University of Cincinnati

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I, Tammy K. Mentzel, hereby submit this original work as part of the requirements for the degree of Master of Public Health in Epidemiology.

It is entitled:
Effects of Adverse Childhood Experiences (ACEs) on Control of Diabetes

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Committee member: Christine Odea, M.D.

Committee member: Jun Ying, Ph.D.
Effects of Adverse Childhood Experiences (ACEs) on Control of Diabetes

A thesis submitted to the
Graduate School
of the University of Cincinnati
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Master in Public Health

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of the College of Medicine
by

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B.S. University of Cincinnati
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Committee Chair: Susan Pinney, Ph.D.
Abstract

Adverse Childhood Experiences (ACEs) are defined as abuse, neglect and other traumatic events that are experienced by individuals under the age of 18. The historic landmark ACE study showed as the number of ACEs increase, the risk for health problems also increases in a strong and graded fashion. The ACE study also found a relationship between the number of traumatic childhood experiences and the health and well-being of the individual as an adult.

The present study examined the prevalence of ACEs in an adult cohort from an urban community health center and the association between the number of ACEs and poor diabetic control as well as social demographic characteristics of the cohort. The study involved administering the validated ACE questionnaire to 112 subjects and recording the latest A1C test result. The cohort ranged in age from 25 to 78 years, 65% were black and 29% were white, 45% had more than a high school education.

ACE score ranged from 0 to 9 with a mean score of 2.8 (SD, 2.3) with 14% having a score of 0; 21% with a score of 1; 16% with a score of 2; 17% with a score of 3; and 32% with a score of ≥ 4. A1C ranged from 5.0 to 13.4 with a mean of 7.9 (SD, 1.8). Comparing A1C and ACE to social demographics showed gender to be significant with a mean A1C for females of 7.7 (SD, 1.5) compared to males 8.2 (SD, 2.2) with a p-value of 0.021. ACE mean for females was 3.3 (SD, 2.4) compared to males 2.2 (SD, 2.0) with a p-value of .011. Incidences of ACEs by gender were also found to be significant with women recalling more incidences of sexual abuse (p=0.001) and emotional neglect (p=0.020). Incidences of ACEs by race/ethnicity was significant for physiological abuse (p=0.049), parental divorce (p=0.006), witnessing maternal violence (p=0.025) and household criminal activity (p=0.052) between whites and blacks and
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significant for physical abuse between blacks and others (p=0.035). Incidences of ACEs by educational level was significant for recalling household criminal activity between those who had less than a high school degree compared to those with more than a high school degree (p=0.006). Total A1C was significantly influenced by the ACE category of psychological abuse (p=0.053).

The present study found a significantly higher prevalence of ACEs compared to the original landmark ACE study. It was also found that A1C and ACE items were related to social demographics. These findings support the need for further research to determine if social demographic related interventions could reduce the health effects of ACEs.
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Finally, I would like to thank my family Tony, Maria and Abby for their love, support and understanding throughout the past three and half years that allowed me the opportunity to pursue my advanced degree. You are the best and I am thankful to be part of this family!
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Introduction

Adverse Childhood Experiences (ACEs) are defined as abuse, neglect and other traumatic events that are experienced by individuals under the age of 18 (CDC, 2014). The historic landmark ACE study showed as the number of ACEs increase, the risk for health problems also increases in a strong and graded fashion (CDC, 2014). The study was a collaborative effort between the Centers for Disease Control and Prevention (CDC) and Kaiser Permanente’s Health Appraisal Clinic. The ACE study also found a relationship between the number of traumatic childhood experiences and the health and well-being of the individual as an adult (CDC, 2014). People who reported 6 or more ACEs died nearly 20 years earlier on average than those without ACEs (CDC, 2014). The Centers for Disease Control have estimated that the lifetime costs associated with ACEs at approximately $124 billion (CDC, 2014). More research is needed to fully understand the full impact of ACEs on health and well-being and to develop interventions to reduce the effect.

Research Question

There have been numerous studies that show an association between ACEs and chronic diseases in adults. Despite these studies, there have been few studies looking at the prevalence of ACEs here in Cincinnati. In addition, no studies have examined the association of uncontrolled chronic diseases and a history of ACEs. Research has also shown ACEs are more significant in vulnerable populations and contribute to the health disparities in these populations. As my thesis, I am proposing a pilot study to establish the prevalence of ACEs in an adult cohort from an urban community health center and evaluate if there is any association between a history of ACEs and the control of the chronic disease, diabetes. If a relationship is found

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Recommendation would be for the practitioners at Crossroad Health Center to begin screening all patients for ACEs.

The central hypothesis of the study is to assess if “there is any association between the number of ACEs and poor diabetic control as well as social demographic characteristics of patients?” Primary outcome measure will be diabetes control defined as the most current A1C level obtained from the medical records. The key independent variable is ACE exposure defined as an ACE score of 0-10 obtained from self-reports. Confounding factors may also contribute to the control of diabetes such as other health conditions, low economic status, and low educational levels and will need to be controlled for.

Review of Literature

Landmark ACE study

The ACE study considered “the largest public health study you never heard of” developed out of Vincent Felitti’s Obesity Clinic in 1985. Felitti was puzzled as to why his patients who were losing weight, making great progress would suddenly drop out. He conducted interviews with those who dropped out and discovered that the most of them had been sexually abused as children. These findings spurred him to conduct further research on the long-term relationship of childhood experiences to important medical and public health problems.

Felitti along with Robert Anda conducted the initial ACE study at Kaiser Permanente’s San Diego Health Appraisal Clinic. All members of the Kaiser Health Plan are eligible for a yearly healthcare appraisal consisting of standardized medical questionnaire with demographic and biopsychosocial information, review of organ systems, previous medical diagnosis, and family medical history. A healthcare provider completes a physical evaluation, the medical
history and reviews the results of the laboratory tests with the patient. All 13,494 Kaiser Health Plan members who completed a standardized healthcare evaluation at the clinic between August – November 1995 and January – March 1996 were eligible to participate. In the week following the standardized healthcare evaluation, all 13,494 members were mailed the ACE study questionnaire that included questions about ten types of ACEs: abuse (emotional, physical, and sexual), neglect (emotional and physical), and household dysfunction (mother treated violently, household substance abuse, household mental illness, parents separation/divorce, and incarcerated household family member) (Felitti et al., 1998).

Response rate was 70.5% (9,508/13,494) (Felitti et al., 1998). The completed medical evaluation findings, including their medical history, laboratory results, and physical findings, were abstracted from the chart for all participants. The researchers chose 10 risk factors that contribute to the leading causes of morbidity and mortality in the United States (Felitti et al., 1998). The risk factors included: smoking, severe obesity, physical inactivity, depressed mood, suicide attempts, alcoholism, drug abuse, parental drug abuse, a high lifetime number of sexual partners, and a history of having a sexually transmitted disease. They also choose to focus on disease conditions (ischemic heart disease, cancer, stroke, chronic bronchitis, emphysema, diabetes, hepatitis, and any skeletal fractures) contributing to the leading causes of mortality in the United States and the presence of these disease conditions in the medical histories provided by the patients in their health appraisal questionnaire (Felitti et al., 1998).

Participant demographics were mean age of 56.1 years (19 – 92 years); 52.1% were women; 79.4% were white; 43% had graduated from college; and only 6% had not graduated from high school (Felitti et al., 1998). Results showed that more than half of the respondents (52%) experienced at least one ACE exposure and 6.2% reported at least four ACE exposures.
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(Felitti et al., 1998). The most prevalent childhood exposure was substance abuse in the household (25.6%) while the least prevalent exposure category was evidence of criminal behavior in the household (3.4%) (Felitti et al., 1998). A graded relationship between childhood exposures and health risk factors was found. Specifically, both the prevalence and risk increased for smoking, severe obesity, physical inactivity, depressed mood and suicide attempts as the number of childhood exposures increased (Felitti et al., 1998). Individuals who reported four or more categories of childhood exposure had a 4- to 12-fold increased health risks for alcoholism, drug abuse, depression, and suicide attempt compared to those who had experienced none (Felitti et al., 1998). A relationship was found between childhood exposures and the previously mentioned disease conditions. Significantly, dose-response relationships between the number of childhood exposures and the following disease conditions were identified: ischemic heart disease, cancer, emphysema, hepatitis, and skeletal fractures (Felitti et al., 1998).

Two major limitations were discussed within the landmark ACE study. First, the data about ACEs were based on retrospective self-reports and can only demonstrate associations between childhood exposures and health risk behaviors, health status and diseases in adulthood (Felitti et al., 1998). Secondly, there are potentially limits about causality because individuals with health risk behaviors or diseases may not necessarily report ACEs (Felitti et al., 1998).

Felitti and Anda conducted a second wave of data collection from the same setting in June – October 1997 replicating the same methodology which resulted in an additional 8,629 sample size and a similar response rate of 68% (Dube, Felitti, Dong, Giles, & Anda, 2003). This has resulted in a total sample size of 17,337/18,175 for the historic landmark ACE study (Dube et al., 2003). Results were similar to analysis of the first wave. Most ACE study results are reported with the combined Wave 1 and Wave 2 results.
An essential component of any research study is the reliability of the survey instrument. Test-retest reliability offers an approximation for the reliability of an instrument to produce the same results each time it is used under the same conditions with the same respondent. The research team of Felitti and Anda unexpectedly had the opportunity to assess the test-retest reliability of their ACE study screening questionnaire during the second wave of their data collection. Inadvertently, 685 participants who had completed the ACE questionnaire in Wave 1 were sent the same questionnaire a second time during Wave 2. The average time between surveys was 20 months (Dube, Williamson, Thompson, Felitti & Anda, 2004). The kappa coefficient (Fleiss, 1981) was used to estimate the test-retest reliability of the 685 participants’ responses to the ACE questions at Wave 1 and 2 (Dube et al., 2004). Results showed for each component question and each category of childhood abuse and household dysfunction the kappa coefficients demonstrated good agreement as defined by Fleiss (1981) (Dube et al., 2004). Similarly, results for the ACE score demonstrated good agreement as well. (Dube et al., 2004). These findings support the use of the validated ACE questionnaire in further retrospective cohort studies.

Public Health Implications

The public health implications with ACEs have been duly noted, according to Robert Block, the former President of the American Academy of Pediatrics, “adverse childhood experiences are the single greatest unaddressed public health threat facing our nation today” (Harris, 2014). The impact of ACEs can be categorized into six areas: prevalence, cost, physical consequences, psychological consequences, behavioral consequences, and economic consequences (CDC, 2014). In 2011 the US DHHS estimated that approximately 681,000 children were confirmed by Child Protective Services as experiencing maltreatment (USDHHS,
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In addition, a cross-sectional, US national telephone survey of 4,503 parents of children aged 1 month to 17 years found that 14% of the children had experienced childhood maltreatment in the last year (USDHHS, 2012). In the US, the cost of this abuse is significant; approximately $124 billion in 2008 (CDC, 2014). Physical consequences occurring because of childhood maltreatment include death, improper functioning and or brain development, severe or fatal head trauma, and increased risk for adverse health effects and certain chronic diseases as adults (CDC, 2014). According to a study by Silverman et al., as many as 80% of young adults who had been abused met the diagnostic criteria for at least one psychiatric disorder by age 21 (Silverman, Reinherz, Giaconia, 1996). These young adults suffered from depression, anxiety, eating disorders, and suicide attempts (Silverman et al., 1996). Other prominent psychological consequences are post-traumatic stress disorder, conduct disorder, and learning and memory difficulties (Dallan, 2001; Perry, 2001). Children who experience maltreatment have also been found to have behavioral consequences. Felitti found that these children are at an increased risk for smoking, alcoholism, and drug abuse as adults, as well as engaging in high-risk sexual behaviors (Felitti et al., 1998). Other studies have shown that maltreatment also increases problems such as delinquency, teen pregnancy and low academic achievement (Kelley, Thornberry, & Smith 1997). An extremely costly behavioral consequence is the increased criminal behaviors. According to a National Institute of Justice study, abuse during childhood increased the likelihood of juvenile arrest by 59%. A 28% increase in adult criminal behaviors and a 30% increase in violent crime were also found (Widom & Maxfield 2001). Fang et al., have estimated the total lifetime economic burden of non-fatal and new cases of childhood trauma to be approximately $124 billion in 2010 in the United States. Consequently, this monetary liability rivals the cost of other high profile public health problems such as stroke and
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Type 2 diabetes (Fang, Brown, Florence, & Mercy, 2012). The estimated average lifetime costs of nonfatal child maltreatment is estimated to be $210,012 per victim and include childhood and adult healthcare costs, productivity loses, child welfare, criminal justice and special education costs (Fang et al., 2012). Research dollars to support intervention strategies are highly encouraged as the costs for these dollars will be much less than the costs of the maltreatment consequences and the burden on the healthcare system.

Current Research Trends

ACEs have a profound impact on health and well-being resulting in major public health implications. More research is needed to understand the full impact of ACEs on health and well-being and to develop interventions to reduce the effects.

Focused efforts on the importance of developing a systematic method for tracking the burden of ACEs and its impact is one important way to advance knowledge that could lead to improved outcomes. In May 2009, the World Health Organization, the National Center for Chronic Disease Prevention and Health Promotion, and participants in the field of public health and early child development from Canada, China, Philippines, Saudi Arabia, South African and others met in Geneva, Switzerland to begin a collaborative relationship to build a framework for public health surveillance that can be used to define the global health burden of ACEs (Anda, Butchart, Felitti, & Brown, 2010). The articulated goal of this collaboration was to form a network aimed at advancing global understanding and measurement of ACEs through the exchange of information and provision of technical expertise and support (Anda et al., 2010). Great strides have been made in the US in regard to tracking the burden of ACEs. In 2008, the Centers for Disease Control and Prevention developed questions similar to those used in the
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ACE study to be added into the behavioral risk factor surveillance system (BRFSS). The BRFSS is the largest running health survey in the world and has proved useful to define the prevalence of health behaviors and other determinants of health in the U.S. (CDC, 2015). In 2009, five states (Arkansas, Louisiana, New Mexico, Tennessee, and Washington) incorporated these questions into their BRFSS. Results showed that the prevalence of ACEs ranged from a low of 6.7% of respondents reporting having had a family member in prison to 29.1% reporting living with a substance-abusing household member. Reporting multiple ACEs was common; 8.7% of respondents reported five or more ACEs (CDC, 2010). Expanding the BRFSS ACE data collection to other states is an important step to building an expanded surveillance network within the US and can serve as a model for other countries.

Effective screening for childhood maltreatment can save children and their communities a lifetime of costly health issues. Screening and interventions need to be developed to counteract the damaging impact of the stress related to childhood maltreatment. One example is the Center for Youth Wellness which aims to serve as a national model for addressing exposure to ACEs (Harris, 2014). Founded by Nadine Burke Harris, the Center for Youth Wellness an initiative out of the California Pacific Medical Center Bayview Child Health Center seeks to “create a clinical model that recognizes and effectively treats toxic stress in children…and pushes the health establishment to reexamine its relationship to social risk factors, and advocates for medical interventions to counteract the damaging impact of stress” (Harris, 2014). For patients who screen positive for ACEs, Harris has developed a multidisciplinary approach to reduce the dose of adversity and treat symptoms using best practices that include: home visits, care coordination, mental health care, nutrition, holistic interventions (mindfulness meditation), medication if necessary, and education for the parents about the impact of ACEs and toxic stress (Harris,
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2014). Harris advocates for universal screening, the right framework, and the recognition that childhood maltreatment is a public health crisis (Harris, 2014). To date, Harris has not published any results on her work other than prevalence of exposure to ACEs being 66% or two-thirds exposed to at least one category and 12% exposed to four or more categories which validated the findings of the original ACE study (Garrett, 2013).

A second example of a screening and prevention program is the Safe Environment for Every Kid (SEEK) model developed out of the University of Maryland School of Medicine office of Howard Dubowitz that aims to help practitioners identify and address targeted risk factors for childhood maltreatment in families with young children (Dubowitz, 2014). The core components of the SEEK model include:

- Train child health primary care professionals to briefly assess and help address targeted psychosocial problem
- Administer a SEEK Parent Questionnaire to screen for targeted problems
- Address problems using a Reflect, Empathize, Assess, and Plan (REAP) approach
- Advocate for a mental health professional to be available in the primary care setting to help assess and address problems
- Distribute SEEK handouts that contain resources for parents (Dubowitz, 2014).

Two large randomized controlled trials, one in a pediatric resident clinic serving very low income, mostly African American urban population, and the second in 18 suburban private pediatric practice serving mostly low-risk, middle income, mostly white population have been conducted on SEEK and have shown promising results (Dubowitz, 2014). The overarching goal
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of the trials was to see if abuse and neglect could be prevented. In the pediatric resident urban clinic which involved 558 families, SEEK children were significantly less likely to be maltreated compared to those who did not receive the SEEK protocol (Dubowitz, 2014). Maltreatment was measured by fewer child protective services reports (13.3% vs. 19.2%, fewer instances of possible neglect documented in their medical record as non-adherence (4.6% vs. 8.4%), and fewer children with delayed immunizations (3.3% vs. 9.6%), and fewer instances of severe physical assault reported by parents (Dubowitz, 2014). Encouraging results were also obtained in the trial with the 18 suburban private pediatric practices which involved 1,119 families, SEEK families reported better outcomes compared to those who did not receive SEEK care (Dubowitz, 2014). SEEK mothers reported less psychological aggression and few instances of minor physical assault than did controls (Dubowitz, 2014). The team concluded that growth of the SEEK model of pediatric primary care may substantially reduce the medical, mental health, and social service costs associated with childhood maltreatment (Dubowitz, 2014). The study has two aims. Aim 1, ACE vs social demographics, aim 2, ACE vs diabetes control.

Methods

Research Proposal

A cross-sectional research study, using a convenience sample, was conducted at Crossroad Health Center. Crossroad Health Center, opened in 1992, is a non-profit community health center providing high quality primary health care services to children and adults in Greater Cincinnati. With a faith-based mission, they provide care that treats the whole person – body, mind and spirit – regardless of ability to pay. The medical home approach allows patients to develop long term relationships with their medical providers resulting in better overall health. Emphasizing
individual dignity and preventive care, Crossroad has become an increasingly important community resource, serving over 6,600 patients, who otherwise would not be able to afford care.

Established patients with a clinical diagnosis of diabetes mellitus were asked to participate in a face to face interview to complete a questionnaire and have health information abstracted from their medical record. The recruitment plan was for at least 100 participants enrolled in this study but not more than 350. There are approximately 450 patients at Crossroad Health Center with a clinical diagnosis of diabetes. We estimated that a reasonable participation rate from this group would be around 70% which would be approximately 300 participants. This number of participants would provide a sufficient sample size to evaluate the prevalence of ACEs and determine if a larger ACE score is predictive of a higher A1C level. Persons participating in the study were required to be 18 years of age and older, willing to answer the ACE questionnaire, be an established patient at the Crossroad Health Center, and have a clinical diagnosis of diabetes. Participants were excluded if they were pregnant or had Type 1 diabetes. The Research Team was comprised of the Principal Investigator (PI) - MPH Student, Co-Investigators – MPH Thesis Committee and a Research Assistant – Graduate Medical Student. Specifically, one of the Co-Investigators is currently the medical director and a practitioner at the Crossroad Health Center. The research team completed CITI training before the start of the study. Additionally, the team members conducted study related training meetings to discuss the overall project including the special handling of data management, storage and confidentiality.

**Recruitment**

Recruiting was done by the Research Assistant (RA) who printed a patient roster list for each
screening day at the beginning of each shift. RA highlighted patients who met inclusion/exclusion criteria:

- **Inclusion:**
  - Established patient (i.e. it is not their first visit)
  - Over age 18 - 65
  - Clinical diagnosis of type II diabetes

- **Exclusion:**
  - Currently pregnant
  - Type I diabetes

A recruitment flyer and script were developed to recruit participants into the study. RA approached every patient who met inclusion/exclusion criteria and gave them a flyer to read while they waited. RA reviewed the participant log to ensure that they did not approach a patient who has already been recruited or who has declined participation. RA asked the patient if they were interested in participating. The participant either agreed to participate or declined. If participant agreed to participate, the research associate read the recruitment script and informed consent document. The research assistant provided an opportunity for questions from the participant after reading the informed consent form. The participant indicated their willingness to take part in the research project by signing two copies of the informed consent document. The research assistant was trained in research ethics to prevent any coercion. Participants were told that they would not receive any direct personal benefit from participating in this research project. It was estimated that each interview would last approximately 5 -10 minutes each. Using the ACE questionnaire, the research associate read each question aloud and recorded the information.
given. If a participant responded to a question and then decided to quit, they were notified that all information up to that point would be kept as part of the study data unless the subject objected and then the data would be discarded. There were no alternative activities for non-participants other than to simply not participate. The participant’s treating staff including the primary care physician would not know whether or not the patient agreed to participate. Participants were given $5 gift cards to Kroger’s as a small token to thank them for their participation. Support and funding for the gift cards were given by the Department of Family and Community Medicine Scholarship Development fund.

Subjects could have emotional discomfort with participating in this study. If a participant became emotional or distressed during the interview, the research assistant offered the participant the opportunity to leave and/or stop the interview and the opportunity to speak with a Behavioral Health Consultants on staff during the recruiting hours at Crossroad Health Center. The RA notified the PI if any participant became emotional or distressed during an interview. The PI notified the IRB in writing within five business days if a participant had to stop the interview due to distress. A Behavioral Health Consultant is on staff at Crossroad Health Center during all hours of operation and will be available to provide counseling if necessary. Individual participation was kept private from all staff at the Crossroad Health Center including the treating physician. No name or any other identifying information was listed on the questionnaire; only ID numbers. The RA entered the exam room of every patient who met inclusion criteria. The identity of the participants was kept confidential. Data obtained from the ACE questionnaire was data entered using only the ID number. It was not possible to match the ID numbers with the patient’s identity. A participant log will was retained by the research team to ensure a patient was not approached twice.
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Data Analysis

Descriptive statistics were analyzed using SPSS (SPSS, IBM) to summarize the numerical variables using mean +/- std and the categorical variables using frequency (in %) respectively. Numerical dependent variables were compared among categorical groups using ANOVA tests and post hoc tests. Dichotomous dependent variables were assessed of associations to independent variables using logistical regression models.

Results

One hundred twenty-six patients were asked to participate in the study; of those 14 either declined or were not eligible for participation. A total of 112 participants were enrolled. Age ranged from 25 to 78 years; with the mean age of 52 (SD, 9.4). Fifty-nine percent of participants were male; 65% were black, 29% were white and 6% were other. Educational level ranged from: 29% less than high school, 27% high school to 45% more than high school.

A Hemoglobin A1C is a test that measures a person's average blood glucose level over the past three months. Hemoglobin is the part of a red blood cell that carries oxygen to the cells and sometimes joins with the glucose in the bloodstream. The Hemoglobin A1C test shows the amount of glucose that sticks to the red blood cell, which is proportional to the amount of glucose in the blood. (ADA, 2015) The American Diabetes Association suggests an A1C target of less than 7.0 for most non-pregnant adults with diabetes noting that more or less stringent glycemic goals may be appropriate for each individual (ADA, 2015). A1C of study participants ranged from 5.0 to 13.4 with a mean of 7.9 (SD, 1.8).
Study participants’ ACE score ranged from 0 to 9 with a mean score of 2.8 (SD, 2.3). Fourteen percent had an ACE score of 0, 21% had an ACE score of 1, 16% had a score of 2, 17% had a score of 3 and 32% reported an ACE score ≥4 (Table 1).

Table 1

Social Demographics of the Sample

<table>
<thead>
<tr>
<th>Social Demographics</th>
<th>(N=112)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>52 ± 9.4</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>46% (46)</td>
</tr>
<tr>
<td>Female</td>
<td>59% (66)</td>
</tr>
<tr>
<td>Race/Ethnicity</td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>29% (32)</td>
</tr>
<tr>
<td>Black</td>
<td>65% (73)</td>
</tr>
<tr>
<td>Other</td>
<td>6% (7)</td>
</tr>
<tr>
<td>Educational Level</td>
<td></td>
</tr>
<tr>
<td>Less than high school</td>
<td>29% (32)</td>
</tr>
<tr>
<td>High school</td>
<td>27% (30)</td>
</tr>
<tr>
<td>More than high school</td>
<td>45% (50)</td>
</tr>
<tr>
<td>A1C</td>
<td>7.9 ± 1.8</td>
</tr>
<tr>
<td>ACE Score</td>
<td>2.8 ± 2.3</td>
</tr>
<tr>
<td>0</td>
<td>14% (16)</td>
</tr>
<tr>
<td>1</td>
<td>21% (23)</td>
</tr>
<tr>
<td>2</td>
<td>16% (18)</td>
</tr>
<tr>
<td>3</td>
<td>17% (19)</td>
</tr>
<tr>
<td>≥4</td>
<td>32% (36)</td>
</tr>
</tbody>
</table>

The highest ACE category reported was parental divorce at 57% followed by household substance abuse at 43% while the lowest ACE category reported was tied with 17% physical neglect and a household criminal activity (Table 2).
Table 2

Prevalence of ACE in the Sample

<table>
<thead>
<tr>
<th>Category</th>
<th>ACE Item</th>
<th>(N=112)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Psychological abuse</td>
<td>Did a parent other adult in the household often or very often:</td>
<td>26% (29)</td>
</tr>
<tr>
<td></td>
<td>• Swear at you, insult you, put you down or humiliate you?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Act in a way that made you afraid that you might be physically hurt?</td>
<td></td>
</tr>
<tr>
<td>Physical abuse</td>
<td>Did a parent or other adult in the household often or very often:</td>
<td>23% (26)</td>
</tr>
<tr>
<td></td>
<td>• Push, grab, slap or throw something at you?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Ever hit you so hard that you had marks or were injured?</td>
<td></td>
</tr>
<tr>
<td>Sexual abuse</td>
<td>Did an adult or person at least 5 years older than you ever:</td>
<td>22% (25)</td>
</tr>
<tr>
<td></td>
<td>• Touch or fondle you or have you touch their body in a sexual way?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Attempt or actually have oral, anal, or vaginal intercourse with you?</td>
<td></td>
</tr>
<tr>
<td>Emotional neglect</td>
<td>Did you often or very often feel that:</td>
<td>32% (36)</td>
</tr>
<tr>
<td></td>
<td>• No one in your family loved you or thought you were important or special?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Your family didn’t look out for each other, feel close to each other, or support each other?</td>
<td></td>
</tr>
<tr>
<td>Physical neglect</td>
<td>Did you often or very often feel that:</td>
<td>17% (19)</td>
</tr>
<tr>
<td></td>
<td>• You didn’t have enough to eat, had to wear dirty clothes, and had no one to protect you?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Your parents were too drunk or high take care of you or take you the doctor if needed it?</td>
<td></td>
</tr>
<tr>
<td>Parental divorce or separation</td>
<td>Were your parents ever separated or divorced?</td>
<td>57% (64)</td>
</tr>
<tr>
<td>Witnessing maternal violence</td>
<td>Was your mother or stepmother:</td>
<td>21% (23)</td>
</tr>
<tr>
<td></td>
<td>• Often or very often pushed, grabbed, slapped, or had something thrown at her?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Sometimes, often, or very often kicked, bitten, hit with a fist, or hit with something hard?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Ever repeatedly hit at least a few minutes or threatened with a gun or knife?</td>
<td></td>
</tr>
<tr>
<td>Household substance abuse</td>
<td>Did you live with anyone who was a problem drinker or alcoholic or who used street drug?</td>
<td>43% (48)</td>
</tr>
<tr>
<td>Household mental illness</td>
<td>Was a household member depressed or mentally ill, or did a household member attempt suicide?</td>
<td>27% (30)</td>
</tr>
<tr>
<td>Household criminal activity</td>
<td>Did a household member go to prison?</td>
<td>17% (19)</td>
</tr>
</tbody>
</table>
EFFECTS OF ADVERSE CHILDHOOD EXPERIENCES (ACEs) ON CONTROL OF DIABETES

Comparing A1C and ACE to social demographics showed gender to be significant (Table 3). Specifically, mean A1C for females was 7.7 (SD, 1.5) compared to males 8.2 (SD, 2.2) with a p-value of .021. ACE mean for females was 3.3 (SD, 2.4) compared to males 2.2 (SD, 2.0) with a p-value of .011.

Table 3

Associations of A1C and ACE to Social Demographics

<table>
<thead>
<tr>
<th>Social Demographics</th>
<th>A1C Mean ± Std</th>
<th>ACE Mean ± Std</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>.007 ± .019</td>
<td>.001 ± .023</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>8.2 ± 2.2</td>
<td>2.2 ± 2.0</td>
</tr>
<tr>
<td>Female</td>
<td>7.7 ± 1.5*</td>
<td>3.3 ± 2.4**</td>
</tr>
<tr>
<td>Race/Ethnicity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>7.4 ± 2.0</td>
<td>2.6 ± 2.3</td>
</tr>
<tr>
<td>Black</td>
<td>7.9 ± 1.8</td>
<td>3.0 ± 2.3</td>
</tr>
<tr>
<td>Other</td>
<td>7.5 ± 1.0</td>
<td>3.0 ± 1.9</td>
</tr>
<tr>
<td>Educational Level</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than high school</td>
<td>7.8 ± 2.0</td>
<td>3.2 ± 2.5</td>
</tr>
<tr>
<td>High school</td>
<td>7.7 ± 1.6</td>
<td>2.6 ± 2.4</td>
</tr>
<tr>
<td>More than high school</td>
<td>8.1 ± 1.8</td>
<td>2.7 ± 2.1</td>
</tr>
</tbody>
</table>

* p = .021
** p = .011

ACE score categories were also compared with the social demographics (Tables 4 – 7). Table 4 showed negative association between age and physical neglect. In particular, a one year increase of age is associated to a 6% decrease of remembering physical neglect (or OR=0.94, p=0.07). The number of ACEs differed significantly in sexual abuse and emotional neglect by gender. Females were 35% more likely to recall sexual abuse compared to males at 4% (p=0.001). Females were also 41% more likely to recall emotional neglect compared to males at 20% (p=0.02). Incidences of physical abuse and household mental illness were also higher in
EFFECTS OF ADVERSE CHILDHOOD EXPERIENCES (ACEs) ON CONTROL OF DIABETES

females vs. males (Table 5). Incidence of ACEs by race/ethnicity was found to be significant between whites and blacks for physiological abuse (38% vs 19%, p=0.049), parental divorce (38% vs 67%, p=0.006), witnessing maternal violence (6% vs 27%, p=0.025), and household criminal activity (6% vs 23%, p=0.052). It was also found to be significant for physical abuse between blacks (19%) and others (57%) (p=0.035). Recalling household criminal activity was significant between those who had less than a high school degree (31%) compared to those with more than a high school degree (6%) (p=0.006). Differences were also found for recalling household mental illness between those with a high school degree (17%) compared to those with more than a high school degree (34%).

Table 4

<table>
<thead>
<tr>
<th>Itemized ACE Odds Ratio vs. Age</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ACE Category</strong></td>
</tr>
<tr>
<td>Psychological abuse</td>
</tr>
<tr>
<td>Physical abuse</td>
</tr>
<tr>
<td>Sexual abuse</td>
</tr>
<tr>
<td>Emotional neglect</td>
</tr>
<tr>
<td>Physical neglect</td>
</tr>
<tr>
<td>Parental divorce or separation</td>
</tr>
<tr>
<td>Witnessing maternal violence</td>
</tr>
<tr>
<td>Household substance abuse</td>
</tr>
<tr>
<td>Household mental illness</td>
</tr>
<tr>
<td>Household criminal activity</td>
</tr>
</tbody>
</table>

* OR = odds ratio of the risk of ACE categories
EFFECTS OF ADVERSE CHILDHOOD EXPERIENCES (ACEs) ON CONTROL OF DIABETES

Table 5

**Itemized ACE Incidence vs. Gender**

<table>
<thead>
<tr>
<th>ACE Category</th>
<th>Male Gender (N=46)</th>
<th>Female Gender (N=66)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Psychological abuse</td>
<td>20% (9)</td>
<td>30% (20)</td>
<td>.205</td>
</tr>
<tr>
<td>Physical abuse</td>
<td>15% (7)</td>
<td>29% (19)</td>
<td>.099</td>
</tr>
<tr>
<td>Sexual abuse</td>
<td>4% (2)</td>
<td>35% (23)</td>
<td>.001</td>
</tr>
<tr>
<td>Emotional neglect</td>
<td>20% (9)</td>
<td>41% (27)</td>
<td>.020</td>
</tr>
<tr>
<td>Physical neglect</td>
<td>13% (6)</td>
<td>20% (13)</td>
<td>.359</td>
</tr>
<tr>
<td>Parental divorce or separation</td>
<td>50% (23)</td>
<td>62% (41)</td>
<td>.204</td>
</tr>
<tr>
<td>Witnessing maternal violence</td>
<td>24% (11)</td>
<td>18% (12)</td>
<td>.461</td>
</tr>
<tr>
<td>Household substance abuse</td>
<td>48% (22)</td>
<td>39% (26)</td>
<td>.376</td>
</tr>
<tr>
<td>Household mental illness</td>
<td>17% (8)</td>
<td>33% (22)</td>
<td>.065</td>
</tr>
<tr>
<td>Household criminal activity</td>
<td>11% (5)</td>
<td>21% (14)</td>
<td>.158</td>
</tr>
</tbody>
</table>

Table 6

**Itemized ACE Incidence vs. Race/Ethnicity**

<table>
<thead>
<tr>
<th>ACE Category</th>
<th>White (N=32)</th>
<th>Black (N=73)</th>
<th>Other (N=7)</th>
<th>White vs Other</th>
<th>Black vs Other</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Psychological abuse</td>
<td>38% (12)</td>
<td>19% (14)</td>
<td>43% (3)</td>
<td>.792</td>
<td>.160</td>
<td>.049</td>
</tr>
<tr>
<td>Physical abuse</td>
<td>25% (8)</td>
<td>19% (14)</td>
<td>57% (4)</td>
<td>.109</td>
<td>.035</td>
<td>.501</td>
</tr>
<tr>
<td>Sexual abuse</td>
<td>19% (6)</td>
<td>23% (17)</td>
<td>29% (2)</td>
<td>.563</td>
<td>.754</td>
<td>.605</td>
</tr>
<tr>
<td>Emotional neglect</td>
<td>41% (13)</td>
<td>27% (20)</td>
<td>43% (3)</td>
<td>.913</td>
<td>.395</td>
<td>.182</td>
</tr>
<tr>
<td>Physical neglect</td>
<td>13% (4)</td>
<td>19% (14)</td>
<td>14% (1)</td>
<td>.898</td>
<td>.752</td>
<td>.407</td>
</tr>
<tr>
<td>Parental divorce or separation</td>
<td>38% (12)</td>
<td>67% (49)</td>
<td>43% (3)</td>
<td>.792</td>
<td>.213</td>
<td>.006</td>
</tr>
<tr>
<td>Witnessing maternal violence</td>
<td>6% (2)</td>
<td>27% (20)</td>
<td>14% (1)</td>
<td>.482</td>
<td>.462</td>
<td>.025</td>
</tr>
<tr>
<td>Household substance abuse</td>
<td>34% (11)</td>
<td>48% (35)</td>
<td>29% (2)</td>
<td>.768</td>
<td>.337</td>
<td>.199</td>
</tr>
<tr>
<td>Household mental illness</td>
<td>38% (12)</td>
<td>22% (16)</td>
<td>29% (2)</td>
<td>.657</td>
<td>.688</td>
<td>.100</td>
</tr>
<tr>
<td>Household criminal activity</td>
<td>6% (2)</td>
<td>23% (17)</td>
<td>0% (0)</td>
<td>.999</td>
<td>.999</td>
<td>.052</td>
</tr>
</tbody>
</table>
EFFECTS OF ADVERSE CHILDHOOD EXPERIENCES (ACEs) ON CONTROL OF DIABETES

Table 7

Itemized ACE Incidence vs. Educational Level

<table>
<thead>
<tr>
<th>ACE Category</th>
<th>Less than high school (N=32)</th>
<th>Educational Level</th>
<th>More than high school (N=50)</th>
<th>P-value</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Psychological abuse</td>
<td>19% (6)</td>
<td>27% (8)</td>
<td>30% (15)</td>
<td>.259</td>
<td>.750</td>
</tr>
<tr>
<td>Physical abuse</td>
<td>28% (9)</td>
<td>23% (7)</td>
<td>20% (10)</td>
<td>.397</td>
<td>.724</td>
</tr>
<tr>
<td>Sexual abuse</td>
<td>31% (10)</td>
<td>17% (5)</td>
<td>20% (10)</td>
<td>.250</td>
<td>.712</td>
</tr>
<tr>
<td>Emotional neglect</td>
<td>38% (12)</td>
<td>20% (6)</td>
<td>36% (18)</td>
<td>.891</td>
<td>.136</td>
</tr>
<tr>
<td>Physical neglect</td>
<td>25% (8)</td>
<td>17% (5)</td>
<td>12% (6)</td>
<td>.134</td>
<td>.559</td>
</tr>
<tr>
<td>Parental divorce or separation</td>
<td>50% (16)</td>
<td>57% (17)</td>
<td>62% (31)</td>
<td>.258</td>
<td>.638</td>
</tr>
<tr>
<td>Witnessing maternal violence</td>
<td>25% (8)</td>
<td>27% (8)</td>
<td>14% (7)</td>
<td>.214</td>
<td>.166</td>
</tr>
<tr>
<td>Household substance abuse</td>
<td>50% (16)</td>
<td>40% (12)</td>
<td>40% (20)</td>
<td>.374</td>
<td>1.00</td>
</tr>
<tr>
<td>Household mental illness</td>
<td>25% (8)</td>
<td>17% (5)</td>
<td>34% (17)</td>
<td>.389</td>
<td>.099</td>
</tr>
<tr>
<td>Household criminal activity</td>
<td>31% (10)</td>
<td>20% (6)</td>
<td>6% (3)</td>
<td>.006</td>
<td>.690</td>
</tr>
</tbody>
</table>

A1C was most closely affected by the ACE category of psychological abuse, physical abuse and sexual abuse (Table 8). Specifically, psychological abuse significantly influenced total A1C (p-value .053). Differences were noted also for physical abuse and sexual abuse as influencing total A1C (p-values of .081 and .095 respectively).
Table 8
A1C vs. ACE Categories (items)

<table>
<thead>
<tr>
<th>ACE Category</th>
<th>Mean ± Std of A1C</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Psychological abuse</td>
<td>7.5 ± 1.5</td>
<td>8.1 ± 1.9</td>
</tr>
<tr>
<td>Physical abuse</td>
<td>7.5 ± 1.4</td>
<td>8.0 ± 1.9</td>
</tr>
<tr>
<td>Sexual abuse</td>
<td>7.2 ± 1.4</td>
<td>8.1 ± 1.9</td>
</tr>
<tr>
<td>Emotional neglect</td>
<td>8.0 ± 1.8</td>
<td>7.9 ± 1.9</td>
</tr>
<tr>
<td>Physical neglect</td>
<td>8.2 ± 2.2</td>
<td>7.8 ± 1.7</td>
</tr>
<tr>
<td>Parental divorce or separation</td>
<td>7.8 ± 1.8</td>
<td>8.0 ± 1.9</td>
</tr>
<tr>
<td>Witnessing maternal violence</td>
<td>7.8 ± 2.0</td>
<td>7.9 ± 1.8</td>
</tr>
<tr>
<td>Household substance abuse</td>
<td>7.8 ± 1.9</td>
<td>8.0 ± 1.8</td>
</tr>
<tr>
<td>Household mental illness</td>
<td>7.8 ± 1.9</td>
<td>7.9 ± 1.8</td>
</tr>
<tr>
<td>Household criminal activity</td>
<td>7.1 ± 1.5</td>
<td>8.1 ± 1.8</td>
</tr>
</tbody>
</table>

Subjects with an ACE score of 0 had an A1C of 8.5 (SD 2.2), ACE score of 1 was 7.7 (SD 1.3), ACE score of 2 was 7.7 (SD, 1.9), ACE score of 3 was 8.5 (SD, 2.4) and ACE score of ≥4 was 7.6 (SD, 1.6) (Table 9).

Table 9
A1C vs. ACE Counts

<table>
<thead>
<tr>
<th>ACE Counts</th>
<th>A1C Mean ± Std</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>8.5 ± 2.2</td>
</tr>
<tr>
<td>1</td>
<td>7.7 ± 1.3</td>
</tr>
<tr>
<td>2</td>
<td>7.7 ± 1.9</td>
</tr>
<tr>
<td>3</td>
<td>8.5 ± 2.4</td>
</tr>
<tr>
<td>≥4</td>
<td>7.6 ± 1.6</td>
</tr>
</tbody>
</table>

Discussion

Thirty-two percent of this cohort reported ≥ 4 categories of ACE which is significantly higher than the prevalence reported in the landmark ACE studies of Dr. Felitti of 12.5% (Dube, 2003). The cohort of the original ACE study consisted of individuals who had completed a
standardized medical evaluation at a large HMO and this cohort is from an urban community health center. This cohort is educationally disadvantaged compared to the Felitti cohort with only 45% having more than a high school education compared to 75% of the Felitti cohort (Felitti, 1998). Additionally, the prevalence from the 2009 BRFSS was only 8.7% for those reporting ≥ 5 categories of ACE (CDC, 2010).

A1C and ACE categories were related to social demographics in this study. Differences were most notably seen in relation to the social demographics of gender. Overall, females reported more ACEs than males. Females were also more likely to recall sexual abuse, emotional neglect, household mental illness and physical abuse as compared to males. Felitti also found that women were more likely to report ACEs compared to men (Dube, 2003).

Gender also makes a difference in the total A1C score with women having a lower overall A1C compared to males. Women recall more ACE categories yet their A1C score is significantly lower than their male counterparts. Does a higher ACE score make women more resilient and better able to control their diabetes? Further research is needed to understand if a correlation exists between A1C and ACE categories.

No differences were found comparing A1C and ACE categories with age. Age was not significantly associated with either A1C or ACE categories. Older subjects were more likely to recall physical neglect compared to younger subjects. This may attributable to older subjects growing up during times of economic instability compared to younger subjects.

Similar to age, no differences were noted in A1C or ACE categories in relation to race/ethnicity. Race/ethnicity was not significant to A1C or the ACE categories. Significant differences were found in regard to recalling psychological abuse, parental divorce, witnessing
EFFECTS OF ADVERSE CHILDHOOD EXPERIENCES (ACEs) ON CONTROL OF DIABETES

maternal violence, and household criminal activity between whites, blacks and the race/ethnicity of others.

In a similar fashion to age and race/ethnicity, no differences were noted in educational level. Educational level was also found not to be significantly associated with either A1C or ACE. Subjects who had less than a high school education reported a significantly more household criminal activity compared to those who had more than a high school education. Differences were also found for recalling household mental illness between those with more than a high school education and those with only a high school education. This difference might be explained that those with higher educational levels being able to recognize mental illness at higher rates compared to those with only a high school education.

No association was found between the number of ACEs and poor diabetic control. A mean A1C of 8.5 (SD, 2.2) was found for those who reported 0 ACEs and similarly an A1C of 8.5 (SD, 2.4) for those who reported 3 ACEs. The lowest A1C of 7.6 (SD, 1.6) was ironically found for those who reported ≥4 ACEs. Possibly the patients at Crossroad Health Center are having more encounters with the health care system compared to the generalized population. Crossroad Health Center also offers behavioral health services which we do not control for.

Strengths and Limitations

There are four overarching strengths with this study. First, it provided the opportunity to determine the prevalence of ACEs in an urban, diverse and low economic status population. The landmark ACE study conducted at Kaiser Permanente was with a higher socioeconomic, higher educated group. To our knowledge, there has not been research in the study of ACEs in the Cincinnati area with an adult population. This study, thus, had the opportunity to increase the baseline knowledge of the prevalence of ACEs and can be the first step toward developing
interventions with marginalized populations to reduce the health disparities leading to more cost effective care for our area. The findings may also provide practitioners with additional data that contribute to the understanding of controlling and managing diabetes. Diabetes and its effect on health and well-being are great. They contribute to increased mortality and are extremely costly to our health care system. The effect is even greater in marginalized populations. According to the CDC, diabetes is more prevalent among African Americans 9.3% and Hispanics 9.2% compared to whites at 5.9%.

Secondly, this study provided new novel information that could lead to improved control of diabetes which could ultimately improve health and well-being and decrease health care costs. The results contributed to the understanding of ACEs and their effect on overall health and increased mortality. As we have discussed ACEs contribute to disease, disability and premature death. Although this study did not replicate the overall finding that ACEs are related to diabetic control, A1C was found to be associated to the ACE categories of psychological abuse, physical abuse and sexual abuse. Gender was an effect modifier of ACE scores. Increased understanding of the effects could also allow investigators to develop interventions to reduce the effects and improve mortality.

A third additional strength is using the validated, standardized ACE instrument to collect information about ACEs. Using a validated, standardized survey instrument provides reliability for the findings. It also gives the opportunity to contribute to the findings of the landmark ACE study.

Lastly, working in collaboration with a community health clinic allowed us to collect data directly from a clinic visit rather than searching for participants. This lessened the burden of finding participants for the study, and was less costly for participant enrollment. Enrolling
participants from one clinic resulted in a more homogenous than enrolling participants from several clinics.

There are several study limitations. First, the study population likely is not a representative sample because of the lower than average economic status and educational attainment of the study sample as compared to the general population. Findings will be specific for a lower socio-economic population, urban, clinic population. The findings may not be applicable for practitioners in a suburban, affluent population.

Confounding factors may also contribute to the control of diabetes such as other health conditions, low economic status, and low educational levels. Do these participants have other factors that contribute to the control of their diabetes? Do they not have enough time to exercise, or is their environment not conducive to walking or may not be safe enough? Do they have access to fruit and vegetables that make up a healthy diet? Do they have the health literacy to understand the dos and don’ts for diabetes control?

Another potential confounding factor is the adoption of the primary care behavioral health model embraced by Crossroad Health Center approximately one year ago. The primary care behavioral health model is primary care services with the integration of behavioral health that results in improved prevention, early identification, and intervention to reduce the incidence of serious physical illness, including chronic disease with increased availability of integrated, holistic care for physical and behavioral disorders that results in improved overall health status (SAMHSA 2015).

Lastly, results may not be generalizable to all populations. The goal of research is that it will inform other investigators and practitioners so that advances are made to improve health.
EFFECTS OF ADVERSE CHILDHOOD EXPERIENCES (ACEs) ON CONTROL OF DIABETES

This study will contribute to increased knowledge but this knowledge will not be applicable to all populations.

**Conclusion**

The prevalence of ACEs was much higher in this cohort compared to Dr. Felitti’s original ACE study. Further research is needed to validate these findings. In this population, ACEs did not affect the control of diabetes. However, multiple previous studies have reported that ACEs do affect health and well-being. Since the overall number of ACEs in this population is higher than reported in the original study, it is recommended that the further studies be undertaken to evaluate the health effects of ACEs in this population. It is also recommended that the practitioners at Crossroad Health Center begin to screen all of its patients using the validated ACE questionnaire.

A1C and ACEs were found to be related to the socio demographic item of gender. Further research is needed to understand if gender specific interventions could reduce the health effects of ACEs. A1C was also found to be associated to the ACE categories of psychological abuse, physical abuse and sexual abuse.

**Institutional Review Board**

Institutional Review Board (IRB) approval was granted on 06/11/2015.
EFFECTS OF ADVERSE CHILDHOOD EXPERIENCES (ACEs) ON CONTROL OF DIABETES

References


EFFECTS OF ADVERSE CHILDHOOD EXPERIENCES (ACEs) ON CONTROL OF DIABETES


EFFECTS OF ADVERSE CHILDHOOD EXPERIENCES (ACEs) ON CONTROL OF DIABETES

Appendix A

Institutional Review Board - Federalwide Assurance #00003152

University of Cincinnati

Date:  6/11/2015
From:  UC IRB
To:  Principal Investigator: Tammy Mentzel
CON AD for Nursing Research
Re:  Study ID: 2015-0429
Study Title: Do Adverse Childhood Experiences (ACEs) Affect One’s Ability to Control Diabetes?

The above referenced protocol and all applicable additional documentation provided to the IRB were reviewed and **APPROVED** using an **EXPEDITED** review procedure in accordance with 45 CFR 46.110(b)(1)(see below) on 6/11/2015.

**This study will be due for continuing review at least 30 days before: 6/10/2016.**

The following was reviewed:

Study Documents

ACE Study Adult Consent Version 6.9.15.doc
ACE Study Flyer Version 3.17.15.doc
ACE Study Participant Log Version 3.17.15.docx
ACE Study Participant Receipt Log 3.17.15.docx
ACE Study Protocol Version 6.8.15.doc
ACE Study Questionnaire Version 3.17.15.docx
ACE Study Recruitment Script Version 3.17.15.docx
ACE Study Step by Step Study Procedures Version 3.17.15.docx
CITI ODea HS.pdf
CITI ODea.pdf
COI Forms ACEs and Diabetes.pdf
The IRB reviewer has determined that this research presents no greater than minimal risk.

Please note the following requirements:

Consent Requirements
Per 45 CFR 46.116 (21 CFR 50.20) the IRB has determined that informed consent must be obtained from all adult participants and that this consent must be documented by signature on the IRB approval consent form.
Per 45 CFR 46.117 (21 CFR 56.109) the IRB has waived the requirement to obtain DOCUMENTATION of informed consent for all adult participants.

AMENDMENTS: The principal investigator is responsible for notifying the IRB of any changes in the protocol, participating investigators, procedures, recruitment, consent forms, FDA status, or conflicts of interest. Approval is based on the information as submitted. New procedures cannot be initiated until IRB approval has been given. If you wish to change any aspect of this study, please submit an Amendment via ePAS to the IRB, providing a justification for each requested change.

CONTINUING REVIEW: The investigator is responsible for submitting a Continuing Review via ePAS to the IRB at least 30 days prior to the expiration date listed above. Please note that study procedures may only continue into the next cycle if the IRB has reviewed and granted re-approval prior to the expiration date.

UNANTICIPATED PROBLEMS: The investigator is responsible for reporting unanticipated problems promptly to the IRB via ePAS according to current reporting policies.

STUDY COMPLETION: The investigator is responsible for notifying the IRB by submitting a Request to Close via ePAS when the research, including data analysis, has completed.

Please note: This approval is through the IRB only. You may be responsible for reporting to other regulatory officials (e.g. VA Research and Development Office, UC Health – University Hospital). Please check with your institution and department to ensure you have met all reporting requirements.
EFFECTS OF ADVERSE CHILDHOOD EXPERIENCES (ACEs) ON CONTROL OF DIABETES

Statement regarding The International Conference on Harmonization and Good clinical Practices: The Institutional Review Board is duly constituted (fulfilling FDA requirements for diversity), has written procedures for initial and continuing review of clinical trials: prepares written minutes of convened meetings and retains records pertaining to the review and approval process; all in compliance with requirements defined in 21 CFR Parts 50, 56 and 312 Code of Federal Regulations. This institution is in compliance with the ICH GCP as adopted by FDA/DHHS.

Thank you for your cooperation during the review process.

Research Categories

5. Research involving materials (data, documents, records, or specimens) that have been collected, or will be collected solely for nonresearch purposes (such as medical treatment or diagnosis). (NOTE: Some research in this category may be exempt from the HHS regulations for the protection of human subjects. 45 CFR 46.101(b)(4). This listing refers only to research that is not exempt.)

7. Research on individual or group characteristics or behavior (including, but not limited to, research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices, and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies. (NOTE: Some research in this category may be exempt from the HHS regulations for the protection of human subjects. 45 CFR 46.101(b)(2) and (b)(3). This listing refers only to research that is not exempt.)
Appendix B

UNIVERSITY OF CINCINNATI
INSTITUTIONAL REVIEW BOARD–SOCIAL AND BEHAVIORAL SCIENCES
(IRB-S)

PROTOCOL

TITLE: Do Adverse Childhood Experiences (ACEs) Affect One’s Ability to Control Diabetes?

1. PURPOSE of the research project AND GENERAL INFORMATION:

   a. PURPOSE
      The purpose of the research project is to evaluate if Adverse Childhood Experiences (ACEs) may it harder for individuals to control and manage their diabetes.

   b. BACKGROUND
      1) Prior research
      Adverse Childhood Experiences (ACEs) are defined as abuse, neglect and other traumatic events that are experienced by individuals under the age of 18. The landmark ACE study showed as the number of ACEs increase, the risk for health problems also increase in a strong and graded fashion. The study was a collaborative effort between the Centers for Disease Control and Prevention (CDC) and Kaiser Permanente’s Health Appraisal Clinic. The ACE study found a relationship between the number of traumatic childhood experiences and the health and well-being of the individual as an adult. People who reported 6 or more ACEs died nearly 20 years earlier on average than those without ACEs. The Centers for Disease Control have estimated that the lifetime costs associated with ACEs at approximately $124 billion. More research is needed to fully understand the full impact of adverse childhood experiences on health and well-being and to develop interventions to reduce the effect.

      2) Significance
      The significance of this research project is that it has the potential to increase knowledge in how Adverse Childhood Experiences (ACEs) affect health especially the control and management of diabetes. This project will also inform researchers in the greater Cincinnati community on the prevalence of ACEs in an urban, diverse and low economic status population. In the greater Cincinnati Community, initial research is underway on ACEs in a pediatric population. To date, no research has been done in an adult population. Understanding the prevalence and its affects are the first steps working
towards interventions to reduce the health and financial effects of ACEs.

c. **FUNDING**
   1) Sponsor’s name and type

   To date, the study has not been funded. Support is being sought from the Department of Family Medicine Scholarship Development Application. The project is also part of a practicum and thesis project of an MPH student.

   2) Sponsor’s role

   Not applicable.

   3) Location of funds

   Not applicable.

   4) Status of funding

   Not applicable.

d. **FACILITIES**

   Crossroad Health Center, opened in 1992, is a non-profit community health center providing high quality primary health care services to children and adults in Greater Cincinnati. With a faith-based mission, they provide care that treats the whole person – body, mind and spirit – regardless of ability to pay. The medical home approach allows patients to develop long term relationships with their medical providers resulting in better overall health. Emphasizing individual dignity and preventive care, Crossroad has become an increasingly important community resource, serving over 6,600 patients, who otherwise would not be able to afford care.

e. **DURATION OF STUDY**

   The study will last approximately one year.

f. **RESEARCH TEAM**

   1) Research team and time commitment

<table>
<thead>
<tr>
<th>Job Title / Responsibility</th>
<th>Time Commitment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Principal Investigator/Oversight</td>
<td>5%</td>
</tr>
<tr>
<td>Co-Investigators/MPH Thesis Committee/Oversight</td>
<td>5%</td>
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</tbody>
</table>
2) Training team members in research ethics

The Principal Investigator, Co-Investigator, and graduate medical student will complete CITI training before the start of the study. Additionally, the team members will conduct study related training meetings to discuss the overall project including special handling of data management, storage and confidentiality.

3) Training team members in research activities

(a) Training

Human subjects training and overview will be conducted at the initial training meeting. During the training, the responsibilities of each research team member will be outlined and discussed.

(b) Verification

A copy of the approved research protocol will be given to all team members to read and to use as a guide in conducting the Adverse Childhood Experiences (ACEs) questionnaire. Principal Investigator will be on-call during all scheduled interview times to answer any questions. This has the potential to increase the rigor of the research study.

2. PARTICIPANTS:

a. RECRUITMENT

Participant recruitment will occur at Crossroad Health Center.

1) Number of participants

(a) Minimum and maximum number of participants.

The minimum number of participants to be enrolled is 100 and the maximum number of participants to be enrolled is 350.

(b) Rationale

There are approximately 450 patients at Crossroad Health Center with a clinical diagnosis of diabetes. We estimate a reasonable response rate of 70% which would be approximately 300 participants. This number of participants will provide a
sufficient sample size to evaluate the prevalence of ACEs and determine if a larger ACE score is predictive of a higher A1C level.

2) Inclusion and exclusion criteria

Persons participating in the study must be 18 years of age and older, be willing to answer the ACE questionnaire, must be an established patient at the Crossroad Health Center, and must have a clinical diagnosis of diabetes. Participants will be excluded if they are currently pregnant or have type 1 diabetes.

3) Vulnerable participants

(a) Vulnerability

None

(b) Rationale

Not applicable

(c) Confirmation

Using the patient roster and highlighting the patients who meet inclusion/exclusion criteria, provides confirmation that the researcher assistant will only approach patients who are eligible to participate.

4) Risks and discomforts from participating

(a) Type and level of risk or discomfort

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<tr>
<th>Risk or Discomfort</th>
<th>Level</th>
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<tbody>
<tr>
<td>emotional discomfort</td>
<td>Potential</td>
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</table>

(b) Safety monitoring plan

Not applicable

(c) Reporting

(1) Notification of PI

Subjects could have emotional discomfort with participating in this study. If a participant becomes emotional or distressed during the interview, the research
assistant will offer the participant the opportunity to leave and/or stop the interview and the opportunity to speak with a social worker on staff during the recruiting hours at Crossroad Health Center. The research assistant will notify the PI if any participant becomes emotional or distressed during an interview.

(2) Notification of IRB

The PI will notify the IRB in writing within five business days if a participant has to stop the interview due to distress.

(3) Other notification

Not applicable

(4) Available resources

A social worker is on staff at Crossroad Health Center during all hours of operation and will be available to provide counseling if necessary.

5) Direct benefits to the participant

Participants will not receive any direct personal benefit from participating in this research project.

6) Recruitment activities

(a) Recruitment materials

A recruitment flyer and script have been developed to recruit participants into the study.

(b) Personnel

Recruiting will be done by the research assistant.

(c) Recruitment activities

- Research Assistant (RA) will print a patient roster list for each screening day at the beginning of each shift.
- RA will highlight patients who meet inclusion/exclusion criteria:
  - Inclusion:
    - □ Established patient (i.e. it is not their first visit)
    - □ Over age 18 - 65
    - □ Clinical diagnosis of type II diabetes
  - Exclusion:
Currently pregnant
Type I diabetes

- RA will approach every patient who meets inclusion/exclusion criteria and give them a flyer to read while they are in the waiting area or already in an exam room. RA will review the participant log to ensure that they do not approach a patient who has already been recruited or who has declined participation.
- RA will ask the patient if they are interested in participating.

(d) Participant response

The participant can either agree to participate or decline.

b. CONSENT PROCESS

1) Presenting information to potential participants

If participant agrees to participate, the research associate will wait until the patient is in an exam room and will read the recruitment script and informed consent document.

2) Answering questions from potential participants

The research assistant will provide an opportunity after reading the informed consent form for questions from the participant.

3) Indicating consent

The participant will indicate their willingness to take part in the research project by signing two copies of the informed consent document.

4) Legally authorized representative (LAR) for minors or cognitively impaired participants

Not applicable

5) Verification of LAR for cognitively impaired participants

Not applicable

6) Avoiding coercion

The research assistant will be trained in research ethics to prevent any coercion. The participant’s treating staff including the primary care physician will not know whether or not the patient agreed to participate.
7) Recruitment incentives

Participants will be given $5 gift cards to Kroger’s as a small token to thank them for their participation.

c. CONSENT DOCUMENTS (ICDs)

List:

ACE Study Adult Consent Version 3.17.15

3. RESEARCH-RELATED ACTIVITY:

a. SECONDARY ANALYSIS of an EXISTING DATASET

1) Person or entity that holds the dataset

Not applicable

2) General description of the data, including when and how the data were obtained

Not applicable

3) List of the fields (or description of the kinds of information) that will be used from the dataset, with specific mention of any individually identifying data

Not applicable

4) Explanation why individually identifying data are needed for your study, how confidentiality of individually identifiable data will be assured, and how soon identifiers will be purged from the dataset

Not applicable

5) Explanation of how the dataset (or portion of the dataset) will be obtained from the current holder

Not applicable

b. REVIEW OF RECORDS that were collected for NON-RESEARCH PURPOSES

1) Person or entity that holds the records

Crossroad Health Center
2) General description of the kind of records, including when and how the records were obtained

The research assistant will review the medical records of each patient on the daily roster to see if they meet inclusion/exclusion criteria and determine eligibility for study participation.

3) Specific description of the information (i.e., data fields) that will be used from the records, with specific mention of any individually identifying information

Date of birth, diagnosis list, and most recent A1C test result and date of test.

4) Explanation why individually identifying information is needed for your study, and how soon identifiers will be purged from the research records

Not applicable

5) Explanation of how the records (or excerpts from the records) will be obtained from the current holder

c. RESEARCH ACTIVITIES

1) Privacy of participation

Individual participation will be kept private from all staff at the Crossroad Health Center including the treating physician. No name or any other identifying information will be listed on the questionnaire; only ID numbers. The research assistant will enter the exam room of every patient who meets inclusion criteria. Staff and treating physician will not know who or who did not agree to participate.

2) Confidentiality of data

The identity of the participants will be kept confidential. Data obtained from the ACE questionnaire will be data entered using only the ID number. It will not be possible to match the ID numbers with the patient’s identity. A participant log will be retained by the research team to ensure a patient is not approached twice.

3) Research-related activities

(a) Participant cohorts

There will be one cohort of participants.
(b) Activities and duration

It is estimated that each interview will last approximately 5-10 minutes each. Using the ACE questionnaire, the research associate will read each question aloud and record the information given. If a participant responds to a question and then decides to quit, they would be notified that all information up to that point would be kept as part of the study data unless the subject objects and then the data will be discarded. There are no alternative activities for non-participants other than to simply not participate.

(c) Data collection tools

ACE Study Questionnaire version 1.5.15

(d) Payments to participants: reimbursement of expenses or payment for time and effort

Participants will receive a $5.00 gift card to Kroger to thank them for their participation.

4. DATA ANALYSIS:

Data will be analyzed using a t-test model. Oversight of the data analysis will be given by Dr. Jun Ying.

5. REFERENCES:

http://www.cdc.gov/violenceprevention/acestudy/

6. ADDITIONAL DOCUMENTATION:

List:

ACE Study Recruitment Flyer Version 3.17.15
ACE Study Recruitment Script Version 3.17.15
ACE Study Participant Log Version 3.17.15
ACE Study Step by Step Study Procedures Version 3.17.15
Appendix C

Do Adverse Childhood Experiences (ACEs) Affect One’s Ability to Control Diabetes?

Step by Step Study Procedures

1. Research Assistant (RA) will print a patient roster list for each screening day at the beginning of each shift.
2. RA will highlight patients who meet inclusion/exclusion criteria:
   - Inclusion:
     - □ Established patient (i.e. it is not their first visit)
     - □ Over age 18 - 65
     - □ Clinical diagnosis of type II diabetes
   - Exclusion:
     - □ Currently pregnant
     - □ Type I diabetes
3. RA will approach every patient who meets inclusion/exclusion criteria and give them a flyer to read while they are in the waiting area or already in an exam room. RA will review the participant log to ensure that they do not approach a patient who has already been recruited or who has declined participation.
4. RA will ask the patient if they are interested in participating.
5. If patient agrees to participate, RA will wait until the patient is in an exam room and will read the recruitment script and informed consent document.
6. Participant will sign and date two informed consent documents and the RA will co-sign and date. Participant will be given one signed copy of the informed consent document.
7. RA will read aloud the questionnaire and record the responses. RA will calculate the ACE score.
8. RA will ask the participant if they would like a copy of their completed questionnaire for their records. If affirmative, RA will provide them with a copy.
9. If participant becomes upset at any time during the interview, the RA will offer the participant the opportunity to leave and/or stop the interview and the opportunity to speak with a social worker on staff during recruitment hours. The RA will notify the Principal Investigator (PI) as soon as possible if any participant becomes emotional or distressed during an interview.
10. RA will thank the participant for their information and give them a $5.00 Kroger gift card as a token of appreciation. Participant will be asked to sign receipt for receiving the gift card.
11. RA will complete the patient log.
12. RA will record the latest A1C score and date on the questionnaire.
13. At the end of each shift, Research Assist will return the completed questionnaires, informed consent documents, receipt log and participant log to a locked file cabinet in a locked office of the co-investigator at Crossroad Health Center.

14. On a weekly basis, the co-investigator will collect completed forms and give them directly to the principal investigator.

15. Principal investigator will complete data entry and store completed forms in a locked file cabinet and locked office in Procter Hall, Suite 310 at the College of Nursing.
Title of Study: Do Adverse Childhood Experiences (ACEs) Affect One’s Ability to Control Diabetes?

Introduction:
You are being asked to take part in a research study. Please read this paper carefully and ask questions about anything that you do not understand.

Who is doing this research study?
The person in charge of this research study is Tammy Mentzel of the University of Cincinnati (UC) College of Medicine.

What is the purpose of this research study?
The purpose of this research study is to ask about the types of adverse childhood events that happened in an adult population and see if the numbers make it harder to control and manage diabetes.

Who will be in this research study?
About 100 - 300 people will take part in this study. You may be in this study if you are 18 years of age or older and are a current patient at the Crossroad Health Center.
What will you be asked to do in this research study, and how long will it take?

You will be asked questions about experiences from your childhood. It will take about 10 minutes to complete and this will be in addition to your clinic visit time. We will also review and record information from your medical record. We will not contact you again for any future research questions related to this study.

Are there any risks to being in this research study?

It is not expected that you will be exposed to any risk by being in this research study. If you become upset thinking about the experiences in your childhood, we have someone who can speak with you to help you feel better.

Are there any benefits from being in this research study?

You will probably not get any benefit because of being in this study. But, being in this study may help researchers understand how often adverse childhood events occur in an adult population.

What will you get because of being in this research study?

You will be given a $5 Kroger gift card for participating.

Do you have choices about taking part in this research study?

If you do not want to take part in this research study you may simply not participate.

How will your research information be kept confidential?

Information about you will be kept private by:

- limiting access to research data to the research team
- keeping research data on a password-protected computer and on a secured network drive
EFFECTS OF ADVERSE CHILDHOOD EXPERIENCES (ACEs) ON CONTROL OF DIABETES

Your information will be kept in a locked file cabinet at Crossroad Health Center and in the 310D Data Collection Centre in Procter Hall for three years. After that it will be destroyed by shredding the paper files. The data from this research study may be published; but you will not be identified by name.

What are your legal rights in this research study?
Nothing in this consent form waives any legal rights you may have. This consent form also does not release the investigator, the institution, or its agents from liability for negligence.

What if you have questions about this research study?
If you have any questions or concerns about this research study, you should contact Tammy Mentzel at 513-558-5574.

The UC Institutional Review Board reviews all research projects that involve human participants to be sure the rights and welfare of participants are protected.

If you have questions about your rights as a participant or complaints about the study, you may contact the UC IRB at (513) 558-5259. Or, you may call the UC Research Compliance Hotline at (800) 889-1547, or write to the IRB, 300 University Hall, ML 0567, 51 Goodman Drive, Cincinnati, OH 45221-0567, or email the IRB office at irb@ucmail.uc.edu.

Do you HAVE to take part in this research study?
No one has to be in this research study. Refusing to take part will NOT cause any penalty or loss of benefits that you would otherwise have. You may start and then change your mind and stop at any time.

Agreement:
I have read this information and have received answers to any questions I asked. I give my consent to participate in this research study. I will receive a copy of this signed and dated consent form to keep.
EFFECTS OF ADVERSE CHILDHOOD EXPERIENCES (ACEs) ON CONTROL OF DIABETES

Participant Name (please print) __________________________________________

Participant Signature _____________________________________________ Date ______

Signature of Person Obtaining Consent _____________________________ Date ______
EFFECTS OF ADVERSE CHILDHOOD EXPERIENCES (ACEs) ON CONTROL OF DIABETES

Appendix E

Adverse Childhood Experiences Study

Instructions: Research Assistant will read aloud each question and record the response.

1. Date of enrollment _______/_______/__________

2. Subject ID Number _______________________

3. Date of birth _______/_______/__________

4. Gender
   □ Male  □ Female

5. Ethnicity
   □ Hispanic  □ Non-Hispanic

6. Race
   □ African American □ American Indian/Alaska Native □ Asian □ Native Hawaiian/Pacific Islander □ White □ Two or More Races

7. Education Level
   □ Some high school; no diploma □ High school graduate/GED □ Some college; no degree □ Trade/technical/vocational training □ College graduate

While you were growing up, during your first 18 years of life:

8. Did a parent or other adult in the household often or very often
   - Swear at you, insult you, put you down or humiliate you?
     Or
   - Act in a way that made you afraid that you might be physically hurt?
   □ Yes  □ No If yes enter 1

9. Did a parent or other adult in the household often or very often
   - Push, grab, slap or throw something at you?
     Or
   - Ever hit you so hard that you had marks or were injured?
   □ Yes  □ No If yes enter 1

10. Did an adult or person at least 5 years older than you ever
    - Touch or fondle you or have you touch their body in a sexual way?
      Or
    - Attempt or actually have oral, anal, or vaginal intercourse with you?
   □ Yes  □ No If yes enter 1

11. Did you often or very often feel that
EFFECTS OF ADVERSE CHILDHOOD EXPERIENCES (ACEs) ON CONTROL OF DIABETES

12. Did you **often or very often** feel that
   - You didn’t have enough to eat, had to wear dirty clothes, and had no one to protect you?
   - Your parents were too drunk or high to take care of you or take you to the doctor if needed?

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
<th>If yes enter 1</th>
</tr>
</thead>
</table>

13. Were your parents ever separated or divorced?

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
<th>If yes enter 1</th>
</tr>
</thead>
</table>

14. Was your mother or stepmother:
   - **Often or very often** pushed, grabbed, slapped, or had something thrown at her?
   - **Sometimes, often, or very often** kicked, bitten, hit with a fist, or hit with something hard?
   - **Ever** repeatedly hit at least a few minutes or threatened with a gun or knife?

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
<th>If yes enter 1</th>
</tr>
</thead>
</table>

15. Did you live with anyone who was a problem drinker or alcoholic or who used street drug?

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<thead>
<tr>
<th>Yes</th>
<th>No</th>
<th>If yes enter 1</th>
</tr>
</thead>
</table>

16. Was a household member depressed or mentally ill, or did a household member attempt suicide?

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
<th>If yes enter 1</th>
</tr>
</thead>
</table>

17. Did a household member go to prison?

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
<th>If yes enter 1</th>
</tr>
</thead>
</table>

Now add up the “Yes” answers: ____________________ This is the ACE Score: ________/10

**Instructions:** Research Assistant will record the following information from the medical record.

18. A1C score ____________________ Date ______________

Data Entry ____________ Initials ____________ Date ____________

PI Review ____________ Initials ____________ Date ____________
Appendix F
Adverse Childhood Experiences Study
Recruitment Script

We are conducting a research study with Crossroad patients who have been diagnosed with having type II diabetes. We are collecting information about their childhood experiences, the first 18 years of life. We want to know if childhood experiences affect the control of a person’s diabetes. Everything that you tell us will remain confidential. We will not share your answers with your physician or anyone else including the Crossroad staff. The information you provide will have a study ID number on rather than your name. If you become upset during the interview, we have someone here who can talk to you to help you feel better. If you decide you no longer wish to participate in the interview, please tell us and we will stop. There is no right or wrong answer, if you do not know the answer to a question it is okay to say so. After the interviews are complete, we will analyze the data to see if childhood experiences affect the control of a person’s diabetes. To thank you for your participation, we will give you a $5.00 gift card to Kroger. The results will be reported in total numbers and we hope these will be published in scientific journals. We also plan to write a one page summary that will be posted at Crossroads for all patients to read. We hope the information we gather will be helpful to the Crossroad physicians to help them understand why patients may have difficulties managing their diabetes. If you would like a copy of your completed questionnaire for your records; we can make a copy for you. Do you have any questions that I can answer? I will now read aloud the informed consent document that we will need you to sign if you agree to participate.
Appendix G

Do Adverse Childhood Experiences (ACEs) Affect One’s Ability to Control Diabetes?

Participant Log

<table>
<thead>
<tr>
<th>Date</th>
<th>Subject ID</th>
<th>Name</th>
<th>Date of Birth</th>
<th>Participation</th>
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</thead>
<tbody>
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<td>/</td>
<td>Agreed or Declined</td>
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<tr>
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<td>Agreed or Declined</td>
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Page ______
### Appendix H

ACE Study

**Gift Card Receipt Log**

<p>| I acknowledge receipt of a $5.00 Kroger gift card as a token of appreciation for my participation in the ACE study. | I acknowledge receipt of a $5.00 Kroger gift card as a token of appreciation for my participation in the ACE study. |</p>
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