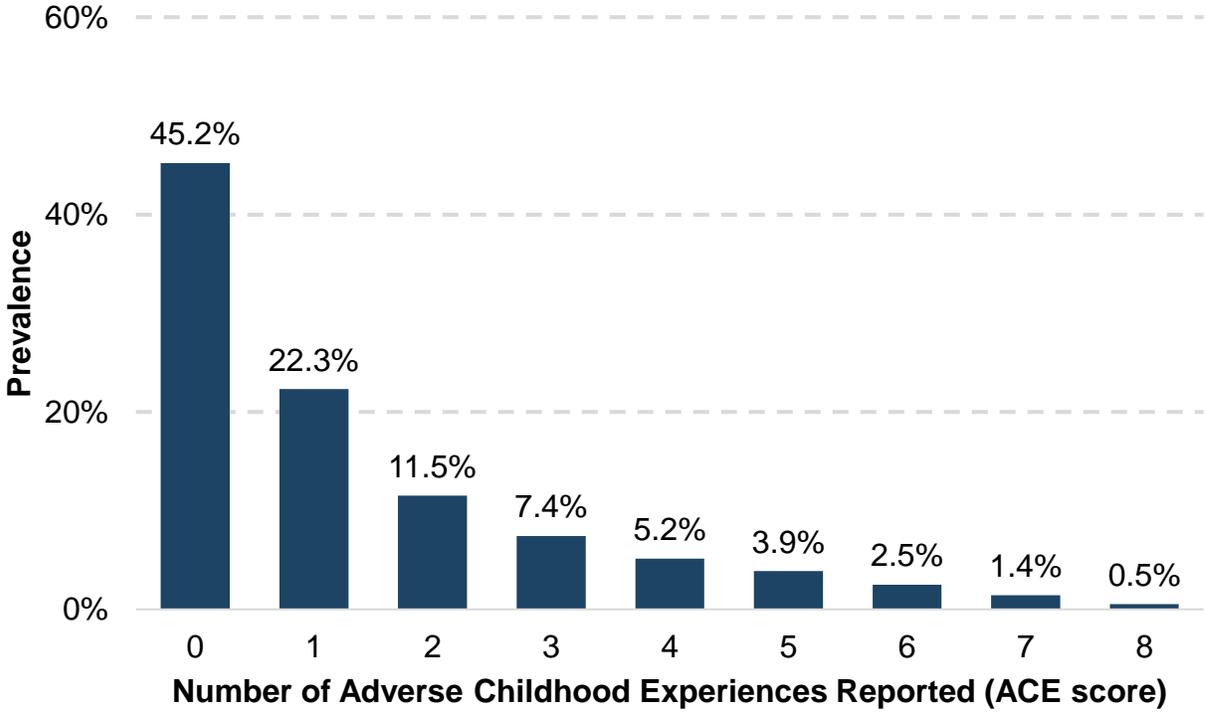
Figure 2. Prevalence of Adverse Childhood Experiences (ACE) among Kansas adults aged 18 years and older by ACE category, KS BRFSS 2014-2015



Source: 2014-2015 Kansas Behavioral Risk Factor Surveillance System, Bureau of Health Promotion, KDHE.

For additional information on the prevalence of Kansas adults who experienced specific ACE categories by demographic characteristics, see Appendix B.

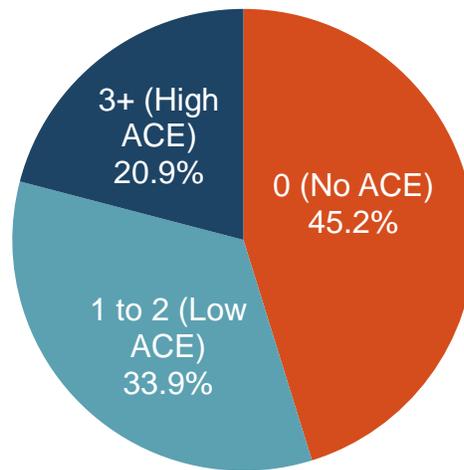
Figure 3. Prevalence of Adverse Childhood Experiences (ACE) among Kansas adults aged 18 years and older by ACE score, KS BRFSS 2014-2015



Source: 2014-2015 Kansas Behavioral Risk Factor Surveillance System, Bureau of Health Promotion, KDHE.

Most Kansas adults (54.8%) reported having experienced at least one ACE (Figure 3). More specifically, 1 in 3 (33.9%) Kansas adults had one or two ACE, and 1 in 5 (20.9%) had three or more ACE (Figure 4). The distribution of ACE scores among Kansas adults mirrors findings from others states.^{vi,vii}

Figure 4. Prevalence of no, low and high ACE among Kansas adults aged 18 years and older, KS BRFSS 2014-2015



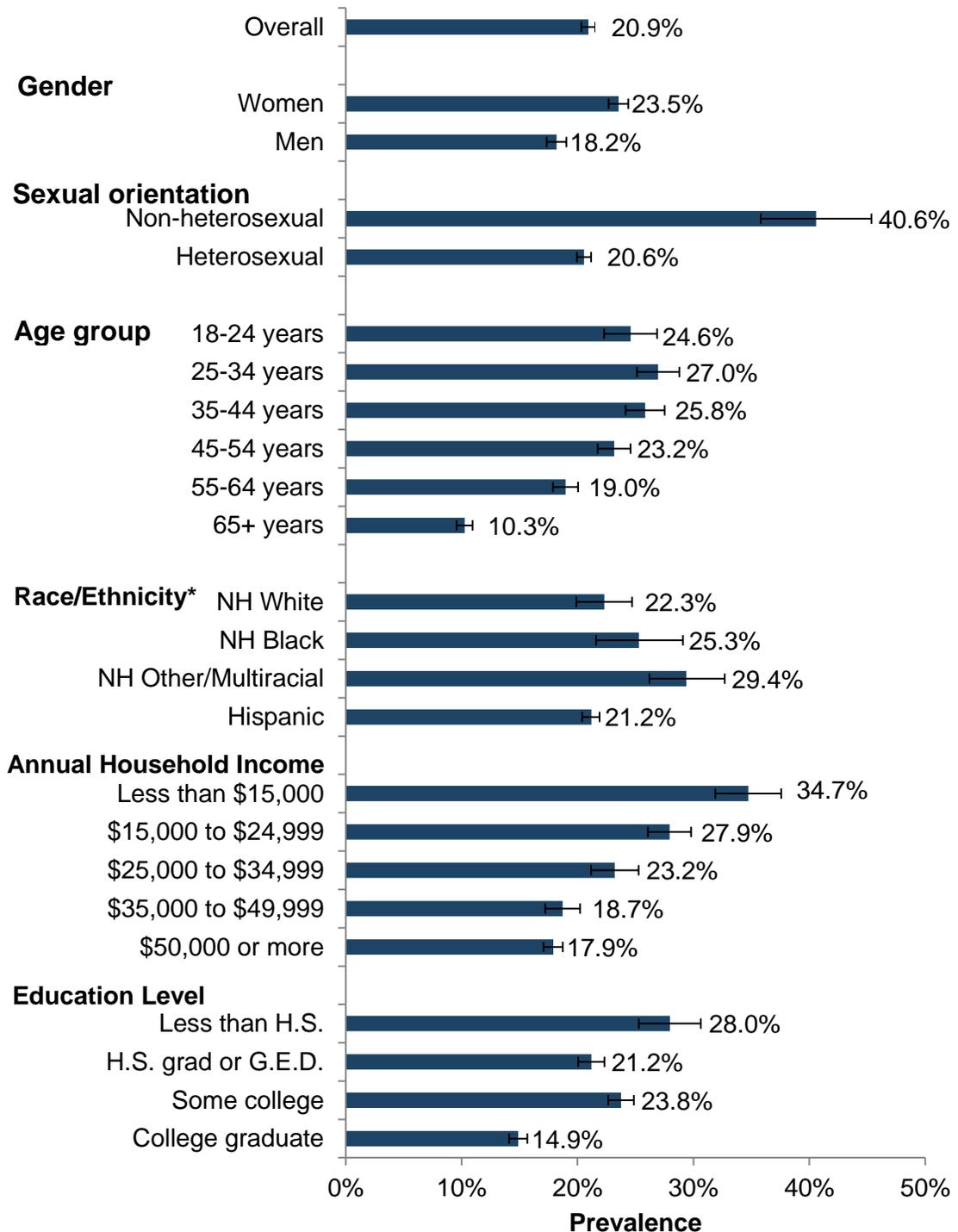
Source: 2014-2015 Kansas Behavioral Risk Factor Surveillance System, Bureau of Health Promotion, KDHE.

In 2014 and 2015, the percentage of Kansas adults who experienced three or more ACE was significantly **higher** among (Figure 5):

- Women compared with men;
- Adults who did not identify as heterosexual compared with heterosexuals;
- Adult younger than 55 years old compared to adults 55 years and older;
- Non-Hispanic other/multiracial compared to non-Hispanic white;
- Adults with an annual household income less than \$35,000 compared with adults with an annual household income of \$50,000 or more; and
- Adults with some college education, a high school diploma or General Educational Development (G.E.D), and adults with less than a high school degree compared with college graduates.

For additional information on the percentage of Kansas adults who had no, one to two and three or more adverse childhood experiences by demographic characteristics, see Appendix C.

Figure 5. Prevalence of high (3+) ACE among Kansas adults aged 18 years and older by selected demographic characteristics, KS BRFSS 2014-2015



Note: NH, non-Hispanic; "Other" race/ethnicity, non-Hispanic American Indian/Alaskan Native, Asian, or Hawaiian/Pacific Islander; GED, General Education Development.
 *Prevalence estimates for race and ethnicity were age-adjusted to the U.S. 2000 standard population.
 Source: 2014-2015 Kansas Behavioral Risk Factor Surveillance System, Bureau of Health Promotion, KDHE.

Prevalence of Health Risk Factors and Health Conditions by ACE Score

Kansas adults with high ACE scores (3+ ACE) had significantly higher prevalence of the following health risk factors (Figure 6), perceived poor health indicators (Figure 7) and chronic conditions (Figure 8 & 9):

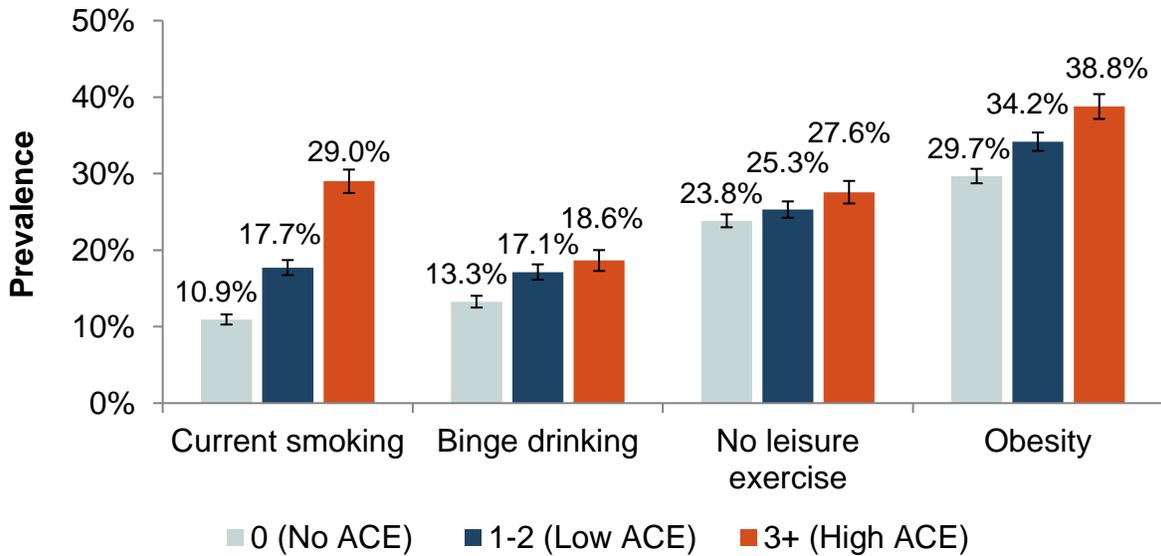
- Current smoking,
- Binge drinking,
- No leisure time physical activity
- Obesity,
- Poor/fair general health,
- 14 or more days of poor physical health,
- 14 or more days of poor mental health,
- Arthritis,
- Asthma,
- Chronic obstructive pulmonary disease,
- Kidney disease,
- Disability, and
- Depression.

However, no significant difference in prevalence were observed among ACE score subgroups for the following health conditions:

- Cancer,
- Coronary heart disease,
- Diabetes,
- Heart attack, and
- Stroke.

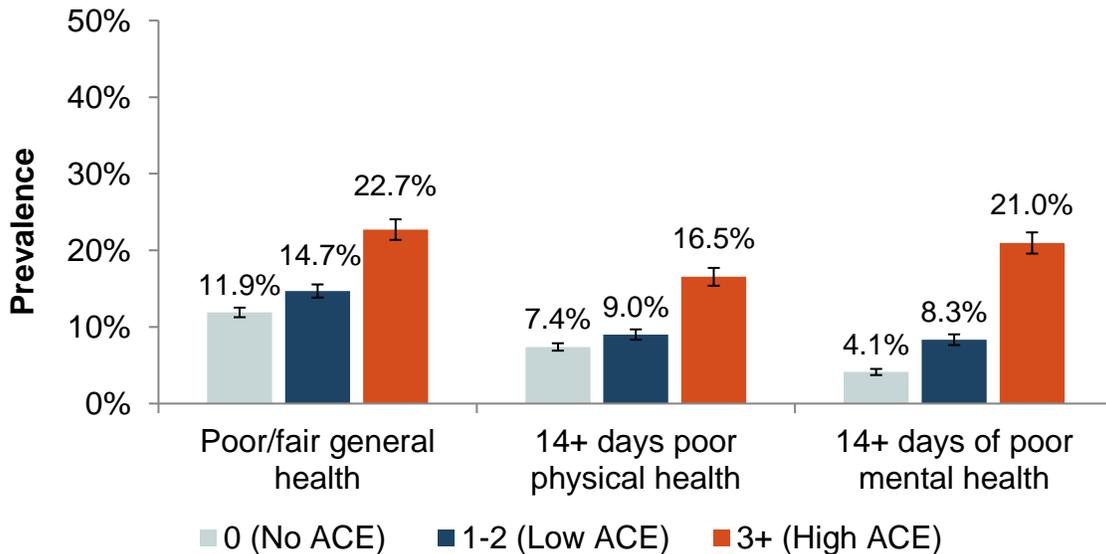
For additional information on the prevalence of selected health risk factors, perceived poor health and chronic conditions among Kansas adults by ACE score category, see Appendix D.

Figure 6. Prevalence of selected health risk factors among Kansas adults aged 18 years and older by ACE score group, KS BRFSS 2014-2015



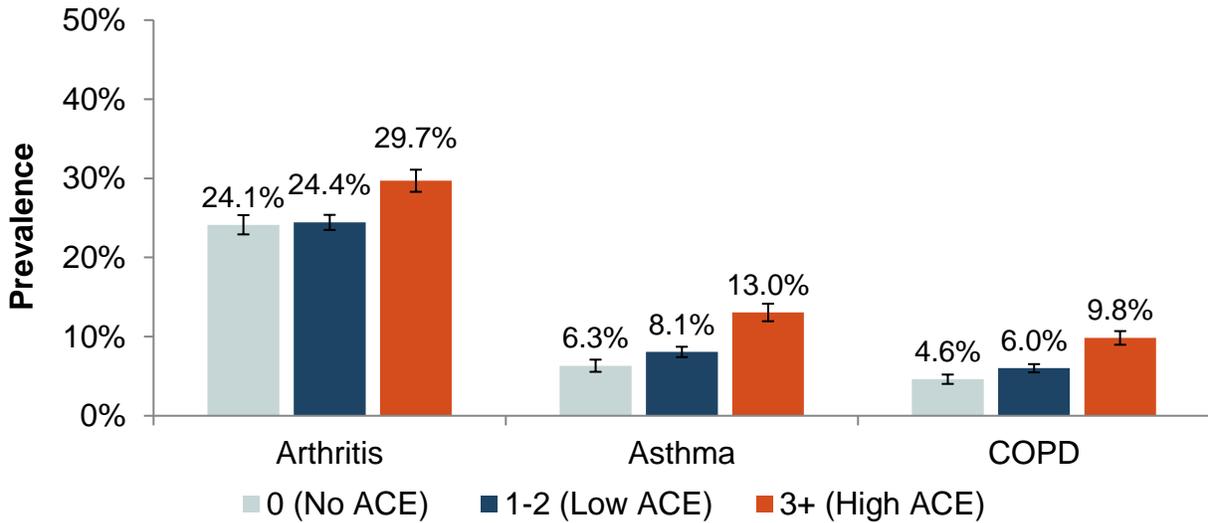
Source: 2014-2015 Kansas Behavioral Risk Factor Surveillance System, Bureau of Health Promotion, KDHE.

Figure 7. Prevalence of perceived poor health indicators among Kansas adults aged 18 years and older by ACE Score Group, KS BRFSS 2014-2015



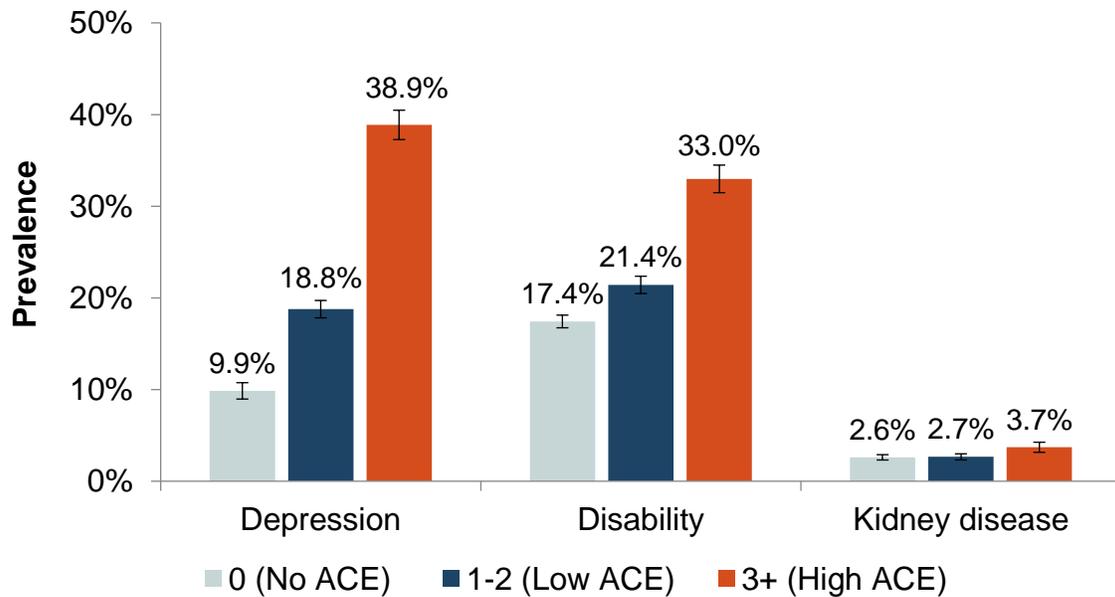
Source: 2014-2015 Kansas Behavioral Risk Factor Surveillance System, Bureau of Health Promotion, KDHE.

Figure 8. Prevalence of selected chronic conditions among Kansas adults aged 18 years and older by ACE Score Group, KS BRFSS 2014-2015



Source: 2014-2105 Kansas Behavioral Risk Factor Surveillance System, Bureau of Health Promotion, KDHE.

Figure 9. Prevalence of selected chronic conditions among Kansas adults aged 18 years and older by ACE Score Group, KS BRFSS 2014-2015



Source: 2014-2105 Kansas Behavioral Risk Factor Surveillance System, Bureau of Health Promotion, KDHE.

Associations between Health Risk Factors and Health Conditions, and ACE Score after Adjusting for Selected Demographic Characteristics

Logistic regression modeling is one analytic method that can be used to examine the association between two or more variables while statistically controlling for additional potentially confounding variables. In this report, prevalence odds ratios were calculated using logistic regression models to compare the prevalence odds of selected health risk factors, perceived poor health indicators and chronic conditions between Kansas adults who had three or more ACE compared with Kansas adults who did not have any ACE. Adjusted prevalence odds ratios (POR) and 95 percent confidence intervals were also calculated to examine these associations while controlling for age, gender, race/ethnicity, education and income. A prevalence odds ratio with a 95 percent confidence interval that contains 1 can be interpreted as no significant association between the selected health risk factor or health condition and higher ACE score.

In the unadjusted analysis, compared with those who did not experience any ACE, Kansas adults with three or more ACE had significantly higher prevalence odds of having all selected health risk factors and conditions except for cancer, coronary heart disease, diabetes, and heart attack. After adjusting for age, gender, race/ethnicity, education and income, the association between these four conditions and having three or more ACE became significant.

Compared with those who did not experience any ACE, Kansas adults with three or more ACE had significantly higher prevalence odds of the following health risk factors, after adjusting for selected demographic characteristics (Table 2):	
• Current smoking	2.3 times higher prevalence odds
• Binge drinking	1.3 times higher prevalence odds
• No leisure time physical activity	1.2 times higher prevalence odds
• Obesity	1.4 times higher prevalence odds

Compared with those who did not experience any ACE, Kansas adults with three or more ACE had significantly higher prevalence odds of the following perceived poor health indicators, after adjusting for selected demographic characteristics (Table 2):	
• Poor/fair general health	2.4 times higher prevalence odds
• 14 or more days of poor physical health	2.6 times higher prevalence odds
• 14 or more days of poor mental health	4.6 times higher prevalence odds

Compared with those who did not experience any ACE, Kansas adults with three or more ACE had significantly higher prevalence odds of the following chronic health conditions, after adjusting for selected demographic characteristics (Table 2):

• Arthritis	2.2 times higher prevalence odds
• Asthma	2.0 times higher prevalence odds
• Cancer	1.4 times higher prevalence odds
• Coronary heart disease	1.5 times higher prevalence odds
• Chronic obstructive pulmonary disease	2.8 times higher prevalence odds
• Depression	5.3 times higher prevalence odds
• Disability	3.1 times higher prevalence odds
• Diabetes	1.3 times higher prevalence odds
• Heart attack	1.3 times higher prevalence odds
• Kidney disease	1.8 times higher prevalence odds
• Stroke	1.8 times higher prevalence odds

In other words, there was a statistically significant positive association between ACE score and each of these health risk factors, perceived poor health indicators and chronic conditions. For example, the adjusted prevalence odds of smoking among Kansas adults with three or more ACE were 2.3 times higher compared to those with no ACE.

Findings in the current report were similar with the 2014 Kansas BRFSS ACE report.^{ix} One exception is that the current report found the prevalence of kidney disease to be significantly higher among Kansas adults with high ACE (3+ ACE) compared to those with no ACE. In the 2014 Kansas BRFSS ACE report this association was not statistically significant. Also, due to availability of data, the following variables are included in the current report that were not included in the 2014 report: sexual orientation, past month leisure time physical activity and disability status.

Conclusion

ACE are prevalent: most Kansas adults have experienced at least one ACE. In Kansas, high ACE scores (3+) are more common among women, non-heterosexual adults, those younger than 55 years of age, adults with lower levels of education and those with lower annual household incomes.

Kansas data highlight the need to increase awareness of ACE as a public health issue because numerous health risk factors, perceived poor health indicators and chronic health conditions are associated with having a high ACE score (3+ ACE). Preventing ACE may have beneficial effects on the short- and long-term health of Kansas adults.

Appendix

Appendix A. Unadjusted and adjusted prevalence odds ratios (POR) of selected health risk factors and conditions among Kansas adults aged 18 years and older with high ACE scores (3+) compared with those with no ACE, KS BRFSS 2014-215

	Unadjusted			Adjusted		
	POR	95% CI		POR*	95% CI	
Health risk factors						
Current smoking	3.3	3.1	to 3.7	2.3	2.1	to 2.6
Binge drinking	1.5	1.3	to 1.7	1.3	1.2	to 1.5
No leisure physical activity	1.2	1.1	to 1.3	1.2	1.1	to 1.3
Obesity	1.5	1.4	to 1.6	1.4	1.3	to 1.5
Perceived poor health						
Poor/fair general health	2.2	2.0	to 2.4	2.4	2.1	to 2.7
14+ days poor physical health	2.5	2.2	to 2.8	2.6	2.3	to 2.9
14+ days of poor mental health	6.2	5.4	to 7.0	4.6	4.0	to 5.3
Chronic conditions						
Arthritis	1.3	1.2	to 1.4	2.2	2.0	to 2.4
Asthma (current)	2.2	2.0	to 2.5	2.0	1.7	to 2.3
Cancer	0.9	0.8	to 1.0	1.4	1.2	to 1.6
Coronary heart disease	0.9	0.8	to 1.1	1.5	1.3	to 1.8
COPD	2.3	2.0	to 2.6	2.8	2.4	to 3.2
Depression	5.8	5.3	to 6.4	5.3	4.7	to 5.8
Disability	2.3	2.1	to 2.5	3.1	2.8	to 3.4
Diabetes	0.9	0.8	to 1.1	1.3	1.1	to 1.5
Heart attack	0.8	0.7	to 1.0	1.3	1.1	to 1.6
Kidney Disease	1.4	1.2	to 1.7	1.8	1.4	to 2.2
Stroke	1.2	1.0	to 1.5	1.8	1.4	to 2.2

POR: Prevalence odds ratio, 95% CI: 95% Confidence interval, COPD: Chronic obstructive pulmonary disease

*Model adjusts for age, gender, race/ethnicity, education and income.

Source: 2014-2015 Kansas Behavioral Risk Factor Surveillance System, Bureau of Health Promotion, KDHE.

Appendix B. Prevalence of selected demographics among Kansas adults aged 18 years and older by ACE category, KS BRFSS 2014-2015

Characteristic	Emotional abuse % (95% CI)	Physical abuse % (95% CI)	Sexual abuse % (95% CI)	Mentally ill household member % (95% CI)	Incarcerated household member % (95% CI)	Substance abuse in household % (95% CI)	Parental separation/divorce % (95% CI)	Violence between adults in household % (95% CI)
Overall	26 (25-27)	16 (15-16)	12 (11-12)	16 (15-16)	6 (6-7)	25 (24-26)	27 (26-27)	15 (15-16)
Gender								
Women	27 (26-27)	16 (15-17)	17 (17-18)	19 (18-20)	6 (6-7)	27 (26-28)	28 (27-28)	16 (15-17)
Men	26 (25-26)	15 (14-16)	6 (5-6)	12 (12-13)	7 (6-7)	23 (22-24)	26 (25-27)	14 (13-15)
Sexual Orientation								
Heterosexual	26 (25-26)	15 (15-16)	11 (11-12)	15 (15-16)	6 (6-7)	25 (24-25)	26 (26-27)	15 (14-15)
Not Heterosexual	46 (41-50)	31 (26-35)	26 (22-30)	35 (30-39)	18 (14-21)	37 (32-41)	44 (39-48)	26 (22-30)
Age Group								
18-24 years	27 (25-30)	14 (12-16)	8 (6-9)	24 (22-26)	13 (12-15)	27 (24-29)	38 (36-41)	14 (13-16)
25-34 years	30 (28-31)	19 (17-21)	12 (11-14)	22 (20-23)	11 (10-12)	29 (27-31)	40 (38-42)	19 (17-20)
35-44 years	32 (30-34)	19 (17-20)	15 (14-16)	17 (15-18)	6 (6-7)	28 (26-29)	33 (31-34)	18 (17-19)
45-54 years	30 (28-31)	17 (16-18)	14 (13-15)	15 (14-16)	5 (4-5)	27 (25-28)	26 (25-28)	16 (15-18)
55-64 years	26 (25-28)	16 (15-17)	13 (12-14)	13 (13-14)	4 (3-4)	25 (24-27)	17 (16-19)	16 (15-17)
65+ years	15 (14-16)	10 (9-10)	9 (8-9)	7 (7-8)	2 (2-2)	17 (16-17)	12 (11-13)	9 (9-10)
Race/Ethnicity*								
NH White	24 (22-26)	23 (20-25)	11 (9-12)	9 (7-10)	6 (5-8)	27 (24-29)	24 (22-27)	21 (19-24)
NH Black	25 (22-28)	13 (10-16)	15 (12-18)	11 (9-13)	16 (13-19)	30 (26-34)	47 (43-51)	22 (19-25)
NH Other/Multi	34 (31-37)	25 (22-28)	17 (15-20)	20 (17-23)	11 (9-13)	30 (26-33)	30 (27-33)	22 (19-25)
Hispanic	27 (26-28)	15 (14-15)	12 (11-12)	18 (17-18)	6 (6-6)	25 (24-26)	27 (26-28)	14 (13-15)
Annual Household Income								
Less than \$15,000	35 (32-38)	26 (23-28)	18 (16-20)	23 (21-25)	13 (11-15)	18 (16-20)	39 (37-42)	25 (22-27)
\$15,000 to \$24,999	30 (28-32)	21 (19-23)	17 (15-18)	17 (16-19)	9 (8-11)	30 (28-32)	33 (32-35)	20 (19-22)
\$25,000 to \$34,999	27 (25-29)	19 (17-21)	14 (12-15)	15 (14-17)	8 (7-10)	27 (25-29)	29 (26-31)	17 (15-19)
\$35,000 to \$49,999	26 (24-27)	14 (13-15)	11 (10-12)	15 (13-16)	6 (5-7)	23 (22-25)	25 (23-26)	14 (13-15)
\$50,000 or more	25 (24-26)	13 (12-14)	10 (9-10)	15 (14-16)	4 (4-4)	23 (22-23)	23 (22-24)	13 (12-13)
Education Level								
Less than H.S.	28 (25-31)	23 (21-26)	13 (11-15)	13 (11-15)	10 (8-12)	32 (29-34)	35 (32-37)	24 (22-27)
H.S. grad or G.E.D.	25 (24-27)	16 (15-16)	11 (11-12)	14 (13-15)	8 (7-9)	26 (25-27)	29 (28-30)	16 (15-17)
Some college	29 (28-30)	17 (16-18)	13 (13-14)	18 (17-19)	7 (6-8)	27 (26-28)	29 (28-30)	16 (15-17)
College Graduate	23 (22-23)	11 (10-12)	9 (9-10)	15 (14-16)	3 (2-3)	19 (18-20)	18 (17-19)	10 (10-11)

*Prevalence estimates for race and ethnicity were age-adjusted to the U.S. 2000 standard population.

Note: 95% CI: 95% Confidence interval. Two dashes (i.e., --) indicates a suppressed estimate due to relative standard error (RSE) of 30% or greater.

Source: 2014-2015 Kansas Behavioral Risk Factor Surveillance System, Bureau of Health Promotion, KDHE.

Appendix C. Prevalence of 0, 1-2, and 3+ ACEs among Kansas adults, by socio-demographic characteristics, KS BRFSS 2014-2015

	0 (No ACE)				1-2 (Low ACE)				3+ (High ACE)			
	N	Weighted Percent	95% CI		N	Weighted Percent	95% CI		N	Weighted Percent	95% CI	
Overall	14545	45.2%	44.5%	to 45.9%	9741	33.9%	33.2%	to 34.5%	5400	20.9%	20.3%	to 21.5%
Gender												
Women	8160	43.6%	42.7%	to 44.6%	5417	32.8%	31.9%	to 33.7%	3336	23.5%	22.7%	to 24.4%
Men	6385	46.9%	45.8%	to 47.9%	4324	35.0%	33.9%	to 36.0%	2064	18.2%	17.3%	to 19.0%
Sexual Orientation												
Heterosexual	13970	45.5%	44.8%	to 46.2%	9328	33.9%	33.2%	to 34.6%	5080	20.6%	20.0%	to 21.2%
Gay/Lesbian/Bi/Other	197	25.9%	21.8%	to 30.0%	216	33.5%	28.9%	to 38.1%	254	40.6%	35.8%	to 45.4%
Age Group												
18-24 years	662	38.8%	36.2%	to 41.4%	609	36.6%	34.0%	to 39.2%	408	24.6%	22.3%	to 26.9%
25-34 years	1056	36.5%	34.5%	to 38.5%	1046	36.5%	34.6%	to 38.5%	769	27.0%	25.1%	to 28.8%
35-44 years	1389	39.8%	37.9%	to 41.7%	1181	34.4%	32.6%	to 36.2%	872	25.8%	24.1%	to 27.5%
45-54 years	2035	42.8%	41.2%	to 44.4%	1574	34.0%	32.5%	to 35.6%	1067	23.2%	21.7%	to 24.6%
55-64 years	3218	46.6%	45.3%	to 48.0%	2325	34.4%	33.1%	to 35.7%	1241	19.0%	17.9%	to 20.0%
65+ years	6070	60.6%	59.5%	to 61.7%	2951	29.1%	28.1%	to 30.2%	1021	10.3%	9.6%	to 10.9%
Race/Ethnicity*												
NH White	13005	43.7%	40.7%	to 46.7%	8291	34.0%	31.2%	to 36.8%	4420	22.3%	19.9%	to 24.7%
NH Black	348	30.9%	27.2%	to 34.7%	445	43.7%	39.5%	to 47.9%	216	25.3%	21.6%	to 29.1%
NH Other/Multiracial	387	38.8%	35.2%	to 42.5%	347	31.8%	28.3%	to 35.2%	336	29.4%	26.2%	to 32.7%
Hispanic	657	45.2%	44.3%	to 46.0%	583	33.7%	32.8%	to 34.5%	382	21.2%	20.4%	to 21.9%
Annual Household Income												
\$50,000 or more	6387	47.8%	46.8%	to 48.9%	4218	34.3%	33.2%	to 35.3%	2051	17.9%	17.1%	to 18.7%
\$35,000 to \$49,999	2042	45.7%	43.8%	to 47.5%	1376	35.6%	33.8%	to 37.5%	686	18.7%	17.2%	to 20.2%
\$25,000 to \$34,999	1382	42.6%	40.3%	to 44.8%	952	34.2%	32.0%	to 36.4%	551	23.2%	21.2%	to 25.3%
\$15,000 to \$24,444	1674	37.6%	35.7%	to 39.5%	1263	34.4%	32.5%	to 36.4%	929	27.9%	26.1%	to 29.8%
Less than \$15,000	651	33.1%	30.4%	to 35.8%	629	32.2%	29.5%	to 34.8%	610	34.7%	31.9%	to 37.6%
Education Level												
Less than H.S.	678	38.8%	36.0%	to 41.6%	539	33.2%	30.5%	to 35.9%	428	28.0%	25.3%	to 30.6%
H.S. grad or G.E.D.	3836	44.6%	43.3%	to 45.9%	2622	34.2%	32.9%	to 35.5%	1460	21.2%	20.1%	to 22.3%
Some college	3888	41.5%	40.3%	to 42.8%	2865	34.7%	33.5%	to 36.0%	1872	23.8%	22.6%	to 24.9%
College Graduate	6112	52.4%	51.3%	to 53.5%	3701	32.7%	31.7%	to 33.8%	1637	14.9%	14.1%	to 15.7%

*Prevalence estimates for race and ethnicity were age-adjusted to the U.S. 2000 standard population.

Note: 95% CI: 95% Confidence interval. Two dashes (i.e., --) indicates a suppressed estimates due to relative standard errors of 30% or greater.

Source: 2014-2015 Kansas Behavioral Risk Factor Surveillance System, Bureau of Health Promotion, KDHE.

Appendix D. Prevalence of selected health risks, perceived poor health and chronic conditions, by ACE score category, KS BRFSS 2014-2015

	0 (No ACE)				1-2 (Low ACE)				3+ (High ACE)			
	N	Weighted Percent	95% CI		N	Weighted Percent	95% CI		N	Weighted Percent	95% CI	
Health risk factors												
Current smoking	1388	29.0%	27.4%	to 30.6%	1521	35.3%	33.6%	to 37.0%	1398	35.7%	33.9%	to 37.5%
Binge drinking	1361	38.2%	36.3%	to 40.1%	1255	37.0%	35.0%	to 38.9%	785	24.8%	23.1%	to 26.6%
No leisure physical activity	3651	42.9%	41.5%	to 44.2%	2568	34.1%	32.8%	to 35.5%	1546	23.0%	21.8%	to 24.2%
Obesity	4082	40.4%	39.2%	to 41.6%	3221	34.9%	33.7%	to 36.1%	2083	24.6%	23.5%	to 25.7%
Perceived poor health												
Poor/fair general health	1886	35.6%	33.9%	to 37.2%	1574	32.9%	31.3%	to 34.6%	1322	31.5%	29.8%	to 33.2%
14+ days poor physical health	1229	33.9%	32.0%	to 35.8%	1003	31.1%	29.1%	to 33.0%	989	35.0%	33.0%	to 37.1%
14+ days of poor mental health	602	20.6%	18.7%	to 22.4%	773	31.1%	28.8%	to 33.4%	1046	48.3%	45.8%	to 50.8%
Chronic conditions												
Arthritis	4558	43.0%	41.8%	to 44.1%	3164	32.6%	31.4%	to 33.7%	2005	24.4%	23.3%	to 25.5%
Asthma (current)	946	34.4%	32.2%	to 36.7%	809	32.9%	30.6%	to 35.2%	706	32.7%	30.3%	to 35.1%
Cancer	1533	48.4%	46.3%	to 50.5%	933	31.9%	29.9%	to 34.0%	510	19.7%	17.9%	to 21.5%
Coronary Heart Disease	827	48.0%	45.2%	to 50.7%	525	31.5%	28.9%	to 34.1%	319	20.5%	18.2%	to 22.9%
COPD	814	33.8%	31.5%	to 36.1%	742	32.9%	30.5%	to 35.3%	665	33.3%	30.9%	to 35.7%
Depression	1541	23.6%	22.3%	to 24.8%	1971	33.6%	32.0%	to 35.1%	2130	42.9%	41.2%	to 44.5%
Disability	3139	35.8%	34.5%	to 37.0%	2568	34.1%	32.8%	to 35.5%	2035	31.3%	30.0%	to 32.7%
Diabetes	1837	46.5%	44.6%	to 48.3%	1242	33.1%	31.3%	to 34.9%	706	20.4%	18.9%	to 22.0%
Heart attack	809	49.9%	47.1%	to 52.8%	490	30.4%	27.8%	to 33.1%	303	19.6%	17.3%	to 22.0%
Kidney Disease	469	41.2%	37.7%	to 44.8%	340	31.6%	28.2%	to 34.9%	242	27.2%	23.8%	to 30.6%
Disability	3139	35.8%	34.5%	to 37.0%	2568	32.9%	31.6%	to 34.2%	2035	31.3%	30.0%	to 32.7%
Stroke	529	43.5%	40.0%	to 46.9%	358	31.9%	28.5%	to 35.2%	274	24.6%	21.6%	to 27.6%

Note: 95% CI: 95% Confidence interval, COPD: Chronic obstructive pulmonary disease

Source: 2014-2015 Kansas Behavioral Risk Factor Surveillance System, Bureau of Health Promotion, KDHE.

References

- ⁱ Felitti VJ, Anda RF, Nordenberg D, et al. Relationship of Childhood Abuse and Household Dysfunction to Many of the Leading Causes of Death in Adults. *Am J Prev Med.* 1998;14(4):245-258.
- ⁱⁱ Whitfield CL. Adverse Childhood Experiences and Trauma. *Amer J Prev Med.* 1998;14:361-363.
- ⁱⁱⁱ Weiss JS, Wagner SH. What explains the negative consequences of adverse childhood experiences on adult health? Insights from cognitive and neuroscience research (editorial). *Amer J Prev Med.* 1998;14:356-360
- ^{iv} Centers for Disease Control and Prevention. Injury Prevention & Control: Division of Violence Prevention. <https://www.cdc.gov/violenceprevention/acestudy/>. Accessed February 21, 2017.
- ^v Rose SMS-F, Xie D, Stineman M. Adverse Childhood Experiences & Disability in US Adults. *PM & R: the journal of injury, function, and rehabilitation.* 2014;6(8):670-680. doi:10.1016/j.pmrj.2014.01.013.
- ^{vi} Centers for Disease Control and Prevention, National Center for Health Statistics. 2014 National Health Interview Survey Early Release Program. www.cdc.gov/nchs/data/nhis/earlyrelease/wireless_state_201602.pdf. Accessed February 21, 2017.
- ^{vii} Austin AE and Herrick HWB. The Effect of Adverse Childhood Experiences on Adult Health: 2012 North Carolina Behavioral Risk Factor Surveillance System Survey. *SCHS Studies.* 2014;167:1-16.
- ^{ix} Adverse childhood experiences among Kansas adults: 2014 Kansas Behavioral Risk Factor Surveillance System Survey. Kansas Department of Health and Environment, Bureau of Health Promotion. 2016. http://www.kdheks.gov/brfss/PDF/ACE_Report_2014.pdf. Accessed February 15, 2017.