

**Adult Primary Care Providers' Adverse Childhood Experiences (ACEs) Knowledge,  
Implementation, and Perceived Barriers: A DNP project**

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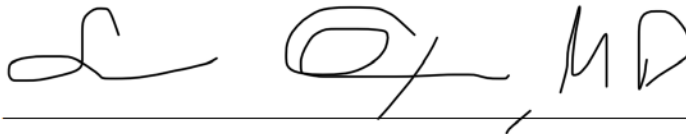
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## Table of Contents

Abstract.....	3
Introduction.....	4
Background.....	6
Problem Statement.....	9
Gap Analysis.....	11
Review of the Literature.....	12
Theoretical Framework.....	18
Aims, Objectives, and Hypotheses.....	19
Methods.....	20
Project Site and Population.....	21
Measurement Instrument.....	22
Ethical Considerations.....	24
Data Analysis and Results .....	25
Discussion.....	33
References.....	36
Appendices (Listed sequentially in order they appear in paper) .....	45
Appendix A.....	45
Appendix B.....	46
Appendix C.....	47
Appendix D.....	48
Appendix E.....	51
Appendix F.....	52

### Abstract

**Objective:** Adverse Childhood Experiences (ACEs) are harmful or distressing events occurring within a child's social or family environment which disrupt psychological and physical development. The goal of this DNP project is to answer this question: How do primary care providers (PCPs) perceive their knowledge, training, screening, and interventions when utilizing ACEs research in their practice? This DNP project seeks to answer this question using a mixed method quantitative design.

**Method:** A 20 item electronic questionnaire was distributed to 33 adult outpatient primary care providers. Quantitative data was collected from 19 of the questions. These included inquiries concerning knowledge of ACEs, screening habits, and perceived barriers to integration of ACEs into adult primary care practice as well as participant demographics. The final item of the questionnaire was an invitation to discuss additional motivations and perceptions with the investigator.

**Results:** Minimal statistically significant data is due to the small sample size. Data was analyzed utilizing a chi-square test, mean and median results, and inferential statistics to test project hypotheses. Descriptive statistics were utilized to describe the population, demographics, and data, via graphs and tables.

**Conclusion:** The implementation and results of this project provide few significant findings. However, additional discussion of PCP motivations and perceptions offer a unique perspective to the concept of what is required to translate the ACEs information into adult primary care.

**Keywords:** Adverse childhood experiences, adult outpatient, toxic stress, primary care providers, motivations, and trauma-informed care.

Primary Care Providers' Adverse Childhood Experience Knowledge, Implementation, and  
Perceived Barriers: A DNP Project

**Introduction**

The psychosocial impact on health is a common concept in modern medicine (Bethell et al., 2017; Dunphy et al., 2019; Merrick et al., 2019). First described by Hans Selye as alarm reactions displayed in animals, psychological connection to biological functions continues to find support in scientific literature (Petruchelli et al., 2019; Selye, 1937; Selye, 1998; Szabo et al., 2017). Selye referred to the complex interactions of stressors on the body in 1936 as general adaptation syndrome (Selye, 1937; Selye, 1998). Over time, Selye differentiated the terms “eustress” and “distress” due to the impact of works from Swedish researcher Levi Lenard (Selye, 1975; Szabo et al., 2017). In the mid-80s, the behavioral sciences developed the study of psychoneuroimmunology – the intersection of the psyche, the nervous system, and the immune system (Vollhardt, 1991). Not until the early 1990s did investigators apply this information to primary care (Felitti et al., 1998). Felitti et al. were initial researchers who quantifiably assigned a number to detect an association between *adult* chronic illness and former experiences of *childhood* adversity (Felitti et al., 1998). Recent scientific advancements confirm the correlation of adverse childhood experiences (ACEs) having effects into adulthood (Bethell et al., 2017; Bhushan et al., 2020; Bora et al., 2021; Hughes et al., 2017). ACEs are harmful or distressing events occurring within a child’s social or family environment which disrupt psychological and physical development (Alhowaymel et al., 2021). Researchers classify these traumatic events into three categories (see Table 1; Bora et al., 2021; Felitti et al., 1998; National Center for Injury Prevention and Control, 2022). A correlational response exists between exposure to

childhood trauma and the development of chronic disease (Bora et al., 2021; Felitti et al., 1998). Approximately 61% of adults in the United States of America (U.S.A.) report experiencing at least one ACEs (Merrick et al., 2019). Sixteen percent of U.S. adults have experienced four or more (Merrick et al., 2019). ACEs scores of four or more are associated with exponential health risks and is considered a public health crisis (Bhushan et al., 2020; Felitti et al., 1998; Hughes et al., 2017; Petrucci et al., 2019).

**Table 1**

*Categories of Adverse Childhood Experiences*

Abuse	Neglect	Household dysfunction
Psychological or Emotional abuse	Physical neglect	Mental illness of household member
Physical abuse	Emotional neglect	Domestic violence towards a parent
Sexual abuse		Incarceration of a household member
		Divorce, separation, or loss of a parent
		Substance abuse:  Includes illegal street or prescription use by household member and problematic drinking or alcoholism of household member

\*Note: This table offers a synthesis of the established categories of ACEs; scores range from 0-12. Three categories exist and the subcategories are not an exhaustive list of types of childhood adversity (Bora et al., 2021; Felitti et al., 1998; National Center for Injury Prevention and Control, 2022).

ACEs exposure is emerging in research with widespread implications for primary care providers (Alhowaymel et al., 2021; Bhushan et al., 2020; Hughes et al., 2017). Almost twenty years post the initial work, Dr. Felitti reflects that the primary care medical community has not applied this research (Felitti, 2017). While adult primary care has been waiting to obtain a streamlined recommendation, social welfare has developed protocols and procedures (Felitti, 2017; Pardee et al., 2017; Purkey et al., 2018). The civic sphere, law enforcement, and the social sciences have been quick to apply ACEs research (Felitti, 2017). Primary care pediatrics has also gained an awareness of the impact of this data (Albaek et al., 2018; Amaya-Jackson et al., 2021; Felitti, 2017; King et al., 2019). However, the application of ACEs to adult primary care has not been well researched (Felitti, 2017; Kalmakis et al., 2017; Roberts et al., 2019). The question remains: *what prevents adult primary care from utilizing ACEs research in practice?* The basis of inquiry of this mixed-method DNP project is twofold: 1) Analyze the development of ACEs scores and the implications for primary care providers' use; 2) explore the current implementation of ACEs research into adult primary care.

### **Background**

In the late 1990's, a longitudinal research study of health prevention and obesity quantified the definition of previous childhood adversity (Felitti et al., 1998). Dr. Felitti, Dr. Anda, and their colleagues coined the term ACEs (Felitti et al., 1998). Felitti et al. (1998) utilized a 10-category tool which described varying sources of trauma. These events are categorized relating to abuse, neglect, and family dysfunction (Bora et al., 2021; Felitti et al., 1998; Gilgoff et al., 2020; National Center for Injury Prevention and Control, 2022). This study illustrated the impact of adversity on long term health consequences (Felitti et al., 1998). Since this initial study, the understanding of the impact of ACEs has expanded (Bora et al., 2021;



Felitti et al., 1998; Gilgoff et al., 2020; National Center for Injury Prevention and Control, 2022). The chances of severe disease, addiction, morbidity, and even mortality increased with an increase of an individual's ACEs score (Bhushan et al., 2020; Felitti et al., 1998; Hughes et al., 2017; Petrucci et al., 2019).

Adverse childhood experiences have an impact on all-cause mortality as revealed in women and people with diabetes (Campbell et al., 2019; Chen et al., 2016). Over a 20 year period, adults with diabetes and ACEs demonstrated 2.3 times higher mortality rate (Campbell et al., 2019). Kidney function and ACEs is associated with increased rates of mortality as well (Ozieh et al., 2020). An important factor from Ozieh et al. (2020) is that decreased renal function or scoring an ACEs alone was not associated with mortality. Rather, the comorbidity of the two increased the overall mortality rate (Ozieh et al., 2020).

The risk of being overweight or obese, contracting chronic obstructive pulmonary disease (COPD), being a current substance abuser, and unemployment increased among adults with higher ACEs exposure (Merrick et al., 2019). Additional negative outcomes include diabetes, heart disease, stroke, mental illness, broken bones and sexually transmitted infections (STIs) (Bora et al., 2021; Juonala et al., 2019). These factors increase independent of traditional risk factors such as smoking (Purkey et al., 2018). In addition, adolescent misuse of prescription drugs increased by 62% for each additional ACEs (Forster et al., 2017). The maladaptive coping mechanisms of adolescents is attributed to effects from ACEs impact (Pardee et al., 2017). However, the protective factor for these adolescents is a positive adult influence (e.g., the influence of a teacher; Forster et al., 2017).

Without a positive adult relationship for a child to build resilience, ACEs exposure leads to toxic stress in the body (Gilgoff et al., 2020). Toxic stress is defined as chronic dysregulation

of the neuroendocrine and immune systems (Gilgoff et al., 2020). The typical human brain response to survival is the production of stress hormones to react to life-threatening situations (Pardee et al., 2017). The brain resets when there is no need for “fight or flight” (Pardee et al., 2017). However, the survival brain in a traumatized individual is hypersensitive and continually activated (Pardee et al., 2017). The hypothalamic-pituitary axis is the primary biological processes disrupted and dysregulated in a toxic response (Gilgoff et al., 2020). This results in a maladaptive response which alarms for typically benign activities (Pardee et al., 2017). These levels of toxic stress lead to long term adverse side effects with related dose responses such as diabetes, respiratory disease, risk taking, and violence (Gilgoff et al., 2020; Petrucci et al., 2019).

In recent years, ACEs research has expanded with varying views for implications of practice (Hughes et al., 2017). ACEs scores have been strongly correlated to chronic psychosocial and medical disease (Boersma et al., 2020; Petrucci et al., 2019). The more ACEs an individual reports, the higher their risk of disease (Bhushan et al., 2020; Felitti et al., 1998; Hughes et al., 2017). This includes both communicable and non-communicable diseases such as heart disease, cancer, respiratory illness, and harmful behaviors (Bhushan et al., 2020; Felitti et al., 1998; Hughes et al., 2017; Petrucci et al., 2019). Alzheimer’s disease or suicide attempts increased exponentially in correlation with ACEs (Bhushan et al., 2020). Of U.S. adults 51.8% have a chronic disease (Boersma et al., 2020). In those adults 27.2% have more than one diagnosis (Boersma et al., 2020). One in six primary care patients utilize healthcare services with a risk factor for chronic disease (Merrick et al., 2019). The defining characteristic of chronic disease is an illness requiring long term support, maintenance, and treatment (Reynolds et al., 2018). The focus of a primary care setting is continuity, coordination, and comprehensive care



(Reynolds et al., 2018). This makes the primary care sector ideal for attending to the impact of chronic disease and ACEs.

### **Problem**

Despite rigorous evidence of the impact of ACEs scores, translation of this research to adult primary care practice is limited (Kalmakis et al., 2017; Petruccelli et al., 2019). Primary care initiatives are ideal for screenings of patients for childhood adversity with impact on health (Gilgoff et al., 2020). However, disconnection exists between inquiry from primary care providers (PCP) and patient perspectives of the provider responsibility (Gilgoff et al., 2020; Kalmakis et al., 2017). Patients report it is within the role of the PCP to inquire and address previous trauma (Goldstein et al., 2017). But multiple studies of PCPs report a lack of confidence to provide trauma-informed care (Bora et al., 2021; Kalmakis et al., 2017; Tink et al., 2017; Weinreb et al., 2010). Despite “ACEs Aware” campaigns, controversy surrounds implementation into practice (Bhushan et al., 2020; Finkelhor, 2018). The controversy is not only how to implement the ACEs questionnaire but also if these research findings should be generalized (Dube, 2018; Finkelhor, 2018). For example, critics claim a tool should not be used if no specific intervention is clearly defined and recommended (Finkelhor, 2018; Glowa et al., 2016). In addition, even if an ACEs score is established it may not change the plan of care (Glowa et al., 2016).

The screening mechanisms related to childhood trauma have evolved. The original ACEs tool was developed for research and was not intended for use in a primary care clinical practice for any population (Felitti et al., 1998; Finkelhor, 2018; Pardee et al., 2017). An additional ACEs screening tool was developed for use in adolescents with revisions to the original tool (Pardee et al., 2017). Similar to the seminal study, the adapted ACEs tool was primarily designed for

research purposes (Pardee et al., 2017). One previously gold standard tool to assess adolescents has not been updated since 1998 and is no longer indicated (Pardee et al., 2017). This adolescent research tool evolved into the current clinically utilized screening; The Rapid Adolescent Prevention Screening© (RAAPS) (Pardee et al., 2017). Additional tools assess children and parents such as Safe Environment for Every Kid (SEEK) or social needs programs (Finkelhor, 2018; Gottlieb et al., 2016). Trauma assessment tools include PTSD reaction index, Trauma Symptom checklist, Structured Trauma-Related Experiences and Symptoms Screener, and Bright Futures (Amaya-Jackson et al., 2021). However, these tools are primarily directed towards pediatrics and adolescents up to 24 years of age (Bora et al., 2021; Finkelhor, 2018; Pardee et al., 2017). Adult screening tools primarily focus on the application of the original ACEs research tool (Rariden et al., 2021). Providers express hesitancy to the application of tools without specified interventions (Amaya-Jackson et al., 2021; Bora et al., 2021; Finkelhor, 2018).

An additional concern exists regarding the possibility of “triggering” relating to screening (Purkey et al., 2018). Triggering is emotional distress or anxiety elicited by situations reminiscent of past trauma (Purkey et al., 2018). Anything from physical touch to feeling dismissed can elicit a “trigger distress” and is highly specific to the individual (Purkey et al., 2018). Side effects of triggering includes inability to advocate for self in a healthcare setting, lack of participation in care, and loss to follow up (Purkey et al., 2018).

The problem remains that despite research to inform the existence of ACEs in primary care, clarity is lacking for how to utilize this information in treatment of adults. The current recommendation is to target ACEs comorbidities and utilize established screening tools for depression, anxiety, PTSD, and other comorbidities of trauma in which treatments have been established (Amaya-Jackson et al., 2021; Finkelhor et al., 2018). Felitti urges a refocus of

primary care from a “biomedical to biopsychosocial approach (Felitti, 2017, p. 206).” Currently, Kaiser Permanente is conducting a study consisting of 130,000 patients to examine the large scale implications of integrating ACEs research into primary care (Felitti, 2017; Felitti, 2019). Nurse practitioners are a key component of the recent integrations into practice with Kaiser Permanente’s application of the original ACEs research (Felitti, 2019). The call is to incorporate multidisciplinary teams to address gaps in health care (Felitti, 2019).

### **Gap Analysis**

ACEs information has primarily been applied in pediatric settings, utilizing a preventative framework (Sherfinski et al., 2021; Szilagyi et al., 2016). However, limitations exist due to the impact that prior exposure to ACEs has in adult primary care settings. Thus, the focus of the gap analysis is to address the recommendations of evidence-based ACEs evaluations utilized for primary care (see Appendix A). In addition, education has been suggested as a strategy to overcome the gaps between ACEs research findings and application to practice (Bora et al., 2021). Therefore, additional information from this project assists in the recommendations for future educational initiatives to meet the gap existent between evidence-based care and current practices in the adult primary care setting. This gap was identified primarily through discussion with key stakeholders within the primary care organization. The goal of the additional academic site as a subsequent setting was assessment of those who train nurse practitioners and practice primary care. In addition, the site was intended to increase the power of results within the collection of data. A Midwestern adult and family primary care clinic network agreed to contribute to this project related to barriers of ACEs research in the primary care setting. SWOT analysis and gap analysis was completed to assist in affirming the impact of the project (see

Appendix B; Bonnel & Smith, 2018). The providers servicing adult primary care in the Midwest made this project appropriate to address the gap in knowledge.

### **Literature Review**

Limited sufficient evidence exists in the literature regarding the barriers preventing family medicine clinicians from implementing ACEs research (Bora et al., 2021; Kalmakis et al., 2017). Analysis of factors contributing to health care practitioners' neglect of ACEs scores in their practice led to the development of the following PICO question: How do adult primary care providers perceive their knowledge, training, screening, and interventions regarding ACEs research in their practice?

### **Search**

Systematic searches utilizing CINAHL, Cochrane, PsycInfo, and PubMed were conducted from September 2021 through November 2022 (see Appendix C). Utilization of the following categories of keywords provided relevant articles: *Adverse childhood experiences, toxic stress, primary care providers, motivations, adult, outpatient, and trauma-informed care*. Initial searches were narrow, terms too specific, and elicited few applicable results. Therefore, searches broadened and these keywords led to Boolean searches (using "AND" and "OR") including, but not limited to, variations of the terms: Trauma, adverse events, childhood abuse, physicians, provider, nurse practitioners, physician assistants, knowledge, screening, legislation, primary care, practices, guidelines, interventions, training, and education. Inclusion and exclusion criteria occurred primarily after utilization of search engine to include screenings of adult primary care PCPs. Also, exclusion criteria were topics related to pediatrician only providers, social work practitioners, pregnancy/prenatal care, emergency department/urgent care/inpatient hospital settings, and medical or nurse practitioner students. This included limiting



publication dates between 2007-2022 with the exception of seminal studies. The choice to expand the search length to 2007 was due to the limited research completed within a narrower timeline. The limitation of topic was intended to minimize the extraneous articles not related to the PICO. After deleting duplicates, excluding books, and articles not in English, a total of 460 results surfaced. The 460 articles were further screened by title or abstract to identify those that included populations specific to addressing the application and perceptions of ACEs research in adult primary care settings. A total of 112 articles was further screened to evaluate which of the articles applied to the PICO question. Three articles adhered to the confines of the project question (see Appendix D; Bora et al., 2021; Kalmakis et al., 2017; Weinreb et al., 2010).

As this literature search resulted in a lack of usable peer reviewed articles, other strategies were implemented. In order to expand initial findings, a consultation with a medical librarian provided the recommendation to apply inclusion and exclusion criteria post search engine. In addition, a further literature search was implemented utilizing authors, reference lists, and works cited, to elicit additional results. The initial search and subsequent measures produced the following relevant thirteen results; a case scenario (Ravi & Little, 2017), a mixed-method study (Kalmakis et al., 2017), two opinion articles (Campbell, 2020; Jones et al., 2020), a letter to the editor (McLennan et al., 2020), a feasibility study (Glowa et al., 2016), two scoping reviews (Ford et al., 2019; Sherfinski et al., 2021), and five cross-sectional surveys (Bodendorfer et al., 2020; Bora et al., 2021; Maunder et al., 2020; Stork et al., 2020; Weinreb et al., 2010). No purely qualitative studies resulted regarding perceptions of primary care providers on ACEs, applied impact of ACEs, or ACEs screenings. In addition to the mixed-method article, the inclusion of the opinion pieces, letter to the editor, and the case study was intended to provide

some qualitative basis in the literature (Campbell, 2020; Jones et al., 2020; Kalmakis et al., 2017; McLennan et al., 2020).

## Results

Of the 6 articles that surveyed primary care providers, attending and resident physicians, physician assistants, nurse practitioners, medical staff, psychiatrists, pediatricians, and providers of additional specialties were included (Bodendorfer et al., 2020; Bora et al., 2021; Kalmakis et al., 2017; Maunder et al., 2020; Stork et al., 2020; Weinreb et al., 2010). The common denominator between all of these articles was the surveillance of family practice primary care (Bodendorfer et al., 2020; Bora et al., 2021; Kalmakis et al., 2017; Maunder et al., 2020; Stork et al., 2020; Weinreb et al., 2010).

A unique feature of the article from Bodendorfer et al. (2020) was the assessment of the “ACEs conversation.” While no actual ACE screening was conducted from the original study, a conversation occurred between providers and parents in a primary care office (Bodendorfer et al., 2020). Out of 238 parents and guardians, 97% marked the preference to discuss this topic with their primary care providers (Bodendorfer et al., 2020). From the providers’ perspective, another feature of the study was the perception that parents felt accused or offended by the topic (Bodendorfer et al., 2020). But a strong conclusion is that ACEs resources for parents are required in practice (Bodendorfer et al., 2020).

A feature of the survey conducted by Bora et al. (2021) is the variability noted between specialties – perceived barriers and knowledge of ACEs were significantly different between family medicine practitioners, pediatricians, and internal medicine providers. Similarly, the online survey from Maunder et al. (2020) demonstrated a strong association between provider



specialty and frequency of screening. Psychiatrists routinely screened, family medicine physicians screened when indicated, and other specialties reported rare occasions of screening (Maunder et al., 2020).

Kalmakis et al. (2017) illustrated that 34% of nurse practitioners usually screened for history of child abuse. Nurse practitioners who reported a confidence in the task had much higher rates of screening (Kalmakis et al., 2017). Additionally, for each five years of years in the field, the odds of screening increased by 17% (Kalmakis et al., 2017).

Features of the electronic survey distributed by Stork et al. (2020) is the directed survey of physicians working in a region with poor health outcomes. The evidence produced by this article illustrated the lack of familiarity with ACEs by providers – 80.5% had no prior experience with ACEs (Stork et al., 2020). In addition, the increased prevalence of ACEs in women was supported (Stork et al., 2020).

Weinreb et al. (2010) was the original study utilized to assess perceptions of adult primary care providers regarding ACEs in practice. This initial study illustrated the concept that confidence, gender, and knowledge impacted the screening habits (Weinreb et al., 2010). This data contributed to the argument that evidence-based guidelines is needed within the adult primary care sector (Weinreb et al., 2010). The remaining literature is best assessed by reviewing those who promote, and those who caution, against the premature integration of ACEs into primary care.

## **Promotions**

In general, healthcare providers require an awareness of ACEs (Campbell, 2020; McLennan et al., 2020). However, the data regarding the knowledge of providers about ACEs is

surprisingly low (Bora et al., 2021; Sherfinksi et al., 2021; Stork et al., 2020). Only 20% of providers had awareness ACEs existed in an article published over 20 years after the initial ACEs study (Stork et al., 2020). In general, few PCPs express a high level of familiarity with the topic (Bora et al., 2021; Kalmakis et al., 2017; Sherfinksi et al., 2021; Stork et al., 2020; Weinreb et al., 2010). Multiple studies affirm the correlation between knowledge of the impact that ACEs have on physical illness and screening practices among physicians (Bora et al., 2021; Maunder et al., 2020; Weinreb et al., 2010). Additional features of increased rates of screening are gender, demographics, confidence in screening ability, and knowledge of someone with a history of child abuse (Bora et al., 2021; Kalmakis et al., 2017; Maunder et al., 2020; Weinreb et al., 2010). However, education related to ACEs is one of the most frequent recommendations for future research and practice implications (Bora et al., 2021; Kalmakis et al., 2017; Maunder et al., 2020; Weinreb et al., 2010).

Barriers to the implementation of ACEs were varied. These included lack of time, gaps in knowledge, discomfort with subject material or fear of retraumatizing patients, lack of adequate referrals or support staff, limited reimbursement, and lack of streamlined practice recommendations (Bodendorfer et al., 2020; Bora et al., 2021; Campbell, 2020; Ford et al., 2019; Glowa et al., 2016; Jones et al., 2020; Kalmakis et al., 2017; McLennan et al., 2020; Ravi & Little, 2017; Sherfinski et al., 2021; Stork et al., 2020; Weinreb et al., 2010). Provider ACEs score, feeling helpless, and risk of offending was also a noted barrier in several articles (Campbell, 2020; Kalmakis et al., 2017; Stork et al., 2020).

Many of the articles that surveyed the attitudes of practitioners did so in conjunction with screening (Bora et al., 2021; Glowa et al., 2016; Kalmakis et al., 2017; Maunder et al., 2020;

Weinreb et al., 2010). One of the first peer reviewed publications examining the screening of ACEs showed the tool added  $\leq 5$  minutes in 90% of patients with any risk (Glowa et al., 2016). This speaks to the concern of time as a noted barrier in additional articles (Bora et al., 2021; Weinreb et al., 2010). However, screening is the precise concern of the cautionary.

### **Cautions**

Critics agree that screening should be conducted with caution (Campbell, 2020; McLennan et al., 2020; Sherfinski et al., 2021). The American Academy of Pediatrics is frequently quoted as having no specific recommendation for screening of ACEs (Campbell, 2020; McLennan et al., 2020). An urgent call for more evidence, systematic reviews, and additional data on outcomes, are promoted as the reason to delay screening (Campbell, 2020; Ford et al., 2019; McLennan et al., 2020; Ravi & Little, 2017). California's policy to allocate millions of funds to screening practices are viewed with derision (Campbell, 2020). Harms are listed as offense and sensitivities of the respondent, the adverse effect of labeling a patient for a chronic condition, a lack of evidence, and a lack of a desire to "go there" (Campbell, 2020; Ford et al., 2019; Kalmakis et al., 2017).

The most compelling qualitative data comes from the mixed-method study from Kalmakis et al. (2017). Nurse practitioners' perceptions included the belief that screening was of benefit to the patient, a responsibility of the practitioner, and came with provider experience (Kalmakis et al., 2017). Education was a significant concern for the practitioners (Kalmakis et al., 2017). In addition, a nurse practitioner's concern to respond correctly was indicated as a significant aspect of screening a client with a personal history of childhood trauma (Kalmakis et al., 2017).

Despite support from nurse practitioners for the responsibility to screen, ambiguity continues to exist for practice guidelines (Campbell, 2020; Ford et al., 2019; Kalmakis et al., 2017; McLennan et al., 2020; Ravi & Little, 2017). However, a common solution named in the literature is trauma-informed care (Campbell, 2020; Felitti, 1998; Jones et al., 2020; Kalmakis et al., 2017; Ravi & Little, 2017; Stork et al., 2020). This concept leads to the discussion of the framework which holds the foundation for provision of sensitive implementation of ACEs research into adult primary care.

### **Theoretical Framework**

The theory underpinning this project is interpretive ethnography (Melnik & Fineout-Overholt, 2019). This is a hybrid of theories developed from behavioral, organizational, system, and social sciences. The conceptual model (see Appendix E) utilized for this project is Roberts and colleagues' model for trauma-informed primary care (TIPC) (Roberts et al., 2019). "Trauma-informed care" initiated in the mental health and juvenile justice arenas (Dube, 2018; Thompson-Lastad et al., 2017). Roberts et al. (2019) developed a model applying this concept to primary care. This model guided the development of the quantitative and qualitative dimensions of this project e.g. providers' experiences, knowledge, and use of trauma related research. All of the mentioned theories formed the foundation of this project. A need exists for representatives of primary care to address the motivations of their utilization of ACEs research. Without an understanding of why PCPs operate as they do, any suggestions for improvement lack clarity and direction (Melnik & Fineout-Overholt, 2019). The TIPC model guided this project by casting a vision for what primary care should resemble, thus projecting potential existing deficiencies toward an ideal framework to implement ACEs research into the primary care setting (Roberts et al., 2019).

### **Aims, Objectives, and Hypotheses**

The primary aim was to determine adult primary care providers' level of familiarity and provider utilization of ACEs research in practice. Secondary aims were the assessment of barriers to the application of ACEs research and potential educational tools for PCPs. The aim of the discussion was to explore the perspectives of primary care providers regarding their experience, knowledge, and utilization of ACEs research in primary care adult practice. Thus, the following objectives were developed.

Objective 1: Assess knowledge of ACEs scores via questionnaire adapted from Bora et al. 2021 and Kalmakis et al. 2017, (see Appendix F) distributed to participants in September 2022.

Objective 2: Assess training variances between clinician specialties specific to ACEs scores via questionnaire adapted from Bora et al., distributed to participants in September 2022.

Objective 3: Inquire about screening habits and barriers in practice to interventions related to ACEs scores via questionnaire adapted from Bora et al. and Kalmakis et al., distributed to same participants September 2022.

Objective 4: Inquire about use of practice interventions to address ACEs scores via questionnaires adapted from Bora et al. and Kalmakis et al. distributed to participants in September 2022.

Objective 5: Explore the perspectives of PCPs regarding utilization of ACEs research in practice via discussion with respondents from quantitative questionnaire (see Appendix G) completed in December 2022.

Objective 6: Assess providers' preferences for additional education to offer recommendations regarding future research.



The objectives of this project were evaluated quantitatively via the following hypotheses:

- Primary care providers perceive their knowledge of ACEs as adequate.
- The differences between nurse practitioners, physician assistants, physicians, and other PCPs are reflected in the participant's screening practices.
- The demographic differences of participants are reflected in the participant's screening practices.
- Nurse practitioners and physicians differ in training related to ACEs.
- Screening practices differ between nurse practitioners and physicians.
- Primary care providers minimally utilize ACEs research in their practice.
- Primary care providers perceive barriers exist to the utilization of screening in primary care.

This mixed method project sought to obtain these objectives via the following design.

### **Methods**

The goal of this project was to answer the PICO question utilizing a sequential, mixed methods, quantitative design with the inclusion of discussion with providers. Sampling was a multidisciplinary online questionnaire of physicians, nurse practitioners, physician assistants, and practitioners providing primary care services. The population was a convenience selection of an outpatient clinic employing primary care providers (PCPs) and a university department of advanced practice nurses in the Midwestern region of the U.S. (see Appendix A) with the option of individual referrals to aid in distribution. Data was analyzed utilizing a chi-square test, mean and median results, and inferential statistics to test project hypotheses.

A chi-square test is a statistical test used to determine whether there is a relationship between two categorical variables (Schober & Vetter, 2019). The goal of this test is to identify



whether a disparity between actual and predicted data is due to chance. Or to identify if a link between the variables is under consideration. The null hypothesis is that there is no relationship between the categorical variables in the population - meaning the variables are independent. If the resulting p-value is less than 0.05, the null hypothesis can be rejected. Chi-square testing was primarily used to compare the differences between provider roles in regards to participant responses.

### **Project Site and Population**

The project site originated in 2 locations. The population consisted primarily of 21 primary care providers and 9 advanced practice nurses in an academic setting to inform perspectives of knowledge and barriers in primary care settings. Three additional practitioners were recruited and the questionnaire was forwarded to them via email. The first site is a critical access hospital with five outpatient clinics employing more than 20 primary care providers. This site services rural communities in the Midwest. Internal medicine and family practice providers were sampled. The questionnaire was distributed to physicians, nurse practitioners, and physician assistants. The additional site is a private liberal arts university in the Midwest composed of advanced practice nurses in an academic setting to inform additional perspectives and offer additional power to questionnaire results. Information regarding location of practice and demographics of participants was embedded into the questionnaire to account for additional participants who contributed and were not a part of these 2 sites.

### **Data Collection Procedure**

A Qualtrics© (online survey tool) questionnaire was administered to participants to obtain the quantitative measures (see Appendix F). The project information and questionnaire link were distributed via email. The option to forward was included within the email for the

potential to gain additional participants. No way of tracking emails forwarded was available to monitor additional distributions of the questionnaire. The questionnaire was also distributed to 9 advanced practice nurse providers at an academic institution in the Midwest via email. These practitioners, the individuals emailed, as well as the private primary care clinic, consisted of a total of 33 known providers of various disciplines who were surveyed (see attached questionnaire exemplar in Appendix F). After the 6 weeks of data collection was complete, all results were analyzed according to the aforementioned methods.

The questionnaire contained an option for participants to provide contact information to volunteer for the qualitative section by phone. The qualitative measure was a semi-structured, scripted, phone interview of the 2 respondents who volunteered. Only one respondent was able to complete the interview. This interview was recorded, the process of transcription initiated by the head investigator, but due to constraints of time and resources, full analysis was not completed. No specific identifiers were collected outside of the name and phone or email contact information for the qualitative data. The dissemination of findings was distributed as a complete manuscript and shared with key stakeholders. Strengths and weaknesses of questionnaire were evaluated in the analysis from Appendix B.

### **Measurement Instrument**

The quantitative measurement tools included a questionnaire developed by Bora et al. (2021) and Kalmakis et al. (2017). Kalmakis et al. was utilized only as a reference for questionnaire structure. The permissions and bulk of the questionnaire was informed by Bora et al. (2021). This tool was adapted from current literature on the topic (Bora et al., 2021). In addition, the length and previous use contributed to the validity of the data (Bora et al., 2021). The questionnaire utilized multiple question structures such as a 3 and 4-point Likert scale,

dichotomous variables, select all that apply, and multiple offers to include choices not specified. Changes of the questionnaire involved the addition of several demographic questions informed by Kalmakis et al. (2017) and adjustment of some of the language for clarity and narrowed scope for the purposes of this project. This was due to preference of the investigator and a desire to keep the questionnaire short to promote participation.

The questionnaire utilized was heavily reliant on the Bora et al. (2021) and Kalmakis et al. (2017) for several reasons. The first was that the acceptable tools in the research primarily focus on pediatricians or registered nurses (King et al., 2019; Stokes et al., 2017). Since the focus of this project was to inform adult primary care providers, the applicability of pediatricians and registered nurses lacked project compatibility. Similarly, another tool survey assessed nursing and family nurse practitioner students only (Zhan et al., 2021). When Baker et al. (2021) studied The Attitudes Related to Trauma-Informed Care Scale (ARTIC), this tool lacked the specificity of assessing attitudes of primary care providers alone. The use of ARTIC in that work assessed educators and human service providers in addition to health care providers (Baker et al., 2021). This led the investigator to discard the ARTIC tool related to lack of specificity to the adult primary care provider. These factors, the appropriateness of the scale to adult primary care, as well as the responsiveness of the researchers who permitted use of the survey, informed the choice of this questionnaire for the project.

The qualitative questions were developed by the project investigator. Dependability was affirmed by reproducing the 8 question script each time the interview was conducted by the head investigator. The respondent was given the option to expand on the topic or offer additional comments by the final question of the interview (see Appendix G). Prior to the collection of the interview data the investigator identified 3 categories of bias. The bias was that 1) respondents

would express a moderate knowledge of ACEs, 2) it would be easy for providers to offer stories of patients who have been impacted by ACEs, and 3) experiences would include frustration with barriers in referral of patients with high ACEs scores. These biases were determined in conjunction with the known quantitative data from the literature (Bodendorfer et al., 2020; Bora et al., 2021; Campbell, 2020; Ford et al., 2019; Glowa et al., 2016; Jones et al., 2020; Kalmakis et al., 2017; McLennan et al., 2020; Ravi & Little, 2017; Sherfinski et al., 2021; Stork et al., 2020; Weinreb et al., 2010). These included perspectives similar to identified data related to lack of time, difficulty in referrals, ambiguity of interventions, and need for more education. Since the items were directed at provision of care and not directed toward ACEs experiences of the respondent, no concerns for triggering was expected. No need arose for counseling resources to be offered – however, this was a consideration of the project.

### **Ethical Considerations**

Ethics is an integral component of any research initiative (Melnyk & Fineout-Overholt, 2019). Internal Review Board (IRB) approval was obtained prior to initiating this DNP project to address any potential ethical conflicts. An important concern in research is consent (Melnyk & Fineout-Overholt, 2019). This was provided for by assent with disclaimer specified at the opening of the questionnaire. Since the qualitative data was provided voluntarily, consent was built into the questionnaire before offering the option to provide identifying information. In addition, a verbal consent was obtained prior to recording of the interview. Additional considerations were beneficence and nonmaleficence (Melnyk & Fineout-Overholt, 2019). No risks were associated with the questionnaire outside of the potential for subject material to potentially cause psychological discomfort for participants who may have a history of adverse childhood experiences. However, this was provided for by the participants' ability to withdraw at



any point in time with less than minimal risk. In addition, the ability to withdraw was specifically disclosed at the onset of the questionnaire. Additional verbal consent was provided upon initiation of the interview with a notification for how the recorded data and respondent information would be utilized.

With any type of data collection, privacy and confidentiality is a significant consideration (Melnik & Fineout-Overholt, 2019). The first provision for confidentiality was built into the questionnaire. For the general quantitative data, the survey tool anonymized the data (e.g. no names or identify information were specifically stored). Obviously, this was impacted by the respondents who offered their information for the qualitative interview data collection. In order to track data attached to qualitative information, each questionnaire was linked to the last 3 digits of each respondent's phone number. In addition, the interview data gathered was stored on a password protected computer. The only individual with access to the data outside of the principal investigator was the quantitative statistician. However, the identifiers were removed and the qualitative information transferred to text prior to any type of access. The gathered information will not be stored any longer than 12 months from initial date of submission. In addition, the project investigator completed training from the Collaborative Institutional Training Initiative (CITI program) to affirm ethical initiatives of the project.

### **Data Analysis and Results**

The project evaluation plan was multifaceted. First, the quantitative data was analyzed with descriptive statistics using Microsoft Excel© to review the characteristics of the questionnaire participants. The quantitative data was analyzed utilizing a chi-square test. The Likert scale data was analyzed utilizing the mean and median results. Inferential statistics were also utilized to test the aforementioned hypotheses. Descriptive statistics were utilized to

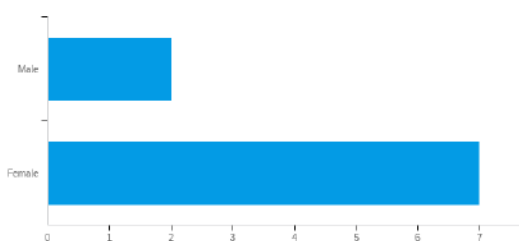
describe the population and data via graphs and tables. Second, the qualitative interview data was recorded and the transcription process initiated. Bias was identified prior to coding but the process never reached completion to warrant review by an independent auditor. Therefore, the qualitative component was included only in discussion of findings as it did not provide trustworthy results.

## Results

Of the 33 verified questionnaires sent, 12 were completed – with partial completion of 2 – for a response rate of 36.3%. The majority of the respondents were female – 77.8% (see Table 2). Only 2 of the respondents identified as male. One male and one female provider volunteered to interview. The age of the sample population ranged as displayed in Table 3 – with fairly even distribution of ages 30 and above.

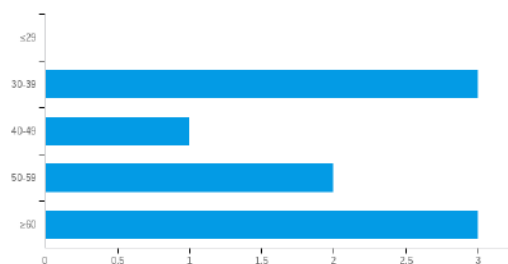
**Table 2**

*Gender of Questionnaire Participants*



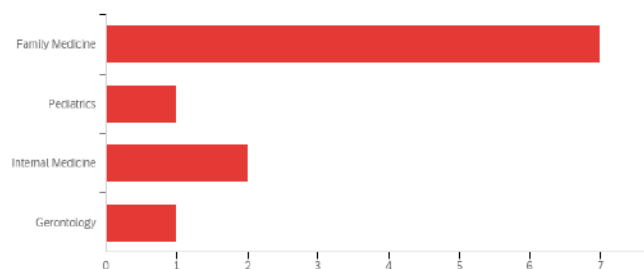
**Table 3**

*Age of Questionnaire Participants*

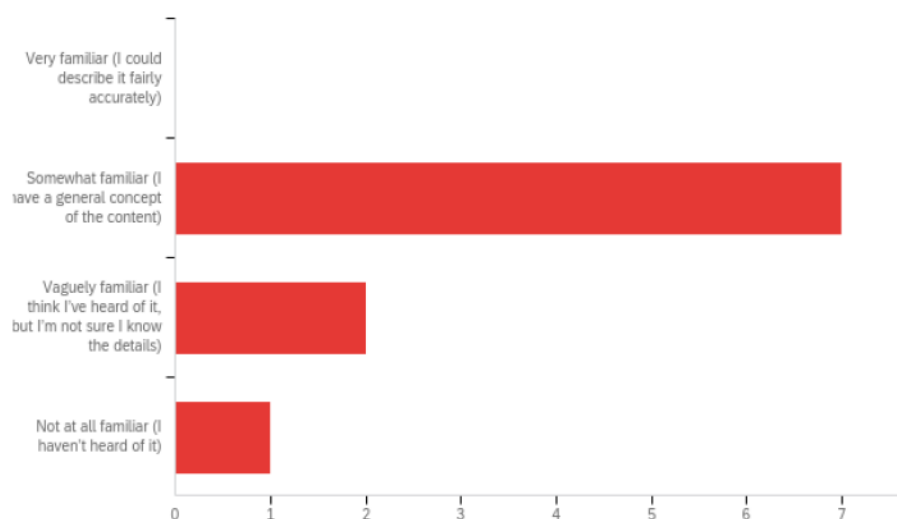


The majority of respondents practiced in rural or small town locations and urban practice, represented at 77.8% and 22.2% respectively. Physicians and nurse practitioners were the only roles who replied to the questionnaire with almost even split – 55.6% physicians and 44.4% nurse practitioners replied. A variety of specialties were represented from family medicine, internal medicine, gerontology, and pediatrics (see Table 4).



**Table 4***Specialties of Questionnaire Participants***Knowledge**

The majority of participants expressed a familiarity with ACEs (see Table 5). However, the knowledge base of primary care providers appeared quantifiably inadequate.

**Table 5***Questionnaire Participants' Familiarity with ACEs*

Tables 6 and 7 illustrate the use of chi-square in manipulation of data. Data displayed is the observed and expected results for how nurse practitioners and physicians responded to question 2 on training. The null hypothesis is that the responses are independent of one another. Assuming no difference between the two practice areas, the expectation is for the participants to be

proportionately distributed. Because 8 individuals responded “No” and 4 of the 9 participants were nurse practitioners, then  $4/9$  of the 8 is expected to be a response from a nurse practitioner.

**Table 6***Chi-square: Observed Results of Training*

Role	No	Yes	Grand Total
Nurse Practitioner	3	1	4
Physician	5	0	5
<b>Grand Total</b>	<b>8</b>	<b>1</b>	<b>9</b>

**Table 7***Chi-square: Expected Results of Training*

Role	No	Yes	Grand Total
Nurse Practitioner	3.56	0.44	4
Physician	4.44	0.56	5
<b>Grand Total</b>	<b>8</b>	<b>1</b>	<b>9</b>

Thus,  $4/9 \times 8 = 3.56$  rounded to 2 decimals is the result. Also,  $5/9 \times 8 = 4.44$  is the expected result for physicians. Similarly, because 1 participant responded “Yes”,  $4/9$  is expected to be nurse practitioners and  $5/9$  physicians. Hence, 0.44 and 0.56 are the results respectively. With arrival at the expected results, Microsoft Excel© has a function CHITEST which returns the  $p$ -value. For the above observed and expected values, the  $p$ -value is 0.36 rounded to 2 decimal places. Because it is greater than 0.05 the null hypothesis cannot be rejected.

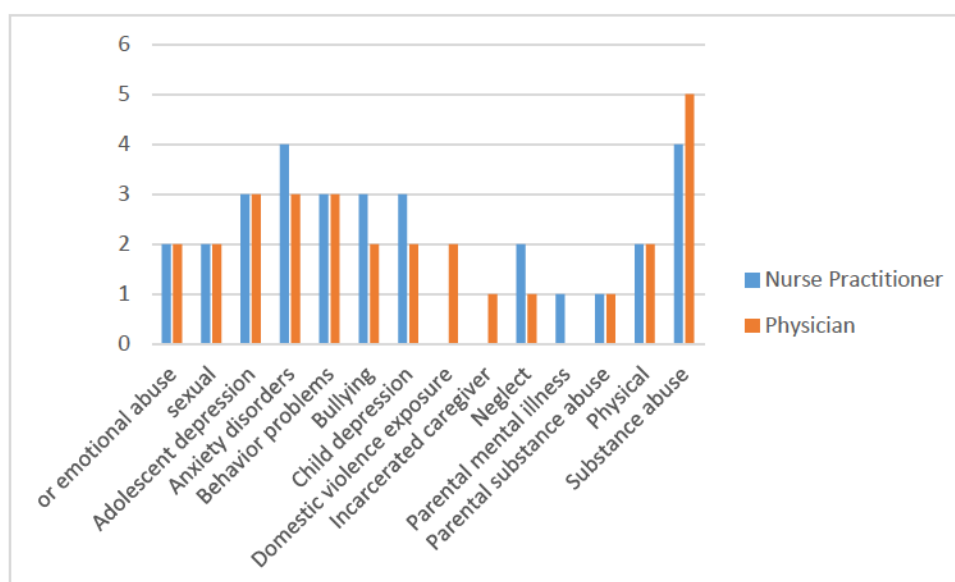
Physicians expressed more knowledge on the impact of childhood trauma on adult well-being with 60% reporting somewhat familiar and 40% reporting vaguely familiar with ACEs research. Nurse practitioners conversely reported somewhat familiar at 25% and 75% reported being vaguely familiar with ACEs. No one described themselves as being very familiar with the ACEs study. The analysis of the additional components of the Likert scale to identify components of knowledge base and subsequent practices provided little variance.

## Implementation

The results regarding implementation to practice include information related to screenings, perceptions of impact, and policies in place to address trauma. While few PCPs specifically screen for ACEs (36%) a variety of other screening practices emerged. A minute difference was calculated between nurse practitioner and physicians screening practices with a chi-square  $p$  value of 0.36. These included routine screening for physical, sexual, or emotional abuse, substance abuse, and anxiety or depression (see Table 8).

**Table 8**

*Variations of Screening Practices by Professional Role*



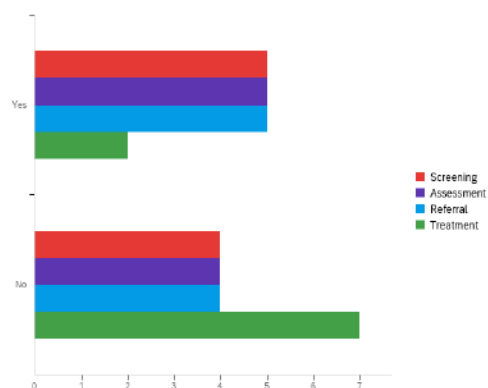
## Perceptions

Perceptions of ACEs data were highly favorable – 100% of participants expressed the belief that additional training on the ACEs research would be helpful. PCPs mentioned protocols existed for screening, assessment, and referral processes but a deviation was noted for treatment protocols. 78% of participants marked no treatment protocols existed at their place of practice.

This negative difference was not noted in the pattern for treatment protocols within internal medicine and primary care (see Table 9).

**Table 9**

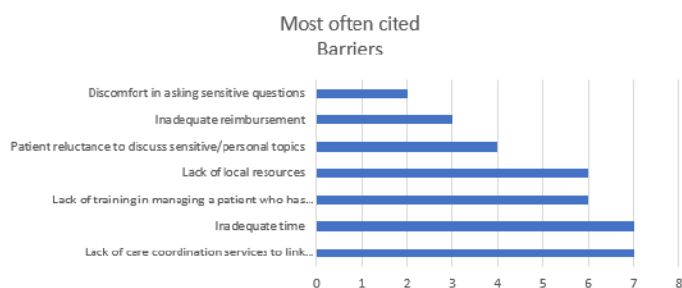
*Existing Protocols at Practice Locations*



“Lack of care coordination services”, “Lack of training”, and “Inadequate time”, were cited as most frequent barriers (see Table 10). The hypothesis of the differences between practitioners was marked in regards to perceived barriers as opposed to screening practices.

**Table 10**

*Barriers Perceived by Questionnaire Participants*



A subtle difference existed between nurse practitioner's responses and physician's responses to barriers (see Table 11). For physicians, inadequate time was most often cited as a barrier. Physicians also cited inadequate reimbursement where none of the nurse practitioners

considered the reimbursement portion of care. Similarly, almost all of the providers marked routine mental health services as extremely difficult for referred patients to access.

**Table 11**

*Variances Displayed Between Disciplines*

	Physician	Nurse Practitioner
Discomfort in asking sensitive questions	1	
Inadequate reimbursement	3	
Inadequate time	5	2
Lack of care coordination services to link patients or families with community resources	4	3
Lack of local resources	2	4
Lack of training in managing a patient who has experienced adverse childhood trauma	2	3
Patient reluctance to discuss sensitive/personal topics	2	2

Additional hypotheses that were not confirmed by the data include little variance between practice locations or age associations regarding provider utilization of data.

### **Limitations**

Multiple significant limitations existed in this project. The first limitation was the small sample size. While the response rate was similar to many surveys, the small sample size of this data made it insignificant and difficult to generalize e.g. none of the chi-square results approached significance. In addition, it cannot be expected to reflect the views of the community as a whole – neither in primary care, these sites, nor the practice locations. Similarly, the sparsity of diversity within the sample limited the conclusions. Physician assistants, acting as primary care providers, were not represented in any form. The selective initial project sites limited the generalizability of project. Further, the survey adapted from Bora et al. (2021) was not a validated survey and therefore reliability was suspect. In addition, the results indicated those who responded to the questionnaire had some level of familiarity with ACEs. This may have

indicated a level of bias inherent within the questionnaire that those who responded already valued the topic.

Finally, the time constraints of the project adversely affected project rigor. The few participants of the questionnaire indicated reminders can be an aid in collection of data. Similarly, if additional time had been permitted to collect more respondents potentially more volunteers could have been included to provide robust qualitative data. Since the qualitative feature presented with weak power it was excluded as a qualitative result. However, some of the comments from the respondent aided in the discussion of the application of this project.

### **Interview with Respondent**

Objective 5 measured the aim to gain perspectives of PCPs in adult primary care. The goal was that additional credibility would be assisted by a minimum of 8-10 qualitative respondents. However, insufficient saturation was reached and additional recruitment was outside the scope of this project. Because 8-10 volunteers did not emerge from the data, the objective was not met. However, the interview process did elicit some unexpected findings from the one completed interview. Much of the conversation between the principal investigator and the respondent followed the pattern of barriers noted in the literature e.g. time, education, appropriate referrals, etc.

However, the respondent made a statement that appeared meaningful to the investigator. The comment was made in response to the inquiry regarding experience of providing care to adults with high ACEs scores. The respondent made the statement, "It's not very satisfying. Because by the time you see them, it's become so much a part of their personality and life that most of them... most of them are afraid to deal with it." This statement was a perception that was missed in the quantitative data of utilization of ACEs in practice. This respondent implied that



the lack of gratification of working with people with a history of childhood trauma impacts the provision of care. A response by the provider to the complex patient who presents to the office is to “groan”. This practitioner stated, “You get your hands dirty” and expressed the tremendous amount of time and energy associated with caring for adults with childhood histories of trauma. The perspective was shared that even mental health providers lack the energy and time to address these issues.

This presents a unique challenge to future research. The role of gratification, motivations of providers, and beliefs about the time and energy required to address ACEs in the adult patient may contribute to the delay of ACEs integration into primary care. A recommendation of this project is to develop a rigorous understanding of the beliefs and motivations that impact provider engagement in the treatment of the adult patient with a history of childhood trauma.

### **Discussion**

Objective 1, 3, and 4, evaluated the knowledge, screening habits, and practice interventions regarding ACEs scores among primary care providers. Despite the small sample size, knowledge and training showed comparable data to the literature related to ACEs knowledge. Familiarity with ACEs appeared limited among this small cohort and affirmed the recommendation to provide additional education to adult primary care providers. However, the small percentage of physicians who expressed more familiarity with ACEs, supported their more diverse set of screening habits. The challenge presented by this data remains – what to do with a patient who alerts for exposure to childhood trauma? Adult PCPs denote protocols for guidance is needed for assessment, screening, and referral. Streamlined recommendations for in-office responses is necessary to assist PCPs in understanding their role relating to adult patients with ACEs.

The variances between clinician specialties in objective 2 was displayed primarily in screening practices and view of barriers. Several unique themes emerged from the barriers PCPs experience in regards to utilizing ACEs in practice. Nurse practitioners perceived different barriers to the utilization by a small margin. According to this data, physicians screened for a wider array of trauma-related behaviors. This would suggest that educating practitioners on services and additional training could increase effectiveness of ACEs translation to practice. In addition, an automated screening process could aid practitioners who find the time requirement of an ACEs conversation too daunting. However, consensus among providers appeared at the overwhelming response that routine mental health services are extremely difficult for referred patients to access. This supports the concern mentioned in the literature review that screening positively for ACEs will simply overwhelm an already burdened healthcare system. Additional information from the project assists in the recommendations for future education to meet the gap existent between evidence-based care and current practices in the adult primary care setting.

### **Conclusion**

The primary recommendation of this project, and much of the literature, is to develop a streamlined recommendation of how to implement ACEs in adult primary care (Dube, 2018; Jones et al., 2020; Kalmakis et al., 2017; Sherfinski et al., 2021; Storik et al., 2020). These include a validated tool for assessment and screening, appropriate interventions in the primary care setting, potential anticipatory guidance for adults, community resources to aid in addressing trauma care, effective strategies to improve the system, and quality education for frontline workers (Bora et al., 2021; Jones et al., 2020; Kalmakis et al., 2017; Sherfinski et al., 2021; Storik et al., 2020). The purpose of this project would be remiss without including the role of doctoral prepared nurse practitioners (DNPs) to aid in the translation of ACEs research into

practice and promotion of trauma-informed care. Advanced practice nurses are active participants in developing research of adverse childhood experiences (Esden, 2018; Kalmakis et al., 2017; Pardee et al., 2017; Rariden et al., 2021; Roberts et al., 2019; Zhan et al., 2021). It is within the scope of the DNP to utilize their expertise to integrate evidence-based practices into health systems (Bonnell & Smith, 2018; Melnyk & Fineout-Overholt, 2019). The role of the DNP as a translator of evidence-based practice is positioned to assist with integration of ACEs research into adult primary care practice. In addition, nurse practitioners are trained in the paradigm that healthcare is something greater than biomedicine (Dunphy et al., 2019). The current project asserts that a key facilitation of Dr. Felitti's transition from biomedical to biopsychosocial is the continued integration of advanced practice nurses within adult primary care (Felitti, 2017).

ACEs is a concern for primary care. After a thorough background and literature review of ACEs, the implementation and results of this project provide few significant findings. More research is needed to determine providers' knowledge, implementation, and perceived barriers to utilization of ACEs in primary care. However, the additional discussion of PCP motivations and perceptions offer a unique perspective to the concept of what is required to translate the ACEs information into adult primary care. It is a most vital recommendation that further research to support streamlined education and practice recommendations maintain priority in healthcare. Attending to the dynamics of childhood trauma and adult behaviors may lead to important and sustainable improvements of quality of health. Preventable morbidity and mortality may result from ignoring the contributions of ACEs in adult chronic disease. In addition, the role of nurse practitioners to educate and assist in application of this evidence is a vision of hope for the future.

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## Appendix A

### Key Stakeholders and Gap Analysis

Site	Contact person	Form of distribution	Notes
Cedarville University	Dr. Angelia Mickle	Email	To APN's on staff
Margaret Mary Health	Dr. Nancy Kennedy	Email	To all outpatient clinic PCPs

\*Note: Approval documents available upon request.

### Gap Analysis Tool

Project: Primary Care Providers' Adverse Childhood Experience Knowledge, Implementation, and Perceived Barriers: A DNP project

Individual Completing Form: Ellen M. McCalla

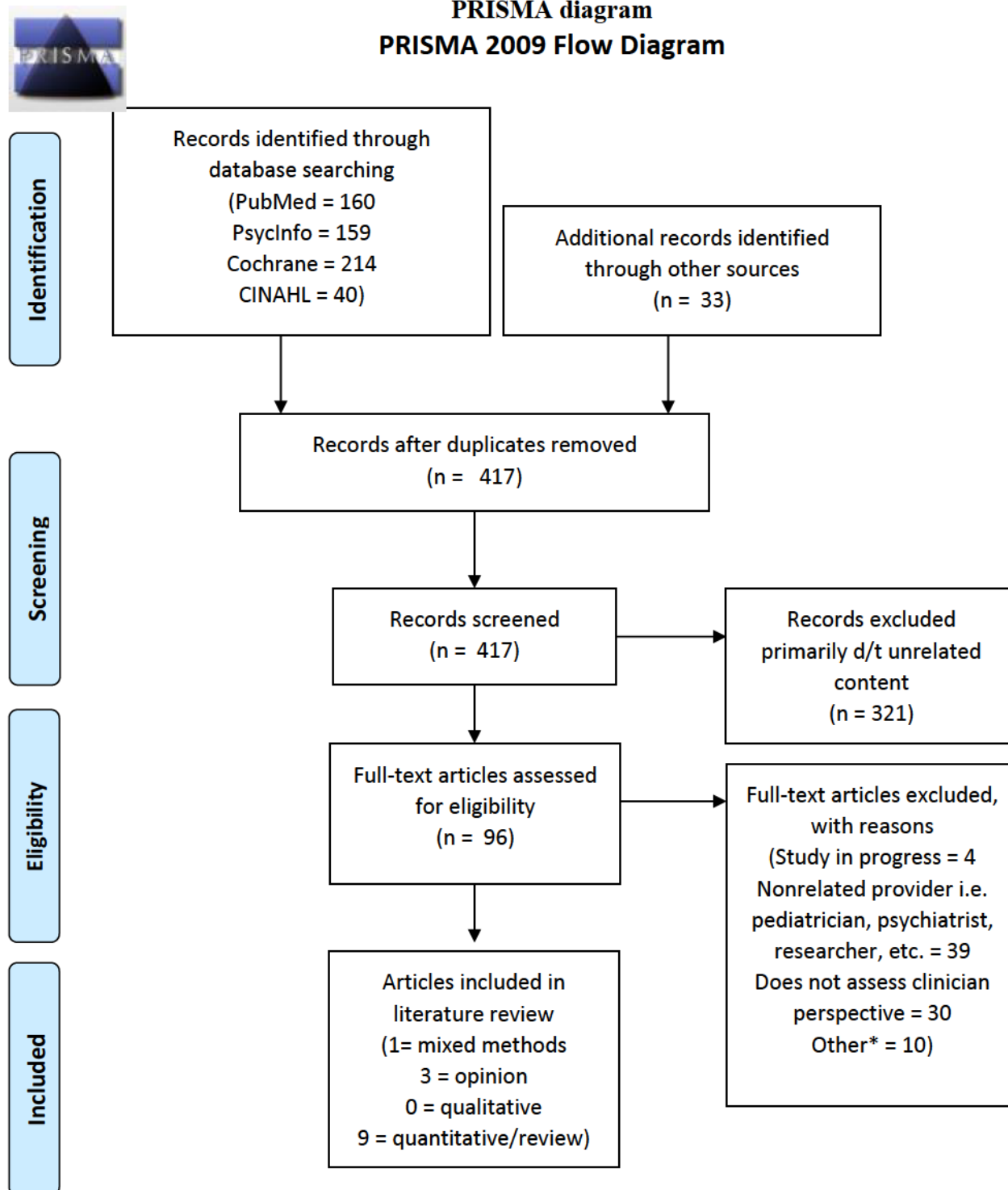
Best Practice Strategies	How Practice Differs from Best Practice	Perceived Barriers Prior to Project
Educate care teams on impact of ACEs for populations served.	Per evaluation with practice stakeholders ACEs are primarily perceived to be a pediatric issue.	Lack of awareness, lack of education,
Implement trauma-informed health systems.	Little to no formal application of trauma-informed initiatives in clinic	Lack of awareness, lack of education, lack of practical application.

\*Note: Best practice strategies implemented from Amaya-Jackson et al., 2021.

**Appendix B**  
**SWOT Analysis**

*See Appendix C for key stakeholders	<b>Internal</b>	<b>External</b>
<b>Positive</b>	<p style="text-align: center;"><b>Strengths</b></p> <ul style="list-style-type: none"> <li>• Specificity of population/well defined niche (Primary care providers)</li> <li>• Diverse clinician sampling (ie physicians, nurse practitioners, physician assistants, etc as primary care providers)</li> <li>• Ability of participants to forward survey to others ie snowball effect</li> <li>• Easy informed consent/confidentiality</li> <li>• Affordable</li> <li>• Ability to collect multiple forms of information (mixed methods design)</li> <li>• Multiple stakeholders*</li> <li>• Simplicity of survey</li> <li>• Selective and open ended questions</li> <li>• Sparsity of data in literature</li> </ul>	<p style="text-align: center;"><b>Opportunities</b></p> <ul style="list-style-type: none"> <li>• Potential for improvement of data collection tools, survey, and analysis.</li> <li>• Potential for additional stakeholders</li> <li>• Ability to expand on data collected (qualitative feature)</li> <li>• Minimal regulations for survey data collection</li> <li>• Adjustments to questionnaire by pretesting survey system</li> <li>• Length and development of survey</li> </ul>
<b>Negative</b>	<p style="text-align: center;"><b>Weaknesses</b></p> <ul style="list-style-type: none"> <li>• Selective initial project sites limiting generalizability of project</li> <li>• Desire for shorter survey leading to potential inaccuracies of data collection</li> <li>• Self-report inherently contributes to sample bias</li> <li>• Individual perspective does not address organizational perspectives of limitations to ACE application in practice.</li> <li>• Discussion posts vs email lend risk for low survey response rates</li> <li>• Diversity of sites and snowball effect potentially affects ability to accurately project response rates.</li> <li>• Fees required from investigator by some sites</li> <li>• Potential ambiguity for application of results</li> <li>• Mixed methods design indicative of additional requirements for rigor/significance.</li> </ul>	<p style="text-align: center;"><b>Threats</b></p> <ul style="list-style-type: none"> <li>• Survey fatigue</li> <li>• Potential for low response rate</li> <li>• Time constraints of project</li> <li>• Potential for technical issues</li> <li>• Lack of interest ie snowball effect inadequate for topic</li> <li>• Potential for bias in participants</li> <li>• Potential structural changes impacting distribution (ie stakeholder contact leaves position)</li> <li>• Organizational denial to participate</li> <li>• Lack of knowledge of topic contributing to potential confusion of terms.</li> <li>• Qualitative feature dependent on participants willingness</li> </ul>

## Appendix C

PRISMA diagram  
PRISMA 2009 Flow Diagram

\*Other includes: Not related to ACEs, policy evaluations, or studies concerning reporting child abuse, IPV, etc.



## Appendix D

## Literature Review Matrix

Literature review: Applied ACEs research in Primary Care Student Name: Ellen McCalla

Reference	Research Design & Level of Evidence	Theoretical / Conceptual Framework	Purpose / Aim	Population / Sample n=x	Variables	Instrument s / Data collection	Results	Implication s for future research	Implication s for future practice
Bodendorfer et al., 2020	Cross sectional questionnaire Level 4	ACE conversation	To examine parent/guardian and provider acceptability of ACE conversation during well-child visits in primary care	231 physician assistants, residents and providers. 71% were attendings.	Perspective, comfort, preparation, motivation, value, impact on care.	NO ACE SCREENING. 8 question survey to examine acceptability and feasibility of "ACE conversation."	PCPs desire resources for parents.	Research that ACE conversation mitigates risk.	An "ACE conversation" could avoid discomfort. Do not assume providers have ACE knowledge. Educate all staff.
Bora et al., 2021	Exploratory cross-sectional study Level 4	Collaborative care	Explore PCPs ACEs knowledge training, screening practices and perceived intervention barriers, including inter-clinician variability.	N=99 attending physicians and residents	Knowledge, training, screening practices, perceived intervention barriers	Survey	Inter-clinician variability exists, few formal trainings, exists and limited familiarity exists.	Develop tools and training for providers.	Educational tools, efficient models, and collaborative care networks.
Campbell, 2020	Expert opinion Level 7	"Trauma-informed care"	Caution against routine screening	n = 1 family medicine MD	n/a	n/a	Routine screening for ACEs should not be conducted.	More evidence on routine screening for ACEs.	Make sure key criteria for health screenings have been met before implementing.
Ford et al., 2019	Scoping Review Level 5	Arksey and O'Malley Framework for scoping reviews	To explore the evidence base for retrospective routine enquiry in adults for ACEs including feasibility and acceptability amongst practitioners, service user acceptability, and outcomes.	N = 4 studies addressing providers administering routine enquiry	Setting for routine enquiry, process for enquiry and service implications, acceptability and outcomes of enquiry	CINAHL, MEDLINE, and PsycINFO from 1997-2018	In general, willingness to enquire	Evidence base is limited, explore who enquiry should target, tools that are appropriate and settings that are appropriate.	Caution on routine enquiry, should be multi-faceted and trauma-informed.
Glowa et al., 2016	Feasibility study Level 6	ACEs research	To explore the feasibility of implementing the ACE screening of adults during routine family	N = 111 clinician surveys	Information about patient, change in care plan, change in referrals, identification of issues, and	Surveys	100% ACE survey did not interfere with visit, perceived acceptability to patient: 98%,	Recommend linking positive ACE scores with screening for current health risk behaviors	Interventions to address ACE risks is possible for a primary care setting.

			medicine office visits		minutes added to visit.		minimal time added to visit.		
Jones et al., 2020	Expert opinion Level 7	Trauma-informed care	Identifying and preventing ACEs	N = 3 – a pharmacist, MD, and PhD	n/a	n/a	Recognize the role of clinicians in prevention of ACEs and implementation of trauma-informed care.	Prospective, longitudinal studies to examine the association of preventing ACEs and specific health outcomes and financial savings.	Data sharing, team-based approach, address underlying trauma through strategies such as cognitive behavioral therapy.
Kalmakis et al., 2017	Mixed method cross-sectional correlational design Level 4	Not stated	To examine NPs practices skills attitudes and perceived barriers to screening adult patients	N=188 nurse practitioners	Knowledge, screening, barriers	Survey	Time and discomfort as barriers	Recommend development of screening tool	Recommend screening in primary care
Mauder et al., 2020	Convenient online survey Level 6	ACEs research	To determine if screening is related to knowledge or medical specialty and to assess perceived barriers	N = 89 family physicians, 48 other specialists and 46 psychiatrists	Demographics, knowledge, usual practice, and perceived barriers	Online survey	Relationship between specialty and knowledge of ACEs as well as screening practices	Test the assumption that screening adult patients for ACEs improves patient outcomes	Encourage education.
McLennan et al., 2020	Letter to Editor Level 7	Consolidated principles for screening	Express concern to the recommendation to implement ACEs in clinical practice.	N = 5 authors, 2 pediatricians and remaining were social science professionals	n/a	n/a	Specific and relevant ACE questions can be integrated as needed into history taking.	Systematically form an evidence base to inform screening of ACEs	Sensitively and safely consider the needs of the patient with disclosure of confidentiality limits
Ravi & Little, 2017	Case Study Level 6	Trauma-informed care	How to sensitively address a patient with significant sexual abuse history.	N = 1 primary care providers experience with an adult patient with history of childhood trauma	Signs or symptoms and approaches to care	n/a	Trauma-informed care actions for physicians	Best practice guideline development	Trauma-informed care to provide sensitive, individualized care from their family physician.
Sherfinski et al., 2021	Scoping review Level 5	ACEs research	Examine how current literature describes the perceptions attitudes, and practices of health professionals and trainees regarding childhood trauma	N = 17 studies from various disciplines	Knowledge, attitudes and perceived barriers toward ACEs. Screening, Educational opportunities, Implementation strategies, and screening cautions	Primarily Pubmed	A large proportion of providers are unaware of the effects of ACEs. Training is good, but not research based. Barriers are varied.	Develop ACE education that is sustainable and enduring. Research impact of screening. What is the cost burden related to ACEs/care?	Educate. Screen if the appropriate resources are in place. Advocate for appropriate resources.
Stork et al., 2020	Convenience survey Level 6	Trauma-informed care	To survey a convenience sample of community based physicians and resident physicians to assess for familiarity	N = 226 physicians plus residents and medical staff	The 10 point ACE questionnaire, 6 basic demographic questions, and 2 questions about familiarity with and use of	Survey Qualtrics	80.5% had no knowledge of ACEs, 3.5% used the ACE questionnaire in practice, 55.5% of physicians reported no	What are best practices for screening and how to coordinate care for patients	Educate. Become a part of a trauma-informed care team.

			with and use of the ACE questionnaire in clinical practice and to measure the prevalence of their own ACEs.		ACE in practice		cumulative ACE score		
Weinreb et al., 2010	Cross-sectional survey Level 4	ACE research	To describe the practices, skills, attitudes, and perceived barriers of a large sample of family physicians in screening adult patients for childhood sexual or physical abuse	N=833 physicians	Practices, skills, attitudes, barriers	Survey	Confidence in screening, perceived role, and knowledge of trauma prevalence were associated with routine/targeted screening. Women and physicians reporting fewer barriers were more likely to routinely screen adult patients.	Develop training programs.	Learn effective primary care approaches to address patients with ACE burden.
*Felitti et al., 1998	Retrospective and prospective cohort Level 4	Trauma-informed care	To describe the long-term relationship of childhood experiences to important medical and public health problems	N=9,508 adult patients	Seven categories of adverse childhood experiences	Questionnaire	Strong graded correlation between childhood adversity and adult disease	Physical and behavioral effects of ACEs on physicians	Educate physician community about the health and behavioral sequelae of childhood trauma.

\*Not an article regarding application of ACEs in adult primary care – summary of the original research

## Appendix E

### Model for Trauma-Informed Primary Care

Table 1. A model for trauma-informed primary care		
Key Elements	TIC	TIPC
Recognition	Recognition of trauma history	Screening and trauma recognition: In a calm and empathic manner, ask about exposure to trauma. Acknowledge that disclosure is difficult and that the patient may disclose when comfortable.
Realization	Trauma influences individuals, their environment, social network, and treatment	Understanding the health effects of trauma: Empower the patient by education about the effects of trauma on health and health-related behaviors.
Response	Patient-centered and controlled care	Patient-centered communication and care: Patients are in control of their care and decisions about their health.
Respect	Respect for emotional safety; avoiding re-traumatization	Emphasize emotional safety and avoid triggers: Identify examinations and procedures that may result in anxiety, flashbacks, or other re-traumatization and create care that is acceptable to the patient.
Resilience	Base care approach on individual strengths	Knowledge of helpful treatment for trauma patients: Recognize individual strengths in managing health. Encourage resilience by focusing on positive aspects of patients' lives (what is going well) to reduce physical and psychological symptoms and improve disease management.

*Note: TIC = trauma-informed care; TIPC = trauma-informed primary care.*

(Roberts et al., 2019)

## Appendix F

### Survey

#### **Adult Primary Care Providers' Adverse Childhood Experience (ACE) Knowledge, Implementation, and Perceived Barriers: A DNP project.**

**The primary purpose of this questionnaire is to determine primary care provider's level of familiarity and utilization of ACE research in their practice. You are being asked to take part in this project to inform current understanding of this research into the primary care setting. Participation is voluntary and the survey can be exited at any time with no consequences to yourself. No more than 20 different types of questions will be posed. Please answer to the best of your ability. Some of the questions may be sensitive in nature but data is anonymized by the survey tool and only linked to your email/phone number with your consent.**

**Please email principal investigator Ellen McCalla at [emoore847@marian.edu](mailto:emoore847@marian.edu) with additional questions.**

**By clicking next you agree to participate in this survey:**

**\*Note: This survey has been adapted and used with permission by Bora et al. (2021).**

For clarity, an adverse childhood experience is a traumatic experience in a human's life before 18 years of age. These include:

- Physical abuse
  - Sexual abuse
  - Emotional abuse
  - Mental illness of household member
  - Problematic drinking or alcoholism of household member
  - Illegal street or prescription drug use by a household member
  - Divorce or separation of a parent
  - Domestic violence towards a parent
  - Incarceration of a household member
- 
1. How familiar are you with the Adverse Childhood Experiences (ACE) Study, an ongoing study conducted by the Center for Disease Control and Prevention (CDC) and Kaiser Permanente to assess the associations between childhood stressors and later-life health and well-being?
    - Very familiar (I could describe it fairly accurately)
    - Somewhat familiar (I have a general concept of the content)
    - Vaguely familiar (I think I've heard of it, but I'm not sure I know the details)
    - Not at all familiar (I haven't heard of it)
  2. Have you received formal training on trauma informed care or adverse childhood experiences?  
Yes  
No



3. Have you ever done ACE screening with your patients?  
 Yes, I have used a formal ACE screening tool  
 Yes, I have inquired about ACE risk factors  
 No  
 Unsure
  
4. If yes, who have you screened for ACEs (select all that apply)?  
 Parents of pediatric patients about their own ACEs  
 Parents of pediatric patients about their child's ACEs  
 Children about their own ACEs  
 Adult patients about their own ACEs  
 Other (please specify) \_\_\_\_\_
  
5. Please select the response(s) you perceive as barriers to your ability as a primary care provider to address ACEs (select all that apply):  
 I do not perceive any barriers to address ACEs  
 Inadequate time  
 Lack of local resources  
 Lack of care coordination services to link patient's/families with community resources  
 Discomfort in asking sensitive questions  
 Parental reluctance to discuss sensitive/personal topics  
 Lack of training in managing a child who has experienced adverse childhood trauma  
 Inadequate reimbursement  
 Other (please specify) \_\_\_\_\_
  
6. Exposure to significant adversity in childhood is associated with the following health outcomes later in life:
 

Obesity	Agree	Disagree
Liver disease	Agree	Disagree
Cancer	Agree	Disagree
Lung disease	Agree	Disagree
Sexually transmitted infections	Agree	Disagree
Heart disease Diabetes	Agree	Disagree
  
7. In general, how difficult is it for patients who need routine or emergency mental health services to be seen by mental health providers in your community?  

	Very difficult	Somewhat difficult	Not difficult
Routine			
Emergency			
  
8. For each of the following categories, does your practice setting have protocols in place for clients who have experienced trauma or violence?  

	Yes	No
Screening		
Assessment		
Referral		
Treatment		

9. Please mark which (if any) of the following problems/conditions you routinely inquire about:
- Child depression
  - Adolescent depression
  - Behavior problems
  - Bullying
  - Anxiety disorders
  - Substance use
  - Domestic violence exposure
  - Physical, sexual, or emotional abuse
  - Neglect
  - Parental mental illness
  - Parental substance abuse
  - Incarcerated caregiver
  - Neighborhood violence
10. How knowledgeable are you about the effect of traumatic early childhood experiences on child wellbeing and adult outcomes?
- Not knowledgeable
  - Somewhat knowledgeable
  - Knowledgeable
  - Very knowledgeable
11. Would you benefit from training on ACEs?
- Yes
  - No
12. Which format would be best for your practice setting in which to learn more about ACEs? Attend seminar/ workshop
- Lecture presentation
  - Receive educational materials
  - On-line continuing education modules
  - Other (please specify) \_\_\_\_\_
13. What ACE-related resources would you find useful in your practice (select all that apply)?
- Patient handouts
  - Parent handouts
  - Child/youth resources
  - Technology resources (websites, QR codes, helplines)
  - Video/Powerpoint for presentation
  - "Toolkit" with materials, ideas, and resources
  - Training in ACEs screening instruments
  - Evidence-based resources
  - Community resources
  - Other (please specify) \_\_\_\_\_
14. What is your area of speciality (select all that apply)?
- Family medicine
  - Pediatrics
  - Internal medicine

Women's Health  
Gerontology  
Other (please specify) \_\_\_\_\_

15. What is your position (Select all that apply)?

Nurse practitioner  
Physician assistant  
Resident physician  
Attending physician  
Faculty/Academic staff  
Administration

16. Practice location:

Urban  
Suburban  
Rural/Small town

17. What is your gender?

Male  
Female  
Other: \_\_\_\_\_

18. What is your age?

≤29  
30-39  
40-49  
50-59  
≥60

19. Would you be willing to volunteer for a short phone interview to collect qualitative data regarding ACE research and barriers to implementation in practice?

Yes  
No

20. If yes, please provide name, contact number and email address. \_\_\_\_\_

NOTE: in providing your information you agree to be contacted by Ellen McCalla for said interview. Your information will be encrypted, protected, and never used for any additional use outside of contacting for additional data collection. It is not necessary to provide this information in order for your former responses to be included in the data collection for this DNP project.

\*Used with permission from Bora et al., 2021; Kalmakis et al., 2017

## **Appendix G**

### **Qualitative Questions**

Disclosure and permissions: You will be asked a set of eight questions regarding your experience, knowledge, and utilization of ACE research in your practice. These questions are from a script and the only additional questions may be a clarification to a response given. You have the right to refuse to answer any question and there is no consequence to withdrawing from this inquiry at any time. Our conversation is recorded and will later be converted to text with portions published in a doctoral paper. In addition, your identifying information will not be attached to the data in any way - do you consent to offer your perspective for my project?

1. Tell me about your knowledge of ACE scores. This can include the degree to which you are familiar with the original research study, the information you have learned about in practice, or how familiar you are with ACEs in general.
2. What is your perspective on the impact of the ACEs information you have thus far?
3. What do you perceive as the impact that ACEs have on your population of clients?
4. What has been your experience as a provider in providing care to adults with trauma/high ACE scores?
5. Can you give me an example of how ACEs impact your care as a primary care provider?
6. Considering ACE research, what do you believe is important for your role as a primary care provider?
7. If you could dream, what would you want to address ACE scores in your patient population?
8. What other comments would you like to offer?