CHILDHOOD STRESSORS AND BEHAVIORAL HEALTH AMONG AMERICAN INDIANS WITH TYPE 2 DIABETES: AN EXPANDED ASSESSMENT OF ADVERSE CHILDHOOD EXPERIENCES USING LATENT CLASS ANALYSIS

Jessica H. L. Elm

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Reading Committee:
Karina Walters, Chair
Tessa Evans-Campbell
Melissa Walls

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Abstract

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Jessica H. L. Elm

Chair of the Supervisory Committee:

Karina Walters

School of Social Work

American Indians experience morbidity and premature mortality at disproportionate and increasing rates compared to other Americans. Type 2 diabetes and behavioral health challenges are major contributors to American Indian morbidity and mortality. Moreover, research demonstrates that social stressors, including childhood adversities, impact health and wellness across diverse populations. Yet, little is known about the prevalence of childhood adversities for American Indians with type two diabetes, nor which childhood events and situations generally impact the health of Natives, nor if there are particular combinations of childhood stressors that have differential impacts on Native health. This dissertation situates empirical analyses within an overall health inequities agenda, considers prior research on childhood adversities and health, and recognizes historically unjust traumas and contemporary American Indian-specific social stressors as having continued health effects.

Given the rationale and framework described above, childhood stressors are analyzed for a sample of American Indian adults with type 2 diabetes from the Great Lakes region (N= 190). Childhood adversities for this sample are analyzed in three distinct ways. First, I estimate the prevalence of seven conventional childhood adversities and “ACEs scores” and compare these to other study estimates. Findings indicate high exposure rates for singular types of childhood adversities and disproportionate ACEs scores among this sample. Second, I use latent class analysis to explore patterns of co-occurring childhood stressors. Ten types of childhood stressors meaningfully contribute to identification of three distinct profiles of childhood stressors: Class 1: Low Adversity Class; Class 2: Household Violence and Incarceration Class; and Class 3: High Adversity Class. In a final analysis, I examine the association between childhood stressor profiles and depressive symptoms, alcohol misuse, and commercial tobacco use. This analysis shows that depressive symptoms are differentially associated across latent classes. Alcohol misuse and commercial tobacco use are not differentially associated across the latent subgroups.

This dissertation expands knowledge about the childhood stressors experienced among American Indians with type 2 diabetes. It suggests that more research is needed to understand the health consequences that may result from childhood adversities for American Indians, particularly those with type 2 diabetes. Multiple practice and policy implications are discussed.

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TEKANUHELATÚKSLA

Ta aswatahuhsí:iohsteʔ onʌ́ tsiʔ náhteʔ ohʌtú yolihwatéhtu.

Akwe·kú úska tsiʔ ʌtwahweʔnu·ní yukwaʔnikúhla tsiʔ akwe·́kú oskʌ·́nʌ́ yukwanuhtúni. Ta tho niyohtúhak yukwaʔnikúhla.

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Ta aswélhekeʔ kʌtyóhkwaʔ néːn tho niyoːlé wakatkweːní néːn tekanuhelatúhsla néːn katsaʔ ok nú takwatóktʌ néːn waʔtkatʌ́ːnukeʔ néːn skwatílhik néːn tho niyoːlé wakatkweːní néːn elhúwa wakewyʌtehtaʔuháti néːn kanʌ́ːlaku akataːtí. Ta tho niyohtúhak néːn yukwaʔnikuhla. Ta ne tho.

CHAPTER 1: INTRODUCTION

This chapter provides an overview of the dissertation, situates the research within a broader health disparities agenda, and provides background context and rationale that informs the analytic approach used for this dissertation.

Social Stressors and Health Disparities

American Indians (AIs) experience astonishing health disparities (Shiels et al., 2017; Indian Health Service [IHS], 2015). Type 2 diabetes (T2D) and behavioral health challenges are major contributors to morbidity and mortality for AIs (Center for Disease Control and Prevention [CDC], 2013; Chapleski, Lichtenberg, Dwyer, Youngblade, & Tsai, 1997; Cwik et al., 2015; IHS, 2015; Shiels et al., 2017; Tann, Yabiku, Okamoto, & Yanow, 2007). Collaborative research and policy development, and effective community-informed interventions are needed to address the long-standing physical and behavioral health disparities in Indian Country (Kirmayer, 2007; Richards & Mousseau, 2012; Walls, Whitbeck, & Armenta, 2016; Walls & Whitbeck, 2012).

Marginalized and oppressed populations in the United States are differentially exposed to social stressors which can translate into behavioral health challenges and health disparities (Hicken, Lee, Ailshire, Burgard, & Williams, 2013; Turner, 2010; Turner & Lloyd, 1995; Wheaton, Young, Montazer, & Stuart-lahman, 2013; Williams, 1999). Some empirical research has examined social stressors in relation to disproportionate health outcomes for AIs (e.g., Chae & Walters, 2009; Sittner, Greenfield, & Walls, 2018; Whitbeck et al., 2001; Whitbeck, Adams, Hoyt, & Chen, 2004); yet, further investigation is needed to understand the extent to which social

stressors influence AI health (Dinges & Joos, 1988; Elm, Walls, & Aronson, under review; Walls & Whitbeck, 2011). To gain meaningful traction in advancing our understandings of AI health disparities, it is imperative that we empirically investigate the "universe" of AI stressors, or a broad range of social stressors, and disentangle the contributions of each type or domain of stressor on AI health (Walls & Whitbeck, 2011; Wheaton, 1994). Empirical demonstration of social stressors as the key driver of AI health disparities can lead us to a more committed framing of health disparities as health inequities and propel tribally-informed practice and policy toward addressing AI health inequities.

Childhood Stressors and Health

Among the many categories of social stressors, those which originate in childhood have unique direct and indirect effects on health (Jones, Nurius, Song, & Fleming, 2018). Early life toxic stressors can become embedded biologically via repeat activation and changes to the neurologic, endocrine, immune, and metabolic systems (Berens, Jensen, & Nelson, 2017; Jensen, Berens, & Nelson, 2017; Miller, Chen, & Parker, 2011; Shonkoff et al., 2012). Severe and chronic childhood stressors can set in motion a series of events involving chronic inflammatory activation, behavioral consequences, early wearing down of physiological systems, and distal disease and disorder outcomes (Kiecolt-Glaser et al., 2003; Miller et al., 2011; Shonkoff et al., 2012). Recurrent stress activation plays a critical biological role in the development of T2D, and precursors such as metabolic syndrome (Baker, Hayden, & Ghosh, 2011; Hotamisligil, 2010). Childhood adversity also negatively impacts mental health and

increases risk for health threatening behaviors which can have additional indirect effects on chronic health conditions (Anda et al., 1999; Felitti et al., 1998).

This dissertation examines a broad range of childhood stressor exposures among a sample of AIs with T2D and investigates tendencies of childhood stressor co-occurrence for this unique population. This dissertation also builds upon the theoretical and conceptual developments, and empirical work of Indigenous researchers and allies, and health sociologists to serve a foundational purpose: to advance social stress research for AIs and add empirical knowledge which may further justify that health differences for AIs are indeed health inequities.

Background

The landmark CDC-Kaiser Adverse Childhood Experiences Studies, (i.e., the "ACEs" studies, data collected from 1995-1997), revealed that ten types of childhood adversity exposures (i.e., emotional, physical and sexual abuse, emotional and physical neglect, intimate partner violence, living with a parent with a substance or mental health problem, parental separation or divorce, and incarceration of a household member before the age of 18), frequently co-occur and strong, graded dose-response relationships exist between these ACEs and myriad health problems (Anda et al., 2009; Dong et al., 2004; Felitti et al., 1998). A primary take-away from the ACEs literature is the aggregate impact of risks on the physical and mental health of adults; i.e., the focus is on co-occurring or clustering of childhood adversities, rather than any one type (Dong et al., 2004; Edwards, Holden, Felitti, & Anda, 2003; Mersky, Janczewski, & Topitzes, 2017). For example, individuals exposed to four or more types of the Kaiser-CDC ACEs had a 4- to 12-fold increase in risk for substance abuse, depression, and suicide

attempt (Dong et al., 2004; Dube, Anda, Felitti, Edwards, & Croft, 2002; Dube et al., 2003; Felitti et al.,1998).

In efforts to modify and replicate this early research with different populations, several similar studies followed the Kaiser-CDC ACEs studies. Some of these later studies concluded that there are additional domains of ACEs that need consideration in health research, particularly regarding behavioral health. One important study by Finkelhor, Shattuck, Turner, and Hamby (2013), examined a nationally representative sample of youth and uncovered that additional poly-victimization occurrences and other stress indicators were associated with behavioral health struggles. These additional types of childhood stressors included peer rejection, peer victimization, exposure to community violence, poor school performance, parental discord, a bad illness or accident involving someone close, and property victimization. Subsequently, researchers have begun to recognize that other sources of stress in childhood, beyond the conventional Kaiser-CDC ACEs, may be salient in forecasting adult health outcomes, particularly for racial and ethnic sub-populations (e.g., Mersky et al., 2017; Wade Jr. et al., 2016; Stolbach & Anam, 2017).

Aside from research momentum that the Kaiser-CDC ACEs studies ignited, the importance of accumulating childhood stressors on health spurred cross-country, community-level social movements and significant policy changes. For example, tribal and non-tribal communities are currently being trained in NEAR Sciences (Neurosciences, Epigenetics, Adverse Childhood Experiences, and Resilience) and the World Health Organization (WHO) has committed significant resources to investigate ACEs internationally. It is useful for tribal communities to remain engaged in the

sociopolitical efforts regarding ACEs to understand local implications and access funds related to prevention and intervention.

Need to Identify American Indian-Specific Childhood Stressors

The ACEs literature has demonstrated critical importance of accumulating and co-occurring childhood stressors on health. However, there are important considerations in conducting this type of research in Indian Country. The CDC-Kaiser ACEs were standardized with samples that are primarily white, middle-class, well educated, and who have health insurance (Edwards et al., 2003). Often AI ACEs researchers are utilizing conventional ACEs indices in their work (e.g., Warne et al., 2017) and to date there is no research has been published about the appropriateness of the conventional set of CDC-Kaiser ACEs for AIs.

Myriad other reasons support investigation of AI-specific ACEs. There is evidence that AI children experience cultural and community-specific childhood stressors that are not reflected in the conventional ACEs index (Brockie et al., 2015; Whitbeck, Hoyt, McMorris, Chen, & Stubben, 2001; Whitbeck, McMorris, Hoyt, & Stubben, 2002). As supported in the conceptual and theoretical framework section (Chapter 2) another reason to further investigate childhood stressors for AIs is that there may be AI-specific constellations of childhood stressors that impact health more so compared to conventional CDC-Kaiser ACEs (Brockie et al., 2015; Mersky et al., 2017; Turner & Avison, 2003; Wheaton, 1999).

Early steps toward deepening our understanding of AI childhood stressors on health is conceptualizing AI ACEs, then developing an AI-specific index. This type of instrument could be useful in future research, reduce measurement error, and result in

more culturally validated findings. Without appropriate measures, underestimation of stressor exposure can lead to erroneous conclusions about the influence of stressors on health (Turner & Avison, 2003; Turner & Lloyd, 1995; Wheaton 1994).

Given these research gaps and needs, this dissertation assesses a broad range of childhood stressors and utilizes person-centered methods (i.e., latent class analysis) to identify individuals who are similar to one another based on their patterns of stressor exposure (Lanza & Rhoades, 2013; Tomczyk, Isensee, & Hanewinkel, 2016). Characterizing homogenous subgroups of AIs with varied experiences with childhood stressors allows us to better investigate which individuals may be a greater risk for health consequences compared to others within the sample. Moreover, by examining childhood stressors in this manner, we begin to conceptualize AI-specific ACEs. Future work can build upon these concepts to inform and develop an AI-specific ACEs index. The AI ACEs index, in turn, can be considered as one aspect of a larger AI stress universe; thus, contributing to AI health disparities research more generally.

Summary of Research Goals, Aims, and Questions

This dissertation consists of seven chapters. Chapter 2 is a literature review that includes a brief demographic overview of the AI population, a review of the epidemiology data for T2D, smoking behaviors, alcohol use problems, and depression among AIs, followed by a discussion of the guiding concepts and theories which inform this dissertation. Finally, the relationships between childhood adversities and behavioral health outcomes are reviewed. Chapter 3 primarily focuses on methods of the parent grant and measures that cross-cut Chapters 4 – 6. Chapters 4 – 6 address aims 1 – 3 respectively (shown below) and each chapter consists of a methods section that is

specific to the analysis for each of the respective aims. These chapters also contain brief discussion sections, including implications and limitations, that mostly speak to the respective aim addressed in the chapter. Chapter 7, the conclusion chapter, synthesizes Chapters 4 through 6 while re-situating dissertation findings and implications within the broad purpose of addressing health inequities for AIs. Finally, Chapter 7 discusses the limitations of all analyses and closes with a roadmap for future research.

The aims of this dissertation are:

Aim1: To estimate the prevalence of seven commonly assessed ACEs and ACEs scores for a sample of AI adults with T2D.

Research Question 1: What is the prevalence of sexual abuse, emotional abuse, physical abuse, household violence, household substance abuse, household mental illness/suicide attempt, household incarceration among a sample of AIs with T2D?

Aim 2: To conduct an expanded ACEs assessment and determine whether AI adults with T2D exhibit variability in profiles of childhood stressors.

Research Question 2: Can distinct subgroups of individuals who share similarities in childhood stressor exposures be identified within a sample of AI adults with T2D?

Aim 3: To examine if latent profiles of childhood stressors are differentially associated with lifetime alcohol problem, depressive symptoms, and smoking status among AI adults with T2D.

Research Question 3: Do childhood stressor subgroups differ with respect to their association with self-report treatment for alcohol use, depressive symptoms, and smoking status?

CHAPTER 2: LITERATURE REVIEW

In this review I begin with a brief overview of the AI population. Next, I present a review of the epidemiology data for T2D, smoking behaviors, alcohol use problems, and depression among AIs. This is followed by a discussion of the conceptual and theoretical framework that guides this dissertation. Because the focus of this work is on the relationships between childhood adversities and behavioral health among a sample of AI adults with T2D, I then present a summary of the empirical research related to ACEs and the connections to T2D, smoking, alcohol use, and depression. Other literature on AI ACEs and comorbidities is presented in later chapters.

Population Description

Depending on the data source and methodology, American Indians and Alaska Natives (AIAN) account for approximately 1.3% to 1.7% (4.1 million to 5.2 million) of the United States population (Norris, Vines, & Hoeffel, 2012; Vespa, Armstrong, & Medina, 2018). Most AIANs, are citizens or descendants of the 567 federally recognized tribes (Bureau of Indian Affairs, 2018), yet most AIANs currently live in urban settings (Norris et al., 2012). Between the years of 2000 and 2010, the AIAN population grew nearly twice as fast as the total United States population (Norris et al., 2012). Native people tend to be younger than the United States population as a whole (median age = 31.4 versus 37.9; U.S. Census Bureau, n.d.). Indigenous people living in the United States have the highest national poverty rate (27.0%; Macartney, Bishaw, & Fontenot, 2013) and low educational attainment (Ogunwole, 2006) compared to other races.

Within the racial category of AIANs, there is a wide diversity of cultures, languages, and geographies across tribal nations. The sample represented in these dissertation analyses resides in the states of Wisconsin and Minnesota. In these states, the AI population total is 224,546 (U.S. Census Bureau, 2018).

Health Disparities

American Indians[1] experience morbidity and premature mortality at disproportionate and increasing rates compared to other Americans. In 2011–14, AIANs had the highest mortality rate across all but one age groups (Shiels et al., 2017). Behavioral health problems and T2D are significant contributors to these disparities (CDC, 2013; Chapleski et al., 1997; Great Lakes Inter-Tribal Epidemiology Center, 2012; IHS, 2016; Shiels et al., 2017; Tann et al., 2007).

The T2D epidemic in Indian Country is unprecedented (Benyshek, Martin, & Johnson, 2001; Carter, Horowitz, Wilson, Sava, Sinnock, & Gohdes, 1989; Pettitt, Aleck, Baird, Carraher, Bennett, & Knowler, 1988)[2]. Diabetes is the fourth leading cause of death for AIs and AIs are 2.8 times more likely than other Americans to die from diabetes (IHS, 2018). Data from 2013-2015 indicate that the overall adult prevalence of T2D for AIs was twice that of non-Hispanic whites (15.1% versus 7.4%; CDC, 2017). Moreover, cardiovascular disease, for which T2D is a major contributor, is the leading cause of death for AIs (IHS, 2018).

[1] Although much of the health literature combines AIs and ANs into one population, this dissertation focuses on AIs and hereafter refers to only AIs.
[2] A majority of AIANs are diagnosed with type 2 diabetes myelitis.

In addition to physical health disparities for AIs, widespread disproportionate behavioral health challenges exist in Indian Country. These include serious psychological distress, (Barnes, Adams, & Powell-Griner, 2005; NCHS [National Center on Health Statistics], 2012, Table 59), smoking (NCHS, 2012 Table 8, Table 62, and Table 64; Phillips et al., 2017), and heavy drinking (NCHS, 2012 Table 64 and Table 68; Szlemko, Wood, & Jumper Therman, 2006; Warne et al., 2017). Among mental health disorders, depression is the most prevalent in some AI communities (Beals et al., 1991). Also, some limited evidence suggests a high rate of comorbidity between alcohol use disorders (AUD) and major depressive disorder within some AI communities (Abbott, 2008; Beals, Manson et al., 2005). Non-traditional tobacco use (i.e., smoking commercial tobacco) is highest among AIs compared to all U.S. races (Blackwell et al., 2014). There is a great disparity in smoking behaviors between AIs and non-AIs in the Midwest region (Chapleski et al., 1997). In Minnesota, 14.4% of the general population are smokers (ClearWay Minnesota & Minnesota Department of Health, 2015) versus the Minnesota AI smoking rate of 59% (American Indian Community Tobacco Projects, 2013). Consequences of these behavioral health struggles include early mortality. From 2001-2005, 11.7% of all deaths among AIs were alcohol attributed versus 3.3% in the general population (CDC, 2008). In 2011–14, AIs had the highest mortality across all age groups and substance misuse and suicide[3] were the primary contributors toward this trend (Shiels et al., 2017).

[3] Suicide is presumably related to depressive symptoms; however, more research is needed to link depression and suicide among AIANs.

Conceptual and Theoretical Foundation

This dissertation relies on a stress process paradigm (Pearlin, 1989; Pearlin, Menaghan, Lieberman, & Mullan, 1981). Inclusive within this paradigm are Indigenous understandings of stressor exposures and consequences. This framework guides exploration of AI childhood stressors and patterns, and investigation of whether compositional and cumulative variations of stressor exposures have differential impacts on behavioral health (i.e., alcohol use, depression symptoms, smoking).

Stress Process Paradigm

The stress process paradigm recognizes that the stress process is a complex, interactive set of events and situations that occur over the life-course and affect wellbeing and health. Understanding the stress process means considering multiple domains of stressors, mediators, buffers, and moderators involved in pathways, proliferation, and accumulation, including root antecedents of stressor exposures (Aneshensel, 1992; Link & Phelan, 1995; Pearlin, 1989; Pearlin et al. 1981; Pearlin, Schieman, Fazio, & Meersman, 2005; Turner & Wheaton, 1997; Wheaton et al., 2013). For purposes of this dissertation, I offer an overarching framework, containing three primary concepts within the stress process paradigm and health sociology literature (i.e., fundamental causes, stress universe, and stress proliferation) while highlighting Indigenous understandings of historical events, stressor exposures, coping, and worldviews that are salient to understanding health disparities (Evans-Campbell, 2008; Walters & Simoni, 2002; Walters, Simoni, & Evans-Campbell, 2002).

Fundamental Causes. The stress process paradigm suggests that social antecedents act as “fundamental causes” of disease by way of differential exposure to

stressors which are functions of social status (Link & Phelan, 1995; Phelan, Link, Diez-Roux, Kawachi, & Levin, 2004; Turner, 2010; Wheaton et al., 2013). Link, Phelan, and colleagues emphasize that upstream social stressors need to be addressed to reduce psychological distress and therefore health risk (Aneshensel, 1992; Aneshensel et al., 1991; Link & Phelan, 1995; Link, Phelan, & Diez-Roux, 2004).

For Indigenous people, historically traumatic events are key health outcome antecedents which began a pathway toward increased risk for substance use disorders and other health consequences (Walls & Whitbeck, 2012; Walters & Simoni, 2002; Walters et al., 2002). Several Indigenous and non-Indigenous scholars posit that historically traumatic colonial events acted as etiological agents for contemporary AI behavioral health and family relationship outcomes (Brave Heart, 1998; Elias et al., 2012; Elm, Walls, & Aronson, under review; Evans-Campbell, 2008; Horejsi, Craig, & Pablo, 1992; Gone, 2009; Paradise, 2016; Sarche & Whitesell, 2012; Walls & Whitbeck, 2012; Walters & Simoni, 2002; Walters, Simoni, & Evans-Campbell, 2002; Walters et al., 2011; Whitesell et al., 2012). Response to historical traumas is one explanation for problematic substance use among AIs (Evans-Campbell, Walters, Pearson, & Campbell, 2012; Morgan & Freeman, 2009; Segal, 1999; Yellow Horse Brave Heart, 2011) with self-medication being a specific a hypothesis for substance abuse as an attempt to numb and avoid pain resulting from these traumas (Yellow Horse Brave Heart, 2011). Empirical evidence of the relationship between historical trauma and substance misuse has been reported by several Native and non-Native scholars (Brave Heart, 2003; Ehlers, Gizer, Gilder, Ellingson, & Yehuda, 2013; Whitbeck, Chen, Hoyt, & Adams, 2004; Wiechelt, Gryczynski, Johnson, & Caldwell, 2012).

Universe of Stress. The universe of stress concept describes a vast set of environmental demands, events, and situations which are potential social stressors. Potential stressors exist across multiple dimensions and domains and each may or may not activate an individual's stress response (Elm, Walls, & Aronson, under review; Turner & Wheaton, 1997; Wheaton, Young, Montazer, & Stuart-lahman, 2013). Responsiveness to stressors is partially dependent on factors such as cultural and environmental context, timing, developmental stage, and others (Wheaton, 1994; Turner & Wheaton, 1997). These factors can also influence the magnitude of impact on an individual (Wheaton, 1994; Turner & Wheaton, 1997). Therefore, not all individuals and populations experience stressors in the same qualitative manner. This concept also explains that individuals or groups vary in their exposure because of the meaning that is associated with the demand, situation, or event. In other words, context matters when considering stressor exposure.

The concept of the universe of stress has important implications for health disparities research. Wheaton and colleagues (2013) claim that understanding the universe of stress is needed for demonstrating that social stress is driving health disparities. It is necessary to cast a wide net for investigating a breadth of stressor domains, types, and dimensions, with careful attention to including potential stressors. This ensures that culturally and developmentally meaningful stressors and stressor constellations are captured in the stress universe construct for sub-populations (Pearlin, 1983; Pearlin et al., 2005; Turner & Avison, 2003; Wheaton,1999). Without conducting research in this way, measurement error may lead to underestimation of stressor

exposure and therefore erroneous conclusions about the influence of stressors on health (Turner & Avison, 2003; Turner & Lloyd, 1995; Wheaton 1994).

Stress Proliferation. Embedded within a life course framework is the concept of stress proliferation which offers another concept to link social stress to later health outcomes. The most basic idea is that life challenges give rise to additional stressor exposures over time and this accumulation in circumstances may intensify the negative effects of other stressors (Pearlin, Schieman, Fazio, & Meersman, 2005). In other words, stressors can interact across a range of developmental time periods and across generations as a series of events and situations (Evans-Campbell, 2008). For AIs, proliferation and accumulation of stressors began historically (Walters & Simoni, 2002; Walters et al., 2011) and proliferation continues in to the present.

This dissertation recognizes that contemporary AI stressors are historically-anchored determinants of AI health (Elm, Walls, & Aronson, under review; King, Smith, & Gracey, 2009) and that an assortment of potential stressors may contribute to the contemporary accumulation and proliferation of stressful events for AIs across the life course and traversing generations (Evans-Campbell, 2008; Pearlin, 1989; Pearlin et al., 2005; Pearlin, Aneshensel, & LeBlanc 1997; Shanahan, Mortimer, & Johnson, 2016; Walters & Simoni, 2002). Together, the concepts discussed above guided the methodological decisions to expand the assessment of childhood stressors and use latent class analysis (LCA) as a meaningful tool to understand clusters of childhood stressors.

Applied Indigenous Context. This section brings the aforementioned concepts and theories together and applies a historical lens to AI children and families more

specifically. Above it was discussed that historically traumatic events can act as etiological agents and that contextual understandings of childhood stressors are necessary for the development of an AI universe of stress construct and health disparities research. A brief example of how historically traumatic events may have led to current increase in risk for AI children is presented here.

Genocidal acts, such as the systematic removal of children from their homes and placement into long-term boarding school led to cultural and familial loss, sadness, guilt, depression, and unresolved grief, and diminished parent capacity, often times complicated by substance abuse (discussed above as historical trauma response; Brave Heart, 2008). Moreover, boarding school experiences may have interrupted the intergenerational transmission of healthy child-rearing practices and in some cases supplanted them with harsh parenting (Horejsi, Craig, & Pablo, 1992; Morrissette & Naden, 1998) or compromised parent-child attachment (Sarche, Narayan, Croy, Elm, & Beaulieu, in preparation). Not unlike other populations who have experienced mass group trauma, children of boarding school attendees also exhibited symptoms, similar to post-traumatic stress disorder and depression (Berant, 2002; Braga, 2012; Brave Heart, 1998; Duran & Duran, 1995; Evans-Campbell, 2008; Prince, 1985a; Prince, 1985b; Walters & Simoni, 2002). This intergenerational cycle of the distal effects of colonization (e.g., grief, loss, mental distress, compromised parenting) may be fundamental for understanding the disproportionate rates of childhood adversities and distal behavioral health risk and challenges within tribal communities (Brave Heart, 1998; Elias et al., 2012; Evans-Campbell, 2008; Walls & Whitbeck, 2011; Walters, Simoni, & Evans-Campbell, 2002; Whitesell et al., 2012; Whitbeck et al., 2009). Today's family- and

community-level reservation living situations translate into some Native children being vulnerable to a widespread assortment of childhood stressor exposures. These ideas are best represented in the conceptual and theoretical works of Evans-Campbell (2008) and Walters and Simoni, (2002) mentioned above. Evans-Campbell (2008) offers a multi-level framework as an important lens for understanding indigenous child, family, and community level stressors in context of historically traumatic events. The Indigenist stress coping model is among the most prominent representations of historical and contemporary types of stressors that impact Native health (Walters, Simoni, & Evans-Campbell, 2002).

Childhood Adversities as Determinants of Health

Childhood adversities are a critical component of understanding the role of stress and trauma exposure on health (Felitti et al., 1998; WHO, 2015). The influence of childhood adversities on health can conceptualized within two broad domains: direct or indirect mechanisms. Childhood stressors can impact biology directly (e.g., changes to the neurologic, endocrine, immune, and metabolic systems) and become embedded early in life, contributing to increased risk for morbidity and mortality in adulthood (Berens, Jensen, & Nelson, 2017). Many direct and indirect relationships and mechanisms are beyond the scope of this dissertation.

Childhood adversities, behavioral health, and T2D have many complex and interconnected relationships. These can be conceptualized in terms of accumulation, risk factors, correlates, mediators, moderators, and comorbidities. For example, ACEs increase risk for smoking (Anda et al., 1999; Jun & Rich-Edwards, 2008; Mersky, Topitzes, & Reynolds, 2013; Vander Weg, 2011; Walsh & Cawthon, 2014) and smoking

is linked to T2D onset and T2D-realted complications (Śliwińska-Mossoń & Milnerowicz, 2017). Again, many of the interconnections between childhood stressors and health outcomes are beyond the scope of this dissertation. The remainder of this literature review focuses on the relationships between childhood stressors and T2D, smoking, alcohol use, and depression. Comorbidities among T2D and behavioral health challenges, and childhood adversities among AIs is discussed in Chapters 4 – 7.

Childhood adversity and type 2 diabetes

Cumulative exposure to childhood adversities have physical health implications. Literature generally indicates a positive association between ACEs and T2D (Felitti et al., 1998; Huang et al., 2015; Gilbert et al., 2015; Huffhines et al., 2016), yet compared to other chronic physical health conditions (e.g., cardiovascular disease), ACEs and T2D is less studied (Huffhines et al., 2016). Specific results about the relationships between ACEs and T2D are mixed (Huang et al., 2015; Huffhines et al., 2016). One reason findings appear to vary is because of differences in the operationalization of variables, including the overall construct of ACEs as a specific set of childhood stressors, and whether co-variates were included in analyses. For example, in one study, sexual and physical abuse, and parent separation/divorce were associated with T2D in unadjusted models. However, when age, race, gender, marital status, educational attainment, region, and income were included in the models, sexual and emotional abuse, and having a parent with a mental illness increased the likelihood of having a T2D diagnosis (Campbell, Farmer, Nguyen-Rodriguez, Walker, & Egede, 2018a). In a meta-analysis that focused only on sexual and physical abuse, and neglect, persons who reported an exposure to one of these forms of maltreatment had a

32% increase in risk of developing T2D compared to participants with zero ACEs exposures (Huang et al., 2015). This same meta-analysis reported that neglect had the strongest relationship with T2D risk compared to physical and sexual abuse (Huang et al., 2015).

Childhood stressors and non-traditional tobacco use

Multiple studies have shown that a graded relationship exists between exposure to multiple childhood adversities and smoking behaviors across multiple populations (Anda et al., 1999; Jun & Rich-Edwards, 2008; Mersky, Topitzes, & Reynolds, 2013; Vander Weg, 2011; Walsh & Cawthon, 2014), including AIs (Warne et al., 2017). For several of these studies the graded associations were also strong (Anda et al., 1999; Jun & Rich-Edwards, 2008; Walsh & Cawthon, 2014). One meta-analysis reported a moderate association between exposure to 4 or more ACEs and current smoking (Hughes et al., 2017). In a more recent and nuanced study, it was found that young adults in a “High/Multiple ACEs class” had more than three times the odds of reporting current commercial tobacco use compared to those in a “Low ACEs Class” (Shin, McDonald, & Conley, 2018).

Childhood stressors and alcohol use

Many studies have concluded that cumulative ACEs are associated with AUDs in adulthood (Koss et al., 2003; Kunitz, Levy, McColoskey, & Gabriel 1998; Langeland & Hartgers, 1998; Warne et al., 2017). Like other outcomes, the relationship between the number ACEs and the risk of adult problematic drinking (e.g., heavy drinking, self-reported alcohol problems, self-reported alcoholism, and early initiation of alcohol use) has been found to be strong and graded (Crouch et al., 2018; Dube et al., 2002; Dube

et al., 2006). A systematic review relieved that individuals who had had at least four ACEs were more than twice as likely to be heavy drinkers and over five times as likely to be a problematic drinker than compared to those who had had zero ACEs (Hughes et al., 2017).

Childhood stressors and depression

The relationship between ACEs and depressive disorders and symptoms is another well studied area. The literature demonstrates that as ACEs accumulate so does the risk for lifetime and recent depressive disorders and symptoms (Almeida et al., 2011; Chapman et al., 2004; Danese et al., 2009). Exposure to ACEs tends to increase the likelihood of depressive disorder by least two times compared to those with no ACEs exposure (Chapman et al., 2004; Kessler, Davis, & Kendler, 1997; K. M. Scott, Smith, & Ellis, 2010). Also, childhood adversities account for as much as 30% to 60% of depression onset (Afifi, Boman, Fleisher, & Sareen, 2009; Dunn, McLaughlin, Slopen, Rosand, & Smoller, 2013; Keyes et al., 2012; McLaughlin et al., 2010; Nock et al., 2013; K. M. Scott et al., 2010). Those who are ACEs exposed also tend to experience a more chronic and severe course of depression (Nannim Uher, & Danese, 2012).

CHAPTER 3: METHODS

This Methods chapter describes the parent study from which I conducted secondary data analysis, the sample and characteristics, and additional background on the dataset that is relevant to Chapters 4 through 6.

Parent Study

The Maawaji' idi-oog Mino-ayaawin (Gathering for Health; i.e., G4H) study was funded by the National Institute of Digestive Diabetes and Kidney Disease (R01 DK091250; Walls, PI). The G4H project was a collaborative research endeavor between the University of Minnesota Medical School, Duluth Campus, and five reservation-based tribal communities in the Midwest, Great Lakes region. The broad goal of the G4H project was to advance measurement of stress processes for AIs. The project involved comparisons of stress biomarkers and self-report measures, investigating interactions between stress processes, and evaluation of T2D disease progression and treatment compliance. The first specific aim of G4H was to couple existing preliminary data on community salient stressors with qualitative feedback on existing measures to adapt and subsequently examine the psychometric properties of stress measures for AIs. The second specific aim was to investigate the relationship between stress biomarkers and self-reported psychosocial stressors, symptoms of distress, and diagnostic measures of anxiety, depression, and trauma to ascertain the degree to which self-report measures are indicative of physiological stress levels. The third specific aim was to follow the study cohort for two years and investigate an innovative conceptual model of multiple measures of stress processes, treatment compliance, mental health, and risk factors for

disease complications. The overall conceptual framework for the G4H study is summarized in Figure 3.1.

The aims and research questions of this dissertation are directly relevant to the G4H project goals of advancing measures of stress and understanding the role of stress processes for AIs, particularly those with T2D. For example, examining childhood stressors while through latent class analysis helps to inform the development of an AI-specific ACEs measure.

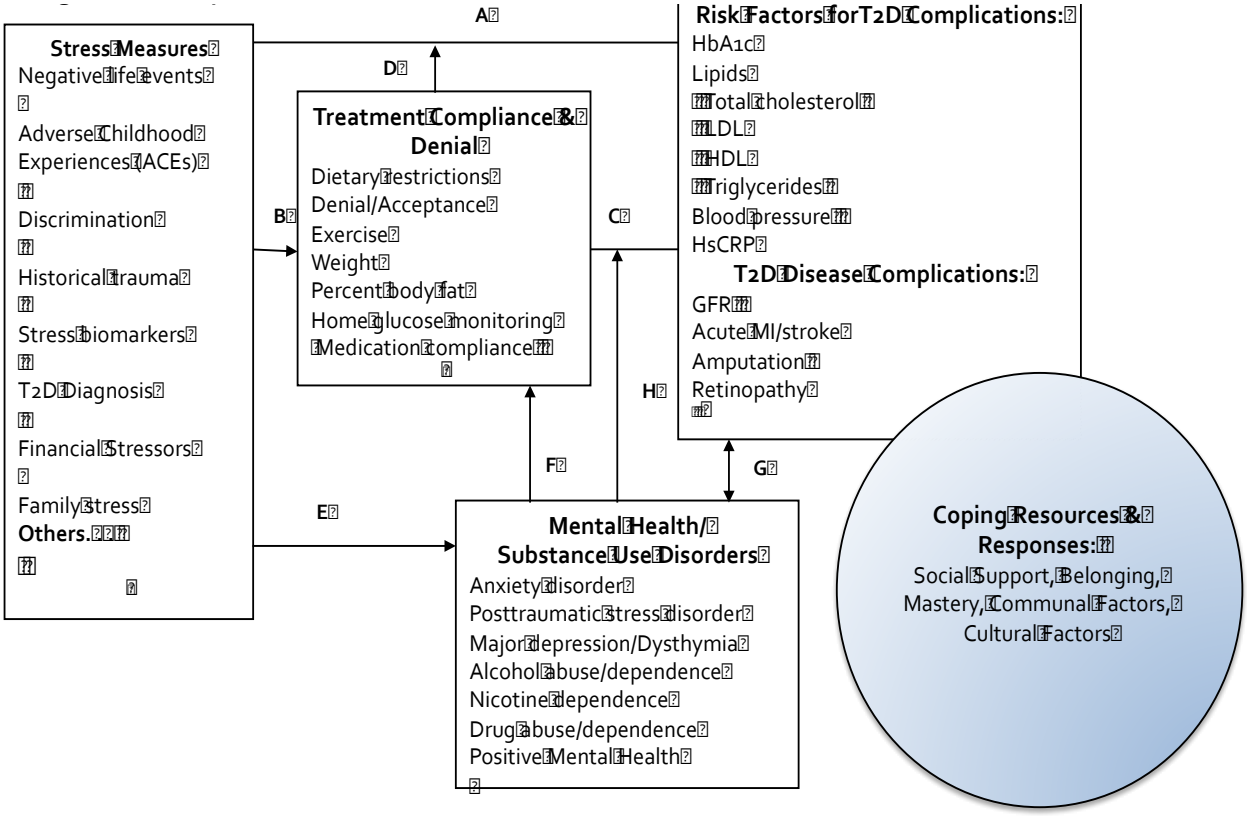

Figure 3.1.

Conceptual Model of the Gathering for Health Study.

The G4H project involved two major phases. First was a qualitative phase, which included two sets of focus groups.[4] The second phase of the parent study involved a longitudinal quantitative phase. For the quantitative phase, four data collection points and assessments were completed for each participant over the course of 18 months. Survey data, salivary cortisol samples, and chart review information from community

[4] Candidate Elm analyzed data from the first set of focus groups and co-authored a manuscript with PI Walls et al. based on this analysis. Title: Sources of Stress among American Indians in the Midwest with type 2 diabetes (under review). This qualitative study, along with the theoretical rationale discussed in this dissertation, showed evidence that an investigation of childhood stressors among the sample was needed. Within the focus groups, participants primarily discussed adult stressors and very little discussion occurred about childhood stressors. The qualitative focus group analysis also provided Candidate Elm with meaningful cultural and background data which helped to conceptualize this dissertation and interpret findings for this dissertation.

medical clinics was collected at each of these time points. Survey data was collected using computer-assisted personal interviews (CAPI) and laptops. Data from laptops were electronically synced via wireless internet connection to a secure server and converted to SPSS data files. Each volunteer received a dinner and wild rice incentive at each focus group, a $50 incentive for completion of each CAPI, and $50 for correct completion of salivary cortisol samples at each assessment. Baseline data collection began in November 2013 and concluded in November 2015.

Human Subjects

This dissertation study falls within the human subjects protocol of the parent study. The University of Washington Institutional Review Board (IRB) released human subjects compliance to the University of Minnesota's IRB and the National Indian Health Service IRB after confirming that the data set used for this dissertation was sufficiently de-identified.

Community-Based Participatory Research Methodology

The parent study and this dissertation follow community-based participatory research (CBPR) principles. Activities aimed at achieving CBPR goals included training of community members as research assistants, community-level infrastructure enhancement, and implementation of permission and verification processes. For example, local Community Research Councils (CRCs) on each participating reservation worked in close collaboration with the G4H research team to develop, refine, and implement study procedures and instruments. This included CRC members providing

feedback on the validity, breadth, redundancy, and cultural relevance of all survey items in the parent study.

As with the parent study, this dissertation is rooted in CBPR methodologies. Candidate Elm travelled to meet with CRC members three times from 2015 to 2017 to meet with CRC members, gain proxy-trust through P.I. Walls (Lucero, Wright, & Reese, 2018), and discuss research ideas and plans. Research findings from this dissertation will be presented in-person to the CRC members within three months of dissertation submission and prior to dissemination through publications and study briefs. All papers resulting from this study will be reviewed by the CRCs prior to submission for publication and community members will be offered the opportunity to co-present and co-author publications.

Tribal government and community approvals

Ethical protocols for approval of the parent study and this dissertation were followed. Each of the five tribal nations who participated in the parent study passed a tribal resolution in support of the parent study prior to the submission of the research proposal. The local CRCs on each reservation approved the parent study scope of work, of which this dissertation and a more specific conceptual overview of this dissertation are included and a more specific conceptual overview of this dissertation. Candidate Elm presented a brief in-person presentation at the quarterly CRC meeting in spring of 2017. Candidate Elm explained to the CRCs that the dissertation would involve examination of childhood stressors with the goal of gaining knowledge about which childhood stressors may be particularly salient for the communities involved in the G4H study, for AIs in general, and for AIs with T2D. The specific aims, research

questions, theoretical foundation, and methods for this dissertation are in alignment with the CRCs approval and desire to investigate childhood stressors. Due to tribal confidentiality, identification of the five participating tribes are not revealed in this dissertation.

Sample

The five partnering tribal health clinics were actively involved in the sampling procedure for the parent study. Clinic staff at each site generated simple random probability samples from tribal clinic records of individuals with a recent diagnosis of diabetes who were over the age of 18 and self-identified as AI. At the beginning of each six-month study period, clinic staff repeated this sampling procedure. A total of 344 individuals were selected for invitation to participate in the G4H study, of which 43 were ineligible for participation, 96 declined participation, and 11 could not be contacted. The baseline study response rate was 67% and the final baseline sample included 194 participants.

The sampling frame and the analytic sample for this dissertation includes all participants from the G4H study who completed the baseline survey (N=190). This includes 106 females (56%) and 84 males (44%) with a median age of 46 years (range = 18 – 77). Of the 190 participants, 78% reported currently living within reservation boundaries and 22% reported living off reservation land. Participants were asked about their relationship status. Forty-six percent of individuals reported being married, 31% indicated cohabitation with a partner, 23% reported being divorced. The remained were either in a significant relationship and not cohabiting, separated, single, or “something else”. Employment status was also assessed. Forty-nine percent of participants

reported that they were employed full time, 12% reported being unemployed and looking for work, 12% reported that they were unable to work due to disability, 11% reported that they were employed part time, 4% reported that they were retired, 4% reported being unemployed and not looking for work, 3% reported student status, 3% reported “something else”, and 2% reported being a homemaker. Participants reported on their current level of education. Thirteen percent reported less than a high school degree, 33% reported having a high school degree or high school equivalency certificate, 41% reported having some college, vocational, or technical training, 13% reported having a college degree, and 1% reported having an advanced degree. Mean per capita household income for the sample is $9,775 with a range of $156 to $37,500. Table 3.1 presents demographic characteristics of the sample.

Table 3.1

Sociodemographic Characteristics of Gathering for Health Study Participants (N= 190)

Female gender	56%
Age (yrs.)	
Median	46
Range	18 - 77
SD	12.2
Resides on reservation	78%
Relationship status	
Married	31%
Divorced	23%
Other	46%
Employment status	
Full time	49%
Part-time	11%
Unemployed	12%
Disabled	12%
Retired	4%
Student	3%
Other	9%
Educational attainment	
Less than high school	13%
High school / equivalent	32%
Some college / vocational*	41%
College degree	13%
Advanced degree	1%
Income	
Mean per capita household	$9,775
Range	$156 - $37,500
SD	$8,899

* Some college, technical or vocational certificate, or associates degree

Measures

All childhood stressor measures and items used in final analyses are described in this chapter. The childhood stressor constructs that did not make it into final analyses are discussed in Chapters 4 and 5 in the context of describing the analytic process. Childhood stressor coding descriptions that vary from this chapter are presented in the appropriate corresponding methods sections in Chapters 4 and 5. Behavioral health outcome items and coding are presented in Chapter 6. Questionnaires and items used for this dissertation are also summarized in the Appendix.

Childhood Stressors: Modified Adverse Childhood Experiences - International Questionnaire (ACE-IQ)

The modified ACE-IQ (hereafter referred to as ACE-IQ) was the primary instrument used for assessing exposure to childhood stressors for this dissertation. The CRCs requested one modification to the original ACE-IQ to include ‘spanking’ in the physical abuse question, whereas the ACE-IQ does not include spanking in the physical abuse construct. (Implications for this are discussed in later chapters.) The *Guidance for Analysing ACE-IQ* that accompanies the ACE-IQ survey guided two distinct ways of coding the variables [World Health Organization (WHO), 2016]. This is discussed further in Chapters 4 and 5. The CDC-Kaiser research and corresponding ACEs Study questionnaire (discussed in the previous chapters), plus expert input organized by the WHO informed the ACE-IQ. A side-by-side comparison of the ACE-IQ and questionnaires referred to in Chapter 4, including CDC-Kaiser ACE Study questions, are presented in the Appendix.

Physical abuse. Two questions from the ACE-IQ determined exposure to physical abuse: (1) “When you were growing up, how often did a parent, guardian, or other household member spank you, slap you, kick you, punch you, or beat you up?” and (2) “When you were growing up, how often did a parent, guardian, or other household member hit you with or cut you with an object, such as a stick, cane, bottle, club, knife, or whip?” Response categories included: “never,” “once,” “a few times,” “many times,” and “don’t know / refused.” Coding for physical abuse varied across analyses and is discussed in Chapters 4 and 5.

Sexual abuse. Exposure to sexual abuse was determined from four ACE-IQ questions: (1) “When you were growing up, how often did someone touch or fondle you in a sexual way when you did not want them to?”; (2) “When you were growing up, how often did someone make you touch their body in a sexual way when you did not want them to?” (3) “When you were growing up, how often did someone attempt oral, anal, or vaginal intercourse with you when you did not want them to?”; and (4) “When you were growing up, how often did someone actually have oral, anal, or vaginal intercourse when you did not want them to?” Response categories included: “never,” “once,” “a few times,” “many times,” and “don’t know / refused.” If a participant reported “never” on all four questions, then they were considered to be unexposed and the sexual abuse variable was then coded as “0.” If the participant reported anything other than “never” on any of the four sexual abuse questions, then the variable was coded as “1” and the participant was considered exposed. For the two separate analyses in Chapters 4 and 5, this construct was coded the same.

Emotional abuse. Exposure to emotional abuse was determined from two

ACE-IQ questions: (1) “When you were growing up, how often did a parent, guardian, or other household member yell, scream, swear at you, insult you, or humiliate you?” and (2) “When you were growing up, how often did a parent, guardian, or other household member threaten to, or actually, abandon you or throw you out of the house?” Response categories included: “never,” “once,” “a few times,” “many times,” and “don’t know / refused.” Coding for emotional abuse varied across analyses is discussed in more detail in Chapters 4 and 5.

Neglect. The ACE-IQ contains three questions that pertain to neglect. These include: (1) “When you were growing up, how often did your parents or guardians not give you enough food even when they could easily have done so?”; (2) When you were growing up, how often were your parents or guardians too drunk or intoxicated by drugs to take care of you?; and (3) “When you were growing up, how often did your parents or guardians not send you to school even when it was available?” Response categories included: “never”, “once”, “a few times”, “many times”, and “don’t know / refused”. The construct of neglect was only included in the second analysis (Chapters 5 and 6). Coding for this variable was unique, did not follow the ACE-IQ *Guidance for Analysing ACE-IQ*, and is expanded upon in Chapter 5. Chronbach’s alpha for the neglect sub-scale was .858.

Household incarceration. Household member incarceration was determined from one ACE-IQ question: “When you were growing up, did you live with a household member who was ever sent to jail or prison?” This variable was coded as “1” if the participant answered “yes” and “0” if the participant answered “no”. This coding did not vary across analyses.

Household mental illness/suicidality. Having lived with someone who was depressed, mentally ill, or suicidal was determined from one ACE-IQ question: "When you were growing up, did you live with a household member who was depressed, mentally ill, or suicidal?" This variable was coded as "1" if the participant answered "yes" and "0" if the participant answered "no". Coding for this variable also did not vary across analyses.

Witnessing household violence. Three ACE-IQ questions pertained to witnessing household violence: (1) "When you were growing up, how often did you see or hear a parent or household member in your home being yelled at, screamed at, sworn at, insulted, or humiliated?"; (2) "When you were growing up, how often did you see or hear a parent or household member in your home being slapped, kicked, punched, or beaten up?"; and (3) "When you were growing up, how often did you see or hear a parent or household member in your home being hit or cut with an object, such as a stick, cane, bottle, club, knife, or whip?" Coding for witnessing household violence is discussed in more detail in Chapters 4 and 5. The Cronbach's alpha for the witnessing household violence questions was .794.

Peer victimization*.* Peer victimization was determined by the ACE-IQ question: "When you were growing up, during the first 18 years of your life, how often were you bullied?" Response options included: "never," "once," "a few times," "many times," and "don't know / refused." Peer victimization was included in the second analysis only and coding specifics are presented in Chapter 5.

Witnessing community violence*.* Exposure to community violence was determined from responses to three ACE-IQ questions: (1) "When you were growing up,

how often did you see or hear someone being beaten up in real life?"; (2) "When you were growing up, how often did you see or hear someone being stabbed or shot in real life?"; and (3) "When you were growing up, how often did you see or hear someone being threatened with a knife or gun in real life?" Response options included: "never," "once," "a few times," "many times," and "don't know / refused." Coding for witnessing community violence varied across analysis and is described in Chapters 4 and 5. The Cronbach's alpha for the witnessing community violence questions was .794.

Other Childhood Stressors

Other childhood stressors not measured using the ACE-IQ are presented here. Two G4H questions determined whether *pregnancy or parenthood* occurred prior to age 18: (1) "Are you now or have you ever been a mother/father, guardian, or caretaker to dependent children?" and (2) "How old were you when you had your first biological child or became a primary caretaker to a dependent child?" This variable is included in the second analysis only (Chapter 5). Again, this chapter describes childhood stressor variables used in final analysis. Chapters 4 and 5 describe additional childhood stressors not included in final analysis along with the rationale for exclusion (e.g., homelessness, divorce and separation).

Behavioral health outcomes variables and coding are discussed in Chapter 6.

Data Preparation and Screening

All analyses for this dissertation utilize baseline, or wave one, data. Raw data screening, including examination of univariate distributions and bivariate correlations, assessment of missing data trends, variable coding, data management, ACES prevalence analysis for Chapter 4, and data set preparation for latent class analysis

modeling were completed in SPSS v. 23 (IBM, 2016). The remaining analyses including latent class modeling and assessment of the associations between subgroups and behavioral health outcomes were completed in Mplus (Version 8; Muthén & Muthén, 1998–2012).

Missing data. As mentioned above, 190 participants completed the baseline survey. Data for these participants were assessed for missing data patterns in order to determine whether any participant characteristics were associated with non-response to a given item(s). One missing data pattern emerged as not missing at random (NMAR). In this instance, eight individuals responded to either zero or only one of ACE-IQ questions. Comparison of means and proportions tests were conducted to determine whether the eight individuals with this missing data pattern differed in terms of demographics (i.e., age, gender, educational attainment, household income) from those who had answered at least two of the ACE-IQ questions. Results showed that those who answered none or only the first ACE-IQ question significantly differed in terms of age only. Given that this difference, while nonrandom, was very small, the Full Information Maximum Likelihood (FIML) procedure was applied in Mplus. A typical assumption for using FIML is that data are missing at random (MAR); however, studies have shown that even when data is NMAR, FIML is superior to pairwise and listwise deletion methods of handling missing data. This method of handling missing data is superior to and estimates parameters and standard errors to estimate missingness (Mazza, Enders, & Ruehlman, 2015; Schafer & Graham, 2002). Although several possibilities may help explain why some participants chose not to complete the majority

of the modified ACE-IQ questions, this is irrelevant to this analysis given the use of FIML.

This dissertation extends the parent study by utilizing cross-sectional baseline survey data from the parent study to explore childhood stressors and exposure patterns, then testing whether subgroups of individuals with different exposure types and compositions have greater or lesser odds of smoking, alcohol misuse, and depressive symptoms. Chapters 4 through 6 each have a supplemental Methods section to accompany this Methods Chapter.

CHAPTER 4: PREVALENCE OF ADVERSE CHILDHOOD EXPERIENCES AMONG AMERICAN INDIANS WITH TYPE 2 DIABETES

As presented in Chapter 1, AIs experience disproportionately high rates of T2D (IHS, 2015) and exposure to childhood adversities (Brockie et al., 2015; Warne et al., 2017). Despite these disparities, minimal research has been conducted about ACEs among AIs with T2D. In the context of T2D and childhood stressor disparities among AIs, and the ACEs and T2D literature, as discussed in Chapter 2, it is useful to assess a population of AIs with T2D to estimate the prevalence of singular and co-occurring ACEs (i.e., ACEs score). For this chapter, I report the prevalence of seven childhood stressors (i.e., sexual, emotional, and physical abuse, household violence, substance abuse, mental illness/suicide, and incarceration) and ACEs scores among a sample of AI adults with T2D from the Midwest. I compare estimations from this dissertation study with those from studies with nationally representative samples, including a general sample, adults with T2D, and an AI sample.

Analytic Process

The description of the overall methods for this dissertation is discussed in the previous chapter. Below are descriptions of the population studies for comparison with the G4H sample. Following the descriptions of the comparison studies, I provide specific coding methods used for *this* chapter. Although direct comparisons across studies cannot be achieved, the analysis discussed in this chapter was designed so that ACEs variable coding closely reflected coding used in other studies.

Comparison Studies

Behavioral Risk Factor Surveillance System Survey (BRFSS). The BRFSS survey is a random-digit-dialed population-based state telephone survey administered through state health departments in collaboration with the CDC (CDC, 2018). It is the largest continually conducted health survey in the world and reports on health risk behaviors, chronic conditions, and health care access. States collect ACEs data through an optional module which is modified from the original CDC-Kaiser ACE Study. (See Appendix for comparison of questionnaires.) Data from the 2011 BRFSS ACEs module survey were transformed to represent a nationally representative sample. The BRFSS data is a good choice for comparisons with this G4H study because it is a widely used data set for contemporary ACEs studies (e.g., Campbell, Farmer, Nguyen-Rodriguez, Walker, & Egede, 2018b; Jones, Nurius, Song, & Fleming, 2018).

National Survey of Children's Health (NSCH). The NSCH is a quadrennial random-digit-dialing household survey designed to produce national and state-specific prevalence estimates on myriad variables pertaining to the physical and emotional health of children under age 18. The survey has a special emphasis on child well-being factors (e.g., family interactions, parental health safe neighborhoods). Data presented here has previously been analyzed by Kenney and Singh (2016). The Kenney and Singh (2016) estimates are a useful reference point for this dissertation because they are from the only nationally representative data about ACEs for AIs that was identified in a literature search. In common with this study, the ACEs prevalence estimates they calculated were household violence, substance abuse, mental illness, and incarceration only.

Prevalence data from the BRFSS and the NCHS are included in Table 4.1, alongside G4H findings. The G4H, BRFSS, and NCHS questionnaires can be found in the Appendix aligns the G4H ACEs questions with the corresponding ACEs questions from BRFSS and NCHS, while noting the minor differences between G4H and the Adverse Childhood Experiences - International Questionnaire (ACE-IQ). (See Chapter 3 for further description of the ACE-IQ.)

Measurement Coding. For this chapter and data set, sexual, emotional, and physical abuse, household violence, substance abuse, mental illness/suicide, and incarceration exposures were estimated using the *Modified Adverse Childhood Experiences - International Questionnaire* (ACE-IQ; WHO, 2012) and methods similar to the BRFSS. This allowed for close conceptualization of variables across studies in order to draw reasonable comparative conclusions. Adversity exposures were determined by dichotomizing sexual, emotional, and physical abuse, and household violence variables into ‘1’ for participants who reported any exposure to these forms of abuse. Those who reported that they never experienced these adversities were coded as ‘0’. Participants who responded ‘yes’ to the questions about household substance abuse, mental illness/suicide, and incarceration were coded as ‘1’. Those who responded ‘no’ were coded as ‘0’. Childhood adversity prevalence estimates were calculated with a 95% confidence interval.

One difference between the use of variables for this study compared to the BRFSS was the omission of the parent divorce and separation variable which was excluded for several reasons discussed in detail in Chapter 5 and briefly summarized here. First, the question was deemed culturally invalid as it does not account for

extended family members who often act as caregivers for children. Second, norms about legal marriage differ in Native communities. Third, recent literature have shown that parent separation/divorce was negatively associated with T2D (Campbell et al., 2018a) and the well-established correlate of T2D: depression (Campbell, Walker, & Egede, 2016). The prevalence of positive responses to each exposure type are reported in Table 4.1.

This chapter also reports ACEs scores among G4H participants and compares proportions of individuals with each score with those from a 2010, 11-state (i.e., 10 states and Washington DC) BRFSS data set. This was the closest data set to a national representative sample that was discussed in the literature as having an ACEs score. Gathering for Health ACEs scores were calculated by summing the exposures for each singular adversity type; thus, the range of the G4H ACEs score is 0 – 7 and 0 – 8 for the BRFSS sample, with a 0 indicating exposure to no ACEs categories. To be included among participants who had a summed ACEs score, G4H respondents needed to answer a minimum of four of the ACEs questions. Individuals who completed the BRFSS ACEs module were included in ACEs score estimations for the 11-state estimates (CDC, 2015).

Findings and Discussion

Among G4H participants, exposure to household violence was the most common adversity reported (65.3%; CI = .620 - .686). High rates of sexual abuse (29.1%; CI = .227 - .369), emotional abuse (51.6%; CI = .490 - .542), physical abuse (55.8%; CI = .530 -.586), and household substance abuse (48.1%; CI = .457 - .505) exposures were also experienced by G4H participants. About one-third (31.8%; CI = .302 - .334) of the

individuals reported having a household member who was incarcerated while they were growing up and 21.7% (CI = .206 - .228) of the sample reported living with a household member with mental illness or suicidality.

Table 4.1
Percent of Exposure to Childhood Stressors among American Indian Adults with Type 2 Diabetes (Gathering for Health), Nationally Representative Sample of Adults – All Races (BRFSS), Nationally Representative Sample of Adults with Type 2 Diabetes – All Races, (BRFSS - TD), and Nationally Representative American Indians and Alaska Natives (NSCH - AIANs)

	Gathering for Health	BRFSS	BRFSS - T2D	NSCH - AIANs
Sexual abuse	29.1%	7.2%	11.6%	-
Emotional abuse	51.6%	32.8%	33.7%	-
Physical abuse	55.8%	13.6%	16.7%	-
Household violence	65.3%	17.2%	18.1%	15.5%
Household substance abuse	48.1%	29.2%	29.9%	23.6%
Household mental illness/suicide	21.7%	17.9%	16.1%	13.2%
Household incarceration	31.8%	7.2%	6.60%	18.0%

Note: In the G4H survey, the physical abuse question includes spanking. The BRFSS survey does not include spanking in their question about physical abuse. See Appendix for comparison of questions across surveys.

Table 4.2 illustrates the prevalence of accumulating ACEs, represented as ACEs scores of 0, 1, 2, 3, or 4 or more. Again, the maximum value for the G4H sample was 7 and for the BRFSS samples it was 8. Table 4.2 compares the ACEs scores from the G4H participants with the BRFSS samples only since the NSCH study did not report on abuse categories. An overwhelming proportion (85.3%) of the G4H sample reported exposure to at least one of the seven ACEs and nearly 40% (38.9%) were estimated to have experienced one, two, or three ACEs. Approximately 40% (41.6%) of respondents experienced four or more ACEs.

Table 4.2

ACE Score Prevalence for Gathering for Health and the 2010 BRFSS

	Gathering for Health	BRFSS 2010
Number of ACEs (ACE score)		
0	14.7%	40.7%
1	9.5%	23.6%
2	16.8%	13.3%
3	12.6%	8.1%
4 or more	41.6%	14.3%

Despite the disproportionate rates of T2D diagnosis and ACEs among AIs, and knowledge about stress and trauma as etiological agents of metabolic disorders (see Chapter 2), this is the first study of which I am aware to document the prevalence of this set of ACEs among AIs with T2D. This study estimates ACEs prevalence by type and by ACEs score for AIs with T2D and assesses whether these prevalence rates are similar or dissimilar to other population estimates. Although caution is necessary in comparing prevalence rates across samples due to measurement and methodological variability (see Appendix for comparison of instruments), findings indicate a highly disproportionate rate of each of the ACEs types and overall ACEs scores among this sample of AIs with T2D, compared to the BRFSS and NSCH samples. These findings are similar to previous studies that found differential rates of ACEs among individuals with T2D (Felitti et al., 1998; Huang et al., 2015; Gilbert et al., 2015; Huffhines et al., 2016) and increased risk of T2D given ACEs exposures (Huang et al., 2015).

Household Violence

Especially remarkable are findings related to household violence. Approximately 15% (range - 15.5%– 17.2%) of both BRFSS groups and the AI national population reported witnessing household violence when growing up, while over 65% (65.3%) of the G4H sample reported growing up among household violence. Brockie et al. (2015) estimated that 40.0% of AI youth ages 15 to 24 were exposed to seeing their mother harmed in the home and among a sample of South Dakotans, 23.8% of the AI population witnessed violence against the mother compared to 5.3% of the non-Native population (Warne et al., 2017). In another study comparing AIs to whites, 55% of low income AI mothers receiving home visiting services in Wisconsin (WI; hereafter refer to as the WI home visiting study), witnessed domestic violence as a child compared to 39% of white mothers (Mersky & Janczewski, 2018). Other comparisons include that among whites in the NSCH study, about 6% reported this adversity.

Household Incarceration

As children, the participants in this study lived with a household member who was incarcerated at particularly high rates when comparing proportions with other populations. About one third of the G4H respondents (31.8%) reported having a household member become incarcerated which is about four and a half times that of the BRFSS general population sample (7.2%) and the BRFSS-T2D sample (6.6%). The G4H rate approaches twice that of the national sample of AIs (18.0%). The estimated rate for the G4H sample is also higher than the rate from the South Dakota study which reported that 22.6% of AIs had lived with a household member who went to jail or prison

(Warne et al., 2017). In contrast, the G4H sample experienced lower rates of this form of childhood adversity compared with the WI home visiting study sample in which the rate among the female participants was 58.9% (Joshua P. Mersky & Janczewski, 2018).

Sexual Abuse

Approximately one-third (29.1%) of the G4H sample reported sexual abuse which is almost three times greater than the 11-state BRFSS study reported above (10.9%). In other recent AI studies, sexual abuse was estimated to be approximately 16% (15.5%) among the SD sample (Warne, 2017), 20% (20.1%) among Plains youth (Brockie et al., 2015), and 25% (25.0%) among AI mothers in the WI home visiting study (Joshua P. Mersky & Janczewski, 2018). Compared to all other AI studies mentioned, G4H sexual abuse rates are higher; although likely not statistically different from the WI home visiting study. In a BRFSS study, 11.6% of individuals with any diabetes reported experiencing sexual abuse which was significantly higher from those with no diabetes (Campbell et al., 2018a).

Emotional Abuse

Rates of emotional abuse appear to be disproportionately high among G4H participants. About half (51.6%) of G4H respondents reported experiencing emotional abuse compared to 35% of the BRFSS sample. In other studies, Brockie et al. (2015) estimated emotional abuse rates among AI youth at a rate similar to the G4H study (48.4%; Brockie et al., 2015); whereas, Warne et al. (2017) and Mersky et al. (2018) reported rates of emotional abuse lower than the G4H sample (30.1% and 23.2%, respectively).

Physical Abuse

Comparing G4H physical abuse rates with other studies is difficult because the G4H survey included a major modification to the physical abuse survey item. As mentioned in Chapter 3, the Community Research Councils asked that 'spanking' be included in the physical abuse question: "When you were growing up, how often did a parent, guardian, or other household member *spank* you, slap you, kick you, punch you, or beat you up?" This change is likely to result in a significant overestimate of physical abuse exposure in relation to previously established standards of assessing this construct. This measurement limitation is also salient because risk of T2D does not appear to increase with exposure to mild physical abuse (e.g., spanking), yet moderate and severe physical abuse does appear to be associated with an increased risk of T2D (Rich-Edwards et al., 2010). Nevertheless, it is important to mention that in one study that compared ACEs among those with and without T2D, there were statistical differences between groups for physical abuse (Campbell et al., 2018a). However, the estimated rate of physical abuse among G4H participants is reported as almost four times greater than in the 11-state BRFSS study (55.8% versus 15.9%), which suggests that the rate among the G4H sample would likely have remained higher than the BRFSS sample, regardless of the physical abuse item modification.

Household Substance Abuse

Among this sample of AI adults with T2D, the prevalence of having grown up among household substance abuse was quite high (48.1%) compared to the 11-state BRFSS study (25.1%), whites in the NSCH (11.6%), and AIs in the NSCH (23.6%).

However, this rate is similar to SD AIs, (50.0%; Warne et al., 2017) and it is lower than the WI home visiting population (72.6%; Mersky & Janczewski, 2018).

Household Mental Illness and Suicidality

In the G4H study, the prevalence of living with an individual with mental illness or who exhibited suicidality was the lowest of all ACEs that were investigated (21.7%); however, this rate was still rather high compared to some other studies. In the 11-state BRFSS study, the estimated rate was 16% (16.3%) and in the NSCH study it was 13.2% among AIs. The prevalence of having lived with a household member with mental illness or suicidality during childhood was estimated to be less than half of the G4H study rate among whites in the NSCH study (9.7%; Kenney & Singh, 2016). Warne et al. (2017) estimated a similar rate (24.4%) for SD AIs who grew up with a household member who had mental illness; whereas, in the WI home visiting study, it was reported that about half of AI mothers grew up in a household with someone who had mental illness (52.9%; Mersky & Janczewski, 2018).

Burden of Childhood Stressors: The ACEs Score

The “ACEs score,” as first coined in the CDC-Kaiser studies and discussed previously in Chapter 2, is often used to represent burden of childhood stressors. ACEs scores are calculated by summing a participant’s reports of exposure to individual adversity types. With this method of calculation, if an individual experienced an event one time then they are considered exposed. Generally, studies tend to report proportions of study participants who experience 0, 1-3, and 4 or more ACEs within ranges of 0 – 7, 0 – 8, or 0 – 10.

This study found that the proportion of G4H participants with an ACEs score of four or greater is about three times greater than the 11-state BRFSS study (41.6% versus 14.3%) and the proportion of participants with an ACEs score of zero is about one-third of the 11-state BRFSS sample (14.7% versus 40.7%). Score estimates should be compared with caution because of measurement and methodology variability. It should be noted that 22.5% of youth in the Brockie et al. (2015) study experienced four or more ACEs and 21.9% reported no ACEs exposure (range 0 – 6). Warne et al., (2017) estimated that 32.4% of South Dakota AIs were exposed to four or more ACEs and that 16.8% were unexposed to ACEs (range 0 – 10). In a study of AI Elders, 31.8% reported exposure to four or more ACEs and about a quarter of this sample were exposed to no ACEs (24.4%; range 0 - 10; Roh et al., 2015). In the Wisconsin home visiting study, the average number of ACEs reported by AI respondents approached four (3.92; range of 0 – 10; Mersky & Janczewski, 2018).

Limitations

The ACEs score information is useful for drawing some general comparisons across studies and populations and theorizing about the influence of co-occurring ACEs on health. However, there are some limitations to the using this indexing method. Scoring ACEs in the usual fashion can be problematic. The summed ACEs score represents a wide variation in the combinations of stressor exposures and implies that each individual ACE has the same magnitude of impact on health. This practice may also discount additional childhood stressors that may have more impact on health for specific populations. Without means to account for the potential heterogeneity in ACEs exposures, non-specific research findings will result. For example, many ACEs studies

report an increase in odds in specific health outcomes in association with the summed score of cumulative childhood stressor exposures. As discussed above, an ACEs score of 4 or greater may be particularly meaningful for understanding cumulative childhood stressor exposure and T2D risk (Bellis et al., 2014; Huffhines et al., 2016), yet we lack specific knowledge about which combinations of four or more types of childhood stressors lead to greater risk compared to other sets of four. Analysis in Chapters 5 and 6 begins to address these issues for AIs by examining a wide range of childhood stressors and how they cluster at the individual level for AI adults with T2D. This analysis is extended in Chapter 6 to assess whether the identified latent classes are differentially associated with behavioral health outcomes. Other limitations (e.g., use of cross-sectional data, over- or under- estimation) are discussed in Chapter 7.

Across most studies that examine the relationship between ACEs and chronic disease risk, researchers conclude that there is a dose-response relationship between the number of ACEs exposed to and disease risk (e.g., Dong et al., 2004; Felitti et al., 1998; Dube et. el, 2003). This pattern does not appear to hold for T2D. Instead there may be a threshold effect involving individuals who endorse at least four ACEs and risk for T2D (Huffhines et al., 2016). That is, those who report exposure to four types of ACEs appear to be at increased risk for any diabetes and T2D, but individuals who have experienced three or fewer ACE types may not be at increased risk for T2D (Campbell et al., 2018; Felitti et al., 1998; Huffhines et al., 2016; Bellis, Hughes, Leckenby, Hardcastle, Perkins, & Lowey, 2014). Furthermore, T2D risk does not appear to increase despite additional exposure to number of ACEs; above four (Felitti et al., 1998a; Huffhines et al., 2016). On the other hand, some studies have found that specific

adversities (e.g., sexual abuse, moderate or severe physical abuse) may contribute to T2D risk. (Rich-Edwards et al., 2010; Riley et al., 2010). Although this study does not examine risk of T2D in relation to ACEs, the disproportionate rate of individuals who experience four or more ACEs is a remarkable finding, particularly in context of research on a potential threshold effect.

Implications

Although implications for each specific type of childhood stressor could be explicated here, the primary aim of this dissertation is to examine *sets* of childhood stressors and, in later chapters, the relationship between childhood stressor sets and health outcomes. Thus, this implications section focuses attention toward the extremely high rate of exposure to household violence for AIs with T2D in the Midwest.

The rate of exposure to household violence for the G4H sample is extraordinarily high compared to populations represented in all other studies mentioned above. This is despite measurement and methodological variance across studies. This suggests that household violence may be acting as a main stressor for children in these tribal communities, as well as other family members in the household. One specific step that that G4H communities could take is partnering with their Tribal councils to encourage them to pass resolutions that specifically recognize that household violence may be a key driver in health disparities, and other types of disparities that go beyond the boundaries of this dissertation (e.g., child welfare implications).

If community members do adopt this recommendation to approach their councils, they should recognize important considerations. First, that tribes may already have intimate partner violence programs and funding in place that address these issues. In

this instance, data from this dissertation might supplement the knowledge they already have. Also, data from this study involves a retrospective report of childhood events that for many respondents took place decades ago. For the current generation, household violence may be less widespread.

Another implication from this analysis, is that Tribal communities are encouraged to define what a trauma-informed approach should look like within their communities and consider the implications for serving patients with T2D. Communities have differing levels of recognition about the resulting proximal, distal, and intergenerational symptoms that have resulted from historical events and losses. However, some tribes involved in this study have begun to educate individuals, families, and communities on the impact of interconnected ACEs and other traumas on health within context of historical traumas. Existing models for preventing and addressing ACEs and promoting intergenerational health can serve as models for tribal communities to adapt or build upon. The Self-Healing Communities Model, for instance, is a community-based capacity building model for enriching and establishing healthy social systems and community networks. The model works by engaging community members, services, experts, funders, and other key partners to create linkages and foster dynamic support systems that assist individuals on a continual basis that is not limited by the duration of involvement with an individual service. This continuous support is achieved through embedding resources within a community context and social network approach (Porter, Martin, & Anda, 2016). Trauma informed-care and approaches are addressed again in Chapter 7.

Research implications that are specific to this chapter are presented here. Additional research implications that cross-cut this chapter and the following two chapters are discussed in Chapter 7 (e.g., need for measurement development). The disparate rates of seven specific ACEs among this sample of AIs with T2D warrant additional research. The above evidence supports a hypothesis that conventional ACEs may be related to T2D. Future research might specifically examine this set of ACEs as risk factors for T2D or its correlates. If this research trajectory is chosen, then longitudinal methods or a prospective study would be the best fit for drawing causal concussions. Aligned with the discussion above and the potential for this set of ACEs to be a risk factor for T2D, future research could also establish whether a threshold effect, dose-response relationship, or other alternative exists for samples of AIs who are at high risk for T2D. Furthermore, cross-sectional analysis could be extended to examine ACEs in relation to T2D management and complications, as there is evidence to suggest that mediating factors (e.g., depression) may play a role in the relationship between ACEs and T2D management (Elm & Aronson, 2015).

Future research should also address the challenges involved when the conventional ACEs index is used with diverse populations. Again, there may alternative or additional ACEs, outside of those presented in this chapter, that drive health outcomes for AIs. It is important that AI-specific ACEs are identified to more fully understand the social processes involved with health consequences. In Chapter 5, I begin to address this issue by considering a broad range of childhood stressors among this unique population. I then use advanced statistical methods to determine if there are distinct patterns and compositional variations of ACEs that occur at the individual level.

CHAPTER 5: LATENT CLASSES OF CHILDHOOD STRESSORS

Ascertainment of the role of childhood adversities in health outcomes is salient to health disparities research. The conventional Kaiser/CDC ACEs measure used in this area of research is potentially misaligned with the experiences of diverse sub-populations. This chapter explores an expanded range of AI-specific childhood stressors with an eye toward informing future instrument development and ACEs methodologies. In alignment with the need for research on AI-specific ACEs and the theoretical and conceptual work discussed in Chapter 2, the aim of this chapter is *to conduct an expanded ACEs assessment and determine whether AI adults with T2D exhibit variability in profiles of childhood stressors* (Specific Aim 2).

Methods

Below, I describe the process of determining which childhood stressors best help distinguish the composition of sub-populations with varied childhood stressor experiences among G4H respondents. This Methods section supplements Chapter 3 highlights the coding methods for dichotomizing childhood stressor variables (which differ from Chapter 4) and describes the parsimonious analytic process for drawing conclusions about latent subgroups of study participants. After exploring childhood stressor patterns, clusters, and descriptors in this chapter, Chapter 6 investigates whether there are differential associations between identified latent classes and behavioral health outcomes.

The first step of analysis in this study was to step back from established assumptions that have been made based on research that uses conventional ACEs and

identify all childhood stressors within the G4H data set. The G4H codebook was closely reviewed and all questions used in the study that addressed potential childhood stressors were identified. Potential stressors included contact sexual abuse, physical abuse, emotional abuse, physical neglect, substance abuse in the household, incarcerated household member, living with someone mentally ill or suicidal, household violence, one or no parents through parental separation, divorce, or death, peer victimization, community violence, experiencing homelessness as a child, becoming pregnant or a caregiver, fighting, experiencing poverty, adoption, and foster care.

Next, an iterative process involved review of the literature and consultation with content and methods experts, including the doctoral committee. Together, we conducted an initial assessment of all potential childhood stressors for consideration for the next phase of analysis. As a result of this process, we concluded that variables “entrance into foster care”, “adoption”, “fighting”, and “one or no parents” would be excluded from further analysis. Foster care and adoption variables were excluded because of potential for significant sampling bias related to historical systematic child removal from homes. The parent death item, which partially formed the category “one or no parents”, was excluded because it was suspected that participants misinterpreted the question about parent death. Responses to the question: “When you were growing up, were your parents ever separated or divorced?” was deemed culturally invalid in that it does not account for extended family members who often act as caregivers for children and norms about legal marriage differ in Native communities. For example, in a recent study, 26% of AI adolescents lived with grandparents or other relatives (Brockie et al., 2015). The fighting variable was excluded because of insufficient literature to

suggest that this might be a salient stressor for AIs and because there was not a recommended coding method provided by WHO (2011) for this variable, unlike all other categorical variables in the ACE-IQ.

Item-level responses were examined, and univariate and bivariate analysis was conducted. Two of the items that form the category of “physical neglect” had low cell size (four participants reported “many times” for the question: “When you were growing up, how often did your parents or guardians not give you enough food even when they could easily have done so?” and three participants reported “many times” to the question: “When you were growing up, how often did your parents or guardians not send you to school even when it was available?”). However, the third item that forms the physical neglect category in the ACE-IQ, “When you were growing up, how often were your parents or guardians too drunk or intoxicated by drugs to take care of you?’, did have sufficient variance in responses to be considered in further analysis (24 participants responded “many times” to the question). These observations were triangulated with child welfare literature that suggests that Native children are most often removed from the home due to parent neglect (Trocmé, Knoke, Blackstock, & Blackstock, 2004) with substance use involvement (most often alcohol use) often co-occurring (Nelson, Cross, Landsman, & Tyler, 1996; Trocmé et al., 2004). This resulted in a modified variable, “neglect due to parent intoxication,” and the elimination of “lived with a household member who was a problem drinker or alcoholic, or misused street or prescription drugs.” Thus, the household substance abuse variable was dropped from consideration in further models. In summary, indicator variables considered for initial LCA modeling included sexual abuse, emotional and physical abuse, parent neglect

due to intoxication, household mental illness/suicidality, incarceration, violence, poverty, homelessness, pregnancy/parenting, peer victimization, and community violence exposure. (Missing data analysis procedures are discussed in Chapter 3.)

Coding

Indicator variables were dichotomized for latent class analysis. Emotional abuse, physical abuse, sexual abuse, household mental illness/ suicidality, incarceration, and violence, peer victimization, and community violence exposure were dichotomized based on the Adverse Childhood Experiences International Questionnaire Guidance for Analysing ACE-IQ, Frequency Version (WHO, 2011). (This manner of coding differs from the coding of ACEs variables in the previous chapter.) Each childhood stressor construct was dichotomized as '1' exposed and '0' not exposed. Childhood poverty was derived from the adapted sub-scale of *Financial Stress* measure (Bray, 2001). Items from this measure included: (1) "While growing up, we seemed to have enough money to make ends meet"; (2) "While growing up, we frequently had to go without things we needed"; and (3) "While growing up, I remember adults arguing about money a lot of the time". Experiencing homelessness as a child was determined from two questions from the adapted *Homelessness* questionnaire (Whitbeck, Crawford, & Sittner Hartshorn, 2012): (1) "Has there been a time in your life when you did not have a place to live?"; and (2) "How old were you the last time you did not have a place to live?". Two G4H questions determined whether pregnancy or parenthood occurred prior to age 18: (1) "Are you now or have you ever been a mother/father, guardian, or caretaker to dependent children?"; and (2) "How old were you when you had your first biological child or became a primary caretaker to a dependent child?" A response to the first

question in the affirmative plus a response to the second question with 19 years or younger indicated that the participant was either pregnant or parenting at age 18 or younger (or within a few months of 18 years) and the variable was then coded as “1”. If this was not the case, then the variables were coded as “0”.

Data Analytic Plan (LCA)

In the next phase of analysis, LCA was introduced. LCA is a person-centered statistical method that brings us closer to understanding the lived experiences of individuals and is used to empirically identify latent, or hidden, homogenous subgroups of individuals who share similar response patterns on a set of observed indicators (Neely-Barnes, 2010; Lanza & Rhoades, 2013). Latent class analysis is aligned with the aim of exploring childhood stressors and has been used in several other child adversity studies to develop profiles (see Chapter 2 for examples). In contrast, LCA is a person-centered approach to bring us closer to understanding the lived experiences of individuals. One of the goals of LCA is to identify the most parsimonious model, or smallest number of classes, to represent the response patterns in the data (Neely-Barnes, 2010). As with other latent variable modeling approaches, the latent factor in LCA models considers both the true covariation among a set of observed variables, along with measurement error. Because the number and composition of classes is unknown, there is no a priori hypothesis regarding expected the number and nature of classes. Instead, statistical indices, are considered in conjunction with theoretical and pragmatic considerations to interpret a best fitting model (Masyn, 2013; Nylund, Nishina, Bellmore, & Graham, 2007; Nylund, Asparouhov, & Muthén, 2007). Latent class modeling begins with a one-class model for comparison and the number of

classes is increased until models are no longer well defined (Nylund, Asparouhov, & Muthén, 2007).

For this exploratory study, LCA was conducted using Mplus (Version 8; Muthén & Muthén, 1998–2012). In standard fashion, a series of latent class modeling procedures began with a one-class model. Models were run until fit indices indicated clear lack of model definition. Modeling procedures stopped at a five-class solution and fit indices were compared across classes. The Akaike information criterion (AIC; Akaike, 1974), Bayesian information criterion (BIC; Schwarz, 1978), and sample size adjusted Bayesian information criterion (SSABIC; Sclove, 1987) values were examined across models. In simulation studies, the SSABIC was superior for models with categorical indicator variables (Nylund et al., 2007). As shown in Table 5.1, the BIC values continued to increase between the two- to five-class solutions, with relatively small differences in change of value. The SSABIC decreased slightly between the three- and four-class models and held steady between the four and five-class models. Changes in the AIC values were minimal. This evaluation indicated that the three- and four-class models needed further inquiry. The Lo–Mendell–Rubin adjusted likelihood ratio test (LMRLRT; Lo, Mendell, & Rubin, 2001) and the bootstrap likelihood ratio test (BLRT; McLachlan & Peel, 2000) further informed which solution was best. The LMRLRT is based on the ratio of the log likelihoods from models with *k* and *k minus 1* classes to determine whether there is statistically significant improvement in model fit between the neighboring classes. The BLRT bootstraps the difference in log likelihoods for models with *k* and *k minus 1* classes and calculates a *p* value for the observed difference. In this study, the three-class solution both the LMRLRT and BLRT were significant;

whereas, for the four-class model only the LMRLRT was significant. Although the entropy value was higher for the four-class model, there was minimal difference with the three-class solution. The entropy measure is an indicator of class distinction and certainty and has a range from 0 to 1. Values closer to 1 indicate higher utility, or better class separation (Celeux & Soromenho, 1996). To confirm which model selection was best, the three and four-class solutions were assessed for conceptual fit by plotting the item response probability values for each indicator variable by class and visually inspecting the distinctions (See Figure 5.1 for visual display of probabilities by class.) Theory and pragmatism were also considered in choosing the best model.

Results

Latent classes were derived using ten childhood stressor indicators: sexual abuse, emotional abuse, physical abuse, parent neglect due to intoxication, household mental illness/suicidality, household incarceration, household violence, pregnancy/parenting, peer victimization, and community violence. Two indicators, poverty and homelessness, did not contribute to meaningful differentiation for classification as their item-response probabilities did not vary much by class. Thus, these two indicator variables were removed from models to improve parsimony and interpretation (Collins & Lanza, 2010). The usual fashion of evaluating fit statistics (Table 5.1), visualization of item response probability plots (Figure 5.1) and consideration of theory guided the conclusion that the three-class solution was the better choice over the four-class model. As seen in Figure 5.1, the three classes had distinguishable characteristics.

Table 5.1
Fit Indices for Latent Class Models

No. of Classes	AIC	BIC	SSABIC	LMRLRT	BLRT	Log Likelihood	Entropy
1	4282.038	4372.955	4284.262	n/a	n/a	-2113.019	n/a
2	1734.858	1803.046	1736.526	165.038*	167.898** *	-846.429	0.708
3	1710.517	1814.422	1713.059	45.552*	46.341***	-823.259	0.748
4	1706.354	1845.976	1709.770	25.718*	26.163	-810.177	0.779
5	1704.971	1880.310	1709.261	22.985	23.383	-798.485	0.812

AIC - Akaike's information criterion; BIC - Bayesian information criterion; SSABIC - Sample-size adjusted BIC; LMRLRT - Lo-Mendell-Rubin Adjusted Likelihood Ratio Test; BLRT - Bootstrapped Likelihood Ratio Test; * $p < 0.05$; *** $p < .001$

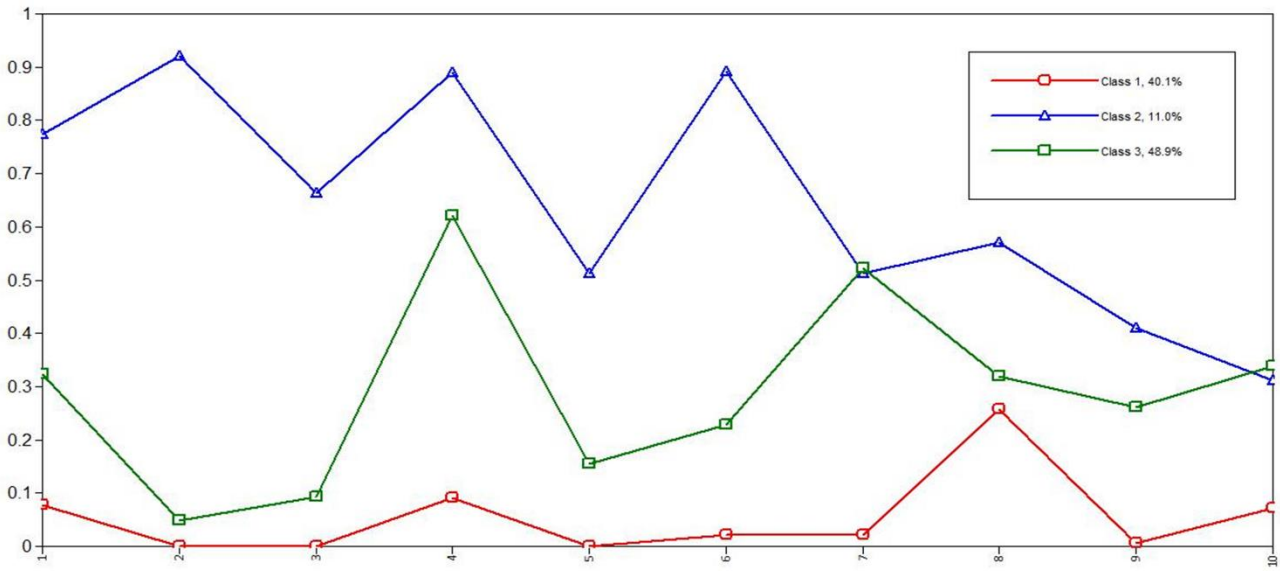

Figure 5.1
Item-response probabilities and proportion of sample assigned to each class.
(1) Sexual abuse (2) Emotional abuse (3) Physical abuse (4) Household violence (5) Neglect due to parent intoxication (6) Household mental illness/suicide attempt (7) Household incarceration (8) Pregnancy/parenthood (9) Bullied (10) Community violence

Class descriptions

Class One was termed the “Low Adversity Class” or LAC. The LAC was characterized by low item-response probabilities on all but one indicator compared to the other classes. Experiencing pregnancy or becoming a caregiver prior to age 18 did not vary significantly compared to Class Three, but there was a distinctive difference compared to Class Two. About 40% (40.1%) of the sample was classified into the LAC. Class Two was named the “High Adversity Class” or HAC. Individuals within this subgroup were characterized by high likelihood of exposure to all but two of the indicators (i.e., Household Incarceration and Community Violence) compared to the other classes. The probability of experiencing sexual abuse, emotional abuse, witnessing household violence, and household mental illness/suicide was above .77 for each of these indicators (range = .77 - .92). For physical abuse, neglect due to parent intoxication, household incarceration, and pregnancy/parenthood the probabilities were in the range of .51 to .66. The probability of experiencing peer victimization and community violence exposure were moderate (.41 and .31, respectively). A total of 11.0% of the sample was classified into the HAC subgroup. Class Three was labeled the “Household Violence and Incarceration Class” or HVIC because household violence exposure and having resided with someone who was incarcerated were the two indicators that particularly stood out for this group. The probability of participants experiencing each of these adversities was .62 and .52, respectively. For each of the indicators, sexual and emotional abuse, household mental illness/suicide, pregnancy/parenthood, peer victimization and community violence the range of

probability was .23 - .34. For neglect due to parent intoxication, physical abuse, and physical abuse the probabilities were low.

The three classes will be carried forward for further analysis in Chapter 6.

Discussion

This chapter explores a broad range of childhood stressors among AIs with T2D and extends prior research by using a novel approach to examine the heterogeneity of childhood stressors. Distinct underlying subgroups with unique compositions and accumulations of childhood stressors emerged from the data. Ten indicator variables (sexual, emotional, and physical abuse, household violence, neglect due to parent intoxication, household mental illness / suicidality, household incarceration, pregnancy/parenthood, peer victimization, and community violence) meaningfully contributed to the emergence of a Low Adversity Class (LAC), High Adversity Class (HAC), and Household Violence and Incarceration (HVI) Class.

Class One: Low Adversity

It is important to recognize that a full 40% of this sample of AI adults with T2D were distinguished by their experiencing lower levels of every childhood adversity compared to the other classes. Another observation about this subgroup is that they experience becoming a caretaker or pregnancy prior to age 18 at slightly lower levels compared to the HVI class. This pattern may be indicative of a community norm of early pregnancy or caregiving, with likelihood of these events increasing modestly relative to exposure to a multitude of childhood stressors. Although this is but one explanation, it is supported by data and theory. Natives have the highest teen pregnancy rate in the

United States compared to all other races (Martin et al., 2018). Another possibility regarding pregnancy and parenthood that extends beyond the description of this LAC and dissertation, is that increase in likelihood of teen pregnancy may be an outcome of increased childhood stressor exposures. Exposure to sexual abuse has been linked to sexual risk-taking and inconsistent contraceptive use; thus increasing the likelihood of early pregnancy (Luster & Small, 1994). However, given the conceptual and theoretical framework and exploratory nature of this study, pregnancy/parenthood prior to age 18 was considered a stressor worth investigating as such.

Class Two: High Adversity Class

Eleven percent of G4H participants were classified into the High Adversity Class (HAC). This group was characterized by high odds of exposure to all but two childhood stressors, compared to the HVIC (household violence and incarceration class) discussed in the next subsection) and their experiences with multiple forms of traumatic victimization and other stressors compared to the HVIC and LAC in this study. (Odds of household incarceration and community violence exposure rates were similar to the HVIC.)

Identification of the HAC is in alignment with prior research, especially the poly-victimization literature. Finkelhor, Ormrod, and Turner (2007) coined the term poly-victimization based on their findings that the majority of young people who experienced one type of victimization ended up experiencing another form. Also in support of this distinct class, other research reported that poly-victims have experienced multiple forms of non-traumatic adversities (Ford, Grasso, Hawke, & Chapman, 2013). Research

shows that individuals who experience multiple forms of victimization are at high risk for behavioral health challenges (Charak et al., 2016; Finkelhor et al., 2013)

Class Three: Household Violence and Incarceration Class

Almost half of the sample was classified as HVIC (48.9%). The emergence of this pattern is not surprising given the high proportion of individuals in the sample who grew up experiencing these two childhood stressors (See Chapter 4). Moreover, the identification of the HVIC aligns with the Mersky and Janczewski's study (2018) that concluded that among Wisconsin mothers receiving early home visiting services, exposure to household incarceration and violence were highest among AIs compared to other races.

There are numerous possibilities for interpreting the unique HVIC pattern. It is important to emphasize that community feedback and assistance with interpreting this finding is particularly essential for contextualizing this pattern and its implications. Furthermore, although this class is described using emphasis on household violence and incarceration exposures, this should not diminish consideration that odds of experiencing other forms of childhood stressors (i.e., sexual abuse, neglect due to parent intoxication, household mental illness/suicide, pregnancy/parenthood, peer victimization and community violence) are high compared to the LAC.

Of the 10 childhood stressors that meaningfully contributed to the class structures in these analyses, three (i.e., pregnancy/parenthood, peer victimization, and community violence) extend beyond the conventional ACEs construct. In addition, one variable (i.e., neglect due to intoxication) essentially collapses two of the conventional ACEs variables (i.e., household substance abuse and neglect). These analyses imply

that unique patterns of exposures exist for AIs with T2D from the 5 tribes involved in the G4H parent study. Furthermore, these findings support the need to further analyze a broad set of childhood stressors for other tribal communities and for Indian Country in general.

Analyses in this chapter shed light on the unique patterns of co-occurrence of childhood stressors within this sample. Without examining the classes in association with health outcomes, we cannot determine if any of the classes vary from one another in terms of their relationship with health. This inquiry is made in the Chapter 6.

Limitations

The identification of the specific latent classes cannot be generalized beyond the G4H sample. However, an important consideration is that the individuals in the G4H study are not necessarily outliers in terms of T2D diagnosis or receiving care at the local tribal health clinic. In fact, T2D is widespread within these communities and it is theoretically probable that findings have some limited generalizability beyond the G4H sample because of the common T2D diagnosis and typical use of the tribal health care systems.

Poverty and homelessness indicators did not help distinguish class membership. However, this does not preclude these indicators from being salient in predicting health outcomes. This may still be the case for this sample of AI adults with T2D. Prior studies have reported that early life poverty and homelessness increase risk of health problems, (DeForge, Belcher, O'Rourke, & Lindsey, 2008; Samaan, 2000; Wickrama, Lee, O'Neal, & Kwon, 2015). The lack of inclusion of poverty and homelessness could be a function of low statistical power, or that high or low prevalence rates (poverty and homelessness,

respectively) meant that there was not enough variance to affect class structure. Another limitation of this study is that poverty and homelessness were not considered as predictors or covariates in modeling procedures.

Research Implications

In addition to poverty and homelessness, other predictors and covariates should be considered in future research. Also, more research is needed to determine whether these stressors or the patterns identified here can be generalized beyond the tribes in this study. Moreover, it is important that future research investigate the strengths and resilience of Native families in context of childhood stressors.

Policy and Practice Implications

A significant portion of individuals in this study have witnessed household violence and had a household member become incarcerated (i.e., HAC, HVIC). This particular cluster of adversities may be considered a priority; however, given that the classes have not yet been tested for their relevance to health outcomes, a recommendation at this stage of analyses would be premature. In order to assess the types of interventions and policies appropriate to deal with such co-occurring childhood stressors as exposure to household violence and incarceration, we need to understand how they related to health outcomes.

A fuller discussion on the limitations of this dissertation, practice implications, and future research is in the final chapter. After describing the latent classes in this chapter, Chapter 6 examines the relationships between the underlying subgroups and behavioral health outcomes.

CHAPTER 6: BEHAVIORAL HEALTH AND LATENT CLASSES OF CHILDHOOD STRESSORS

Cumulative exposure to childhood adversities has major physical and behavioral health implications (Felitti et al., 1998; Mersky, Topitzes, & Reynolds, 2013). More research is needed to understand the roles that specific types and constellations of childhood stressor exposures play in AI health outcomes. Among this sample of AIs with T2D, I explored whether associations to behavioral health outcomes (i.e., smoking status, lifetime alcohol problem, and current depressive symptoms) vary for three latent subgroups of individuals with childhood stressor exposures (identified in the previous chapter). This chapter also presents prevalence statistics for smoking status, lifetime alcohol problem, and current depressive symptoms for the Gathering for Health (G4H) sample of Midwest AIs with T2D, following the methods section.

Methods

Prior research has demonstrated strong relationships between childhood adversity and poor behavioral outcomes (Chapman et al., 2004; Felitti et al., 1998b; Schilling et al., 2007). This chapter examined the associations among latent class membership and three behavioral health outcomes: smoking, lifetime alcohol problem, and depressive symptoms. To supplement the methods presented in Chapter 3 and Chapter 5, this section presents the processes involved in assessing associations between the latent subgroups and the relevant behavioral outcomes, and to assess the prevalence of smoking, alcohol problems and current depressive symptoms. All measurement occurred at wave one.

Prevalence of Outcomes

Smoking. Smoking was measured using two behavioral categories: ever smoked and 30-day use. Ever smoked was determined through use of the question: “Have you smoked at least 100 cigarettes or 5 packs of cigarettes in your entire life?” Those who reported smoking at least 100 cigarettes in their lifetime, but not being a current occasional or daily smoker were considered to be a former smoker and coded as ‘1’. Participants who identified as smoking fewer than 100 cigarettes in their lifetime and not being a current smoker were categorized as being a former smoker and coded as ‘0’. Occasional and daily smokers were identified through the question “In the past 30 days, how often did you smoke cigarettes?” and coded as ‘3’ if they smoked less than every day and ‘4’ if they were daily smokers.

Lifetime alcohol problem. Individuals with a lifetime alcohol problem were coded ‘1’ if they had ever received treatment for alcohol use, endorsed currently believing that they have a problem, or reported that someone else thinks they currently have a problem. If none of these were endorsed, then the participant was coded as ‘0’.

Depressive symptoms. Depressive symptoms were examined by three categories [‘none/minimal’ (score 0 – 4), ‘mild thru moderate’ (score 5 - 14), ‘moderately severe to severe’ (score 15 – 27] based on recommended scoring and collapsing mild and moderate groups, and moderately severe and severe groups because of low frequency and easier interpretation of results. Other methods considerations, including further description on instruments used for this analysis, were discussed in Chapter 3.

Data Analysis

After identifying the most accurate number of classes using latent class modelling and 10 childhood stressor variables (see previous chapter), associations between classes and the observed behavioral health outcomes were assessed using Pearson's chi-squared test of independence. Again, the outcome variables were smoking status, lifetime alcohol problem, and depressive symptoms.

Results

Just over 60% of the sample reported smoking on some days or every day during the past month (S.D. = 7.3). This includes 44.9 % of the sample who are daily smokers. About a third (36.3%) of the sample was estimated to have an alcohol use problem within their lifetime. Depressive symptoms were generally low for this sample. About half of the sample (55.4%) reported none/minimal depressive symptoms.

When comparing smoking status across classes, there were no significant differences. This was also the case for report of lifetime alcohol problem. For depressive symptoms, the overall test statistic was significant and there was a significant difference in level of depressive symptomology between the LAC and the HAC, and the LAC and the HVIC. For those classified into the LAC, 76% (75.5%) were considered to have none to minimal levels of depressive symptoms and 2% (2.1%) scored within the moderately severe to severe symptomology category. For individuals classified as HAC, about a third scored within each of the three ranges presented (range = .311 - .370). Those classified as HVIC, were about half as likely to score into the none to minimal category compared to the LAC (.400 versus .755) and about three times as likely to

score into the ‘moderately severe to severe depression’ category compared to the LAC participants (.063 versus .021).

Table 6.1
Probability of behavioral health outcomes by total sample and class

	Total Sample	Low Adversity (40%)	High Adversity (11%)	HVI (49%)	Overall Significance Test
Non-traditional tobacco use					4.443
Never smoked	19.3%	0.211	0.097	0.202	
Formerly smoked	19.3%	0.218	0.253	0.159	
Current occassional smoking	16.6%	0.208	0.180	0.132	
Current daily smoking	44.9%	0.363	0.471	0.507	
Lifetime alcohol problem	36.3%	0.274	0.359	0.457	2.940
Depression symptoms					16.097**
None / minimal	55.4%	0.755	0.370	0.400	
Mild thru moderate depression	37.6%	0.224	0.311	0.537	
Moderately severe to severe depression	7.0%	0.021	0.319	0.063	

For depressive symptoms, there were significant differences between the Low Adversity Class and the High Adversity Class, and the Low Adversity Class and the HVI Class.
HVI = Household Violence and Incarceration
**p < .01

Discussion

In this set of analyses, variation in smoking status, lifetime alcohol problem, and depressive symptoms varied across latent subgroups. However, the overall test statistic only reached significance for depressive symptoms. Lack of statistical significance for non-traditional tobacco use and lifetime alcohol problem may have been a function of low statistical power or lack of variance (e.g., binomial distribution). Other recent G4H research supports this interpretation. Walls et al. (under review) reported very low rates (10.7%) of at risk drinking for the G4H sample across four waves of data. These

findings are discussed further below, along with prevalence estimates of outcomes and outcomes by class.

Non-traditional tobacco use

Among this sample of adults with T2D, there was a high prevalence of non-traditional tobacco use. About 61% of the G4H sample were identified as current occasional or daily smokers. This is comparable to the Minnesota AI smoking rate of 59% (American Indian Community Tobacco Projects, 2013). One might expect to see a lower smoking rate for G4H participants if IHS, for example, had targeted individuals with T2D for smoking cessation. This targeted intervention is a logical assumption given the particularly harmful effects of smoking for individuals with T2D (Śliwińska-Mossoń & Milnerowicz, 2017) and the potential for enormous cost-savings (O'Connell, Wilson, Manson, & Acton, 2012). On the other hand, literature reports that diabetes patients do not vary in terms of smoking prevalence compared to non-diabetics (Śliwińska-Mossoń & Milnerowicz, 2017).

This finding about smoking prevalence can also be considered in relation to disparities between AIs and non-AIs in the Midwest region in terms of smoking status. In Minnesota, 14.4% of the general population are smokers (ClearWay Minnesota & Minnesota Department of Health, 2015); a rate that is less than one-third compared to the G4H sample.

The finding that smoking rates did not significantly vary across latent classes was surprising given prior research. Strong, graded relationships have been reported between exposure to multiple traumatic childhood adversities and smoking behaviors (Anda et al., 1999; Jun & Rich-Edwards, 2008). In a more recent and nuanced study, it

was found that young adults in a “High/Multiple ACEs class” had more than three times the odds of reporting current tobacco use compared to those in a “Low ACEs Class” (Shin et al., 2018). These prior studies suggested that, at minimum, one would expect that the HAC would have statistically significant difference in smoking status compared to the LAC. However, this was not the case. One explanation could be that smoking norms are deeply embedded within these communities. This may translate into all young people from these communities being at high risk for adopting a smoking habit, regardless of ACEs exposure levels. This is discussed again in Chapter 7.

Alcohol problem

About a third of the G4H sample (36.3%) experienced a lifetime alcohol problem. Similar rates have been found in other studies. In the Warne et al. (2017) study (referred to frequently in Chapter 4), about 40% of both the AI and non-AI adults in neighboring South Dakota reported current alcohol misuse. Although the rates are similar for G4H and South Dakotans, the latter is likely underestimated in comparison to the G4H rate due to measurement variability. In a national study, it was estimated that 43% of AIs experienced lifetime AUD and about a third of the general population (29%) had a lifetime diagnosis of AUD (Jung, Zhang, Pickering, & Ruan, 2015). Although, caution is necessary in comparing these alcohol misuse rates across studies because measurement variability, findings from this study suggest that lifetime alcohol misuse may not vary significantly across multiple populations and sub-populations, including AIs with T2D. Alternatively, it may be that G4H participants have lower rates of lifetime alcohol problem compared to AIs and non-natives in South Dakota because of the measurement issue mentioned above. It is possible that participants from G4H, and

other AI studies, report lower rates of alcohol use because of internalized shame resulting from AI alcohol stereotypes (Fish, Osberg, & Syed, 2017; Gonzalez & Skewes, 2016; Myhra, 2011; Walls et al., accepted).

Rates of lifetime alcohol use problem did not vary statistically across latent classes, although differences were in the expected direction. Again, this may be a function of lack variance within the sample (e.g., binomial distribution including lifetime abstainers), a result of the construction of the variables, or because of the alcohol use measure itself. For example, number of daily or weekly drinks could be used as a continuous measure to provide more variation. In consideration of this and findings from Warne et al. (2017), adjustment in the measurement of alcohol use may reveal important findings and should be considered in future research. In the Warne et al. (2017) study, alcohol misuse was not significantly correlated with ACEs scores in their first analysis. In a second analysis, they adjusted the alcohol misuse threshold and dichotomized the variables to reflect more severe alcohol misuse and ACEs scores of 6 and greater were found to be associated with severe alcohol misuse for all South Dakotans. Because the AIs in the Warne et al. (2017) study experienced more ACEs, this reflected a higher rate of severe alcohol misuse. This is meaningful in that Warne et al. (2017) found that South Dakota AIs appear to exhibit similar rates of any type of AUD but have an increased prevalence of more severe AUD.

Depressive symptoms

Regarding depressive symptoms, over half of the sample scored in the none to minimal range (55.4%) on the PHQ-9, 38% exhibited mild to moderate depressive symptoms, and 7% of the sample scored in the moderately severe to severe depressive

symptoms range. Although, the majority of the sample experienced none to minimal depressive symptoms, latent class modeling helped identify that there are statistical differences in symptomology across subgroups of individuals with similar childhood stressor experiences. Those classified as HVIC and HAC were significantly more likely to experience moderately severe to severe depression symptoms compared to those from the LAC. Not surprisingly, HAC participants were by far more likely to score in this highest depressive symptom range. Beyond these within sample comparisons, it is difficult to draw conclusions regarding depression and ACEs for AIs. One reason is because the measure of depression may not adequately capture distress or suffering for AIs (Beals, Novins et al., 2005; Scott, Clapp, Mileviciute, & Mousseau, 2016).

Limitations

This study examines a limited number of behavioral health outcomes. Latent subgroups identified here may be uniquely associated with mental health challenges and substance use patterns not included in this study. Outcome variables in this study use non-diagnostic criteria which limited the types of conclusions and comparisons that could be made. Although cross-sectional data were used in these analyses and causality cannot be confirmed, these analyses examine associations between *childhood* events and situations with *adult* outcomes. Finally, I cannot conclude that the methods used for identifying the classes and examining the relationships between classes and outcomes are superior to using the CDC-Kaiser construct of AI ACEs with behavioral health outcomes compared to the summed count method used to develop the ACEs score in previous studies. It may be that simply conducting a count of the types of ACEs exposed to, coding ACEs as a continuous measure, and determining a cut-off point

(e.g., 4 or more) might replicate similar findings. Additional limitations that cross-cut Chapters 4 through 6 are discussed in Chapter 7.

Implications

In addition to the expanded implications section in Chapter 7, this section discusses research, practice, and policy implications that are primarily relevant to this chapter. Future research should expand the types and degrees of severity of behavioral health outcomes that are examined in association with ACEs for AIs. One specific example, relevant to this chapter, is that future research should build on these dissertation analyses and the work of Warne et al. (2017) to investigate ACEs in relation to severity of AUD. Also, there may be mediating or interacting effects, or comorbid outcomes among the behavioral health variables examined in this study, which need further consideration. For example, there could be a sub-set of individuals who have a current alcohol problem and high current depressive symptoms, who we might expect to be classified as HAC. It is important to note that it remains unclear whether commonly utilized depressive symptom measures capture the lived experience of suffering for AIs (Beals, Novins et al., 2005; Kisely et al., 2017; Scott et al., 2016) and that more research is needed on mood disorders and distress, and how to better measure mental health challenges among AIs. Finally, future research should disentangle the roles that ACEs, smoking norms, and substance accessibility play in the development of T2D onset and disease management.

For 7% of the sample with moderately severe to severe depressive symptoms, treatment is warranted using antidepressants, psychotherapy, or a combination of antidepressants and psychotherapy (Kroenke & Spitzer, 2002). For those experiencing

mild to moderate symptoms, providers should encourage their patients to engage in social and cultural activities, which may help buffer further depressive symptoms (Brockie, Elm, & Walls, accepted). Patients scoring within these ranges should also be seen for follow up evaluation and those who are identified as having moderate symptoms should be discussing treatment plans and therapies with their providers. For patients who score in the moderately severe to severe range, referral, clinical evaluation, and treatment should begin as soon as possible (Kroenke & Spitzer, 2002).

ACEs index for depression risk

The adoption of an ACEs index for predictive utility in the clinical setting could help screen and identify T2D patients who are at risk for depression; therefore, potentially preventing T2D related complications. In this study it was found that individuals, who were classified as HVIC or HAC were more likely to experience moderately severe to severe levels of depressive symptoms compared to the LAC. In light of this increased risk and the history of childhood stressor exposure, screening and referral are particularly critical for these individuals. However, some individuals who could be considered low risk for depression on the basis of their ACEs history (i.e., those classified as LAC) could still experience depressive symptoms and benefit from screening and mental health services. Because depression can impact T2D patients' ongoing health trajectory and adherence to T2D treatment protocols (Gonzalez et al., 2008) depression screening is appropriate for all T2D patients. Tribes, and tribal behavioral health service units in particular, may also choose to further assess depressed T2D patients for ACEs to gain insight into past traumas that may further inform their treatment plan.

To prevent poor diabetes self-care and T2D complications, tribal health programs serving the G4H tribes could adopt a screening tool using the ten childhood stressors shown to contribute to the latent profiles in this dissertation and monitor mental health changes for those with patterns similar to the HAC and HVIC subgroups. Such a tool could be utilized as another indicator of risk for T2D related complications and successfully help delay or prevent T2D complications by preventing or reducing depressive symptoms. When looking at the relationship to depressive symptoms by class, 32% of the individuals classified as HAC exhibited moderately severe to severe depressive symptoms. This suggests that providers pay close attention to mood changes among those with T2D and high exposure to childhood stressors. As discussed in our recent study (Brockie, Elm, & Walls, accepted), providers should encourage the development of social networks and cultural activity participation for AI T2D patients who exhibit interest. Supporting these patients may prove useful in promoting physical and mental health and delay T2D complications. It should be noted that is not known the extent to which G4H participants are seeking treatment for depression. It could be that many at-risk or depressed participants are in treatment, seeking treatment for a mood disorder, or engaging is social and cultural activities which could improve their mood (Brockie, Elm, & Walls, accepted).

Administrative implications of screenings

Tailored screening tools have administrative implications. Clinics and patients are often over-burdened with screenings to conduct with patients. These findings could help with decision-making related to screening and assessment. For example, data from this chapter suggests that brief screening and referral for household violence and

incarceration among those with T2D may result in identification of a large portion of individuals who are currently or at risk of depression. Pairing, combining, or staggering depression and household violence and incarceration screeners in a thoughtful and etiologically significant manner may result in more precise diagnoses and reduced patient screening burden.

Although the smoking and drinking outcomes did not vary statistically by latent class, they did trend in the expected direction. Findings regarding these outcomes may still be relevant to program development staff, administrators, and others who serve the five G4H tribes. Non-traditional tobacco use is particularly harmful to those with T2D and is a major contributor to T2D complications (e.g., vascular constriction leading to amputation; Śliwińska-Mossoń & Milnerowicz, 2017). These data suggest that – because community norms and challenges shape the everyday context surrounding individuals at-risk for or experiencing T2D – broad, community-level prevention and cessation programming may be necessary to combat smoking for T2D patients and community members in general.

CHAPTER 7: CONCLUSION

This conclusion chapter synthesizes Chapters 4 through 6 while situating the dissertation findings within the broad purpose of addressing health inequities for AIs, particularly AIs with T2D. Below, I revisit the study aims, briefly reiterate major findings, highlight some prior implications, offer implications when considering the overall findings, discuss the limitations of the analyses, and provide a roadmap for future research.

The aims of this dissertation were met by estimating the prevalence of seven commonly assessed ACEs and ACEs scores (Aim 1, Chapter 4), conducting an expanded childhood stressor assessment, determining that ten childhood experiences contributed to three distinct childhood stressor profiles (Aim 2, Chapter 5), then examining the associations between latent subgroups and behavioral health outcomes (i.e., lifetime alcohol problem, depressive symptoms, and smoking status; Aim 3, Chapter 6).

Chapter 4 reported that this sample of AIs with T2D experience highly disproportionate rates of seven types of conventional childhood stressors and ACEs scores compared to other populations. These findings are critical and have implications regarding trauma-informed care and research. Additional research is needed on singular types of ACEs for AIs with T2D, and AIs more generally. There is a paucity of research on incarceration and children of incarcerated parents among AIs. This chapter also indicates that future research should examine the specific relationships between ACEs exposures (by type and score) and risk for T2D and T2D-related complications, as well as pathways that may be involved in these relationships. Additionally, findings

from Chapter 4 demonstrate significant methodological challenges in accurately operationalizing AI ACES through different combinations of ACES exposure types, frequencies, and severities. Future research will need to determine methodological procedures to accurately capture severity, chronicity, and multiplicity of AI ACES exposures, particularly across developmental life periods and transitions.

Analyses from Chapter 5 identified unique subgroups who share similar patterns of childhood stressors. These subgroups included LAC, HVIC, and HAC. Ten childhood stressors helped to meaningfully distinguish these three profiles. The utilization of an expanded group of childhood stressors suggested that there may be additional childhood stressors beyond the conventional ACES. Findings from this chapter also suggested that an expanded array of childhood stressors for AIs should continue to be investigated. Additionally, latent class analysis proved to be a useful tool to help differentiate groups of AIs with differing childhood stressor experiences. The three latent subgroups were not examined in terms of health outcomes until the following chapter; therefore, their relevance in terms of behavioral health implications were not discussed in Chapter 5. Latent class analysis is a person-centered tool which identified distinct classes of stress experiences and may prove to be an effective predictor of health outcomes in future AI research.

In Chapter 6, this dissertation determined that specific compositional variations of stressor exposures have differential associations with lifetime alcohol problem, smoking status, and depressive symptoms for AI adults with T2D living in the Midwest. Although only one behavioral health outcome varied statistically across latent subgroups (i.e., depressive symptoms), there were still important and unique implications by each

behavioral health outcome that were discussed. For example, smoking did not vary statistically across classes. However, this was likely because community norms of non-traditional tobacco use are so wide spread that all individuals in the sample have similar likelihood of smoking regardless of exposure to ACEs. For the tribes in this study, identifying which childhood stressors predict smoking may not be enough to design prevention programs for non-traditional tobacco use. Community-wide smoking prevention and cessation programs are needed to shift community-norms and address non-traditional tobacco use across generations. Findings regarding depressive symptoms, had different treatment implications for adults living with T2D. For example, secondary prevention efforts targeting T2D complications may involve treating ACEs-related depressive symptoms, particularly for individuals in the HAC and HVIC groups. Further implications regarding ACEs and behavioral health are discussed below and in Chapter 6.

Overall Implications

Collectively, findings from this dissertation suggest research, program, and policy implications.

Research Implications

This dissertation is a platform from which to begin conceptualization of an AI-specific ACES construct. By accounting for an expanded set of childhood stressors, employing LCA, and examining the association between the latent subgroups, this dissertation demonstrated a meaningful approach for future research. Latent class analysis was shown to be a robust approach for understanding the patterns of childhood

adversity for AIs with T2D from the tribes represented in this study. Researchers who build upon this approach in future should involve further examination of an array of childhood stressors for AIs generally with the aim of establishing a set of ACEs that cross-cut the tribal experience in Indian Country. Future similar studies could be used to examine whether similar profiles emerge in other tribal communities. For example, it could be that HVIC pattern is similar across tribal communities in that experiencing household violence and incarceration is common among a high proportion of individuals, even those who do not experience high odds of exposure to other childhood stressors. Consistent findings of high exposure to household violence and incarceration would support an emphasis on additional resources being directed towards addressing these traumas that are rooted in and cause harm not only at the individual-level, but also at the community- and systems-level.

The use of LCA in conjunction with findings regarding differential behavioral health outcomes in this dissertation supports the above research approach in another important way. Advancing the development of an AI ACEs index could occur by using person-centered methods and testing classes for their predictive validity using longitudinal data. Research could help narrow the specific compositional and cumulative variations of AI-childhood stressors that are most predictive of health outcomes. If we are able to construct a useful ACEs tool for research then this could aid in addressing health disparities more generally. Because behavioral health is closely linked to chronic disease onset, management, and outcomes, identifying AI-specific ACEs has the potential to reduce health disparities for AIs. Childhood stressors can treatment and prevention targets for a broader set of chronic health conditions for AIs.

Practice Implications

Based on these dissertation findings, diabetes programs serving AIs should assess for exposure to childhood stressors. This dissertation demonstrated high rates of seven conventional ACEs for this sample of AIs with T2D and that participants classified into HAC and HVIC had increased odds for moderate to severe depressive symptoms compared to the LAC. This is salient given that depression reduces the likelihood of engaging in diabetes self-management behaviors (Bell, Andrews, Arcury, Snively, Golden, & Quandt, 2010; Gonzales et al., 2008; Lin, Katon, Von Korff et al., 2004; Gonzalez, Safren, Cagliero et al., 2007). This suggests that Midwest AIs with T2D classified as either the HAC or HVIC are at higher risk for T2D related complications. In fact, prior unpublished analyses conducted by me and Aronson (2015), supports the recommendation of assessing T2D patients for ACEs. We showed that for AIs with T2D from two Midwest tribes, depressive symptoms almost fully mediated the relationship between an ACEs score of four or more and diabetes mismanagement.

Administrative and Policy Implications

Findings from this chapter provide support for implementing underscore the need for routine mental health assessments for AIs with T2D. Universal depressive symptom screenings and referrals to treatment are warranted given the strong relationships between depression and poor T2D management (Lin, Katon, Korff, & Rutter, 2004). Diabetes patients who experience depression are less likely to seek treatment and adhere to prescribed treatment and diabetes management protocols, resulting in poorer long-term health outcomes (Gonzalez et al., 2008). Therefore, among T2D patients

experiencing depression, it would be ideal to address both conditions in a coordinated services environment.

A trauma-informed approach to health care should be considered by Tribes. Because trauma-informed care and approaches are not well defined, this leaves an important opportunity for communities to develop trauma-informed systems and care strategies that are appropriate to their context. This may mean that trauma-informed approaches are considered for extension beyond the health care delivery system to reach children and families in school, homes, justice facilities, and other places that deliver services. The development of a fully integrated, Indigenous trauma informed approach in all tribal-serving systems may be the key to fully support children, families, and the community and address long-standing community-wide challenges.

However, prior to taking up this endeavor, Tribes should be cognizant of the major commitment, access to financial and other resources, and capacity needed to fulfill these major systems changes. For example, one common approach to trauma-informed care is training for all practitioners and staff along with strong administrative leadership to guide workplace culture shifts (Center for Substance Abuse Treatment, 2014). Often Tribal health systems are lacking in several of these areas and need to engage in fundamental infrastructure and capacity building as an early step before taking on a major project such as trauma informed systems and care development. However, once foundational capacity is established, particularly in Tribal health clinic settings, trauma-informed care approaches are being implemented with vision and clear aims and purpose. For example, trauma-informed systems and care development is occurring alongside implementation of integrated care (behavioral health/ physical

health) strategies in Tribal clinics (e.g., Seattle Indian Health Board). Given the perpetual underfunding of the IHS system and the growing dependence on Medicaid as a supplement, it is imperative that tribes begin addressing this now.

In addition to the federal policy advocacy implications mentioned in Chapter 4, this dissertation has additional tribal policy implications. Tribes should consider developing guidelines for assessing ACEs across systems (e.g., health, education) and sub-populations (e.g., pediatrics, T2D patients). ACEs screenings and assessments are currently being implemented in health clinics and providers are finding great value from the information they gather from the screenings. (Gillespie & Folger, 2017). Uptake of such tools has the potential to improve quality of care and outcomes for T2D patients as well as patients seen in other health clinic departments. Efforts such as these can be incorporated into a larger effort to implement trauma-informed care.

Tribal councils should consider passing resolutions that support trauma informed care development, health inequities research, and other large endeavors. Without the support of the tribal council, these types of efforts are less likely to be implemented.

Limitations

This dissertation has several limitations that need to be considered. First, this dissertation is exploratory in nature; thus, caution should be used when interpreting findings. Generalizability is limited to this sample of AI adults with T2D from Midwest tribes. However, individuals in the G4H study are not necessarily outliers with respect to T2D diagnosis or risk, nor receiving health care services at the local IHS clinic. In fact, T2D is so widespread within Midwest tribal communities, and across other regions in Indian Country, that findings from this study may reflect the experiences of other AIs.

Nevertheless, generalizability of findings should be explored across regions and settings, including among urban residing AIs. Another limitation of this dissertation is that the data analyzed are cross-sectional which limits the inferences that can be made. Without longitudinal data analyses, one cannot conclude, for example, if childhood stressor exposures preceded the onset of depressive symptoms. However, analyses examine associations between *childhood* events and situations with *adult* outcomes, thus temporal ordering can be generally assumed. Another limitation of this dissertation is the potential for systematic error such as recall bias and false negative findings (Hardt et al., 2004). Recall for some respondents required reflection back decades earlier. Although unlikely, particularly for the analyses in Chapter 5 which have a higher threshold for determining exposure to some stressors, false negative findings are possible. Respondent burden may have affected how participants engaged with and responded to ACEs questions. The ACE-IQ was the last set of questions within a long survey. Furthermore, measurement and methodology differences across studies interfere with our ability to make definitive conclusions about prevalence of exposures and ACEs scores. For example, in the ACE-IQ, and therefore G4H, spanking was included within the construct of physical abuse; whereas in other national studies spanking was not included as part of the physical abuse construct. This can result in over- or under-estimation of exposure. In this dissertation, physical abuse may be overestimated compared to most studies. Finally, several measures in the G4H study were adapted, which could limit confidence in validity and reliability, as these have not been used in past research studies (Bradley, 1994). On the other hand, the aim of the extensive CBPR processes was to increase validity within the local AI context. Multiple

iterations of development involved focus groups and piloting questionnaires. These adaptations of measures more likely improved the appropriateness of the instruments for this sample (Bradley, 1994). Another important limitation is that I did not test whether conventional ACEs indexing (i.e., ACEs scoring in Chapter 4) differed from the expanded use of ACEs with LCA (Chapter 5) in term of predicting behavioral health outcomes. Thus, I am unable to conclude whether the expanded version of ACES in Chapter 5 is more useful. Lastly, class predictors were not included in analyses (e.g., age, gender) which could help further describe the profiles. More about limitations were discussed in chapters 4 through 6.

Future Directions

This dissertation did not aim to correlate ACEs with T2D etiology or T2D related outcomes, nor test the theoretical pathways leading from exposure of ACEs to physical health outcomes, via behavioral health. Rather it looked at behavioral health outcomes, some of which have been shown to increase risk of onset and poor T2D outcomes (Campbell et al., 2016; Śliwińska-Mossoń & Milnerowicz, 2017). Direct and indirect pathways of effects of stressors on behavioral health and physical health are an important next step in the advancement of AI ACEs research and more generally, health disparities research. Behavioral health outcomes have implications for physical health far beyond that of T2D. In fact, AIs mortality rates are remaining high due to substance use and suicide (Shiels et al., 2017).

To address some short-coming from this dissertation, future research could use LCA with an expanded investigation of childhood stressors and test for predictive validity across classes. This should be followed by comparing the utility of the

conventional ACEs count method (i.e., Aces score) and the identified classes as they predict various health outcomes. This may be a useful pathway to more fully understand which childhood stressor sets, whether from the conventional ACEs, the ACE-IQ / WHO, or derived from the AI community, are most predictive for AIs health outcomes.

Combinations of stressors also have the potential to have an additive or moderating effect with ACEs and result in stress proliferation. For example, microagressions are known triggers of distress for Native people (Chae & Walters, 2009; Walls, Gonzalez, Gladney, & Onello, 2015) and have been linked to distress for AI with T2D (Sittner et al., 2018). It is likely that these experiences create cumulative burden in conjunction with ACEs exposures. Racial and ethnic microagressions and discrimination, historical trauma, and other AI-specific domains of stressors need further investigation. The goal is to more fully understand the universe of stressors that may influence health.

With a more nuanced investigation of a broad range of social stressors, we can more fully determine the variation of health outcomes associated with specific combinations of adverse life experiences. Childhood adversities are one category of social stressors that have been shown to have significant long-term health effects. Understanding the roles that specific types and different constellations of childhood stressor exposures play in behavioral health and diverse health trajectories for AIs could go a long way in addressing health disparities for AIs, particularly those living with chronic diseases such as T2D, metabolic syndrome, and cardiovascular disease. Drawing conclusions about which types of stressors influence health can lead us to a more committed reframing of health disparities as health *inequities*. At the point at which

we can empirically determine that a broad range of social stressors impact the health of AIs, we will then gain significant leverage in addressing health *inequities,* beyond the typical interventions seen in federal requests for program proposals today (e.g., individual level eating behaviors). In the meantime, the ACEs movement provides an opportunity for tribal leaders and other advocates to utilize ACEs data to gain access to resources.

Future research should examine mediators and moderators. The literature points to several modifying variables that increase the effects of childhood stressor exposures, thus increasing risk for poor behavioral health outcomes. These modifiers therefore have the potential to indirectly influence physical health outcomes (i.e., diabetes related risks). One example highlighted in the child maltreatment literature is mentioned here. Sexual abuse perpetration by a father or other father figure is the most psychologically damaging compared to victimization involving other types of relationships (Ketring & Feinauer, 1999). In closing, it is crucial that future research and intervention development consider potential moderators that can buffer the effects of ACEs. Brockie et al. (accepted) recently demonstrated the importance of social and cultural health promoting factors and their relevance in ameliorating the negative impact of ACEs for AIs with T2D. Likely social and cultural resources can protect from or reduce risk for behavioral and physical health outcomes beyond T2D and the behavioral health outcomes in this study (Walters & Simoni, 1995).

REFERENCES

Abbott, P. J. (2008). Comorbid alcohol/other drug abuse and psychiatric disorders in adult american indian and alaska natives: A critique. *Alcoholism Treatment Quarterly*, *26*(3), 275–293. https://doi.org/10.1080/07347320802071927

Afifi, T. O., Boman, J., Fleisher, W., & Sareen, J. (2009). The relationship between child abuse, parental divorce, and lifetime mental disorders and suicidality in a nationally representative adult sample. *Child Abuse and Neglect*, *33*(3), 139–147. https://doi.org/10.1016/j.chiabu.2008.12.009

Anda, R. F., Croft, J. B., Felitti, V. J., Nordenberg, D., Giles, W. H., Williamson, D. F., … Page, P. (1999). Adverse Childhood Experiences and Smoking During Adolescence and Adulthood. *JAMA*, *282*(17).

Anda, R. F., Dong, M., Brown, D. W., Felitti, V. J., Giles, W. H., Perry, G. S., … Dube, S. R. (2009). The relationship of adverse childhood experiences to a history of premature death of family members. *BMC Public Health*, *9*(1), 106. https://doi.org/10.1186/1471-2458-9-106

Baker, R. G., Hayden, M. S., & Ghosh, S. (2011). NF-κB, Inflammation, and Metabolic Disease. *Cell Metabolism*, *13*(1), 11–22. https://doi.org/10.1016/J.CMET.2010.12.008

Barnes, P., Adams, P., & Powell-Griner, E. (2005). *Health Characteristics of the American Indian and Alaska Native Adult Population, United States, 1999-2003*. Hyattsville. Advance data from vital and health statistics; Publication No 356. Hyattsville, MD: National Center for Health Statistics.

Beals, J., Manson, S. M., Whitesell, N. R., Mitchell, C. M., Novins, D. K., Simpson, S., & Spicer, P. (2005). Prevalence of major depressive episode in two American Indian reservation populations: unexpected findings with a structured interview. *The American Journal of Psychiatry*, *162*(9), 1713–1722. https://doi.org/10.1176/appi.ajp.162.9.1713

Beals, J., Novins, D. K., Whitesell, N. R., Spicer, P., Mitchell, C. M., & Manson, S. M. (2005). Prevalence of mental disorders and utilization of mental health services in two American Indian reservation populations: mental health disparities in a national context. *The American Journal of Psychiatry*, *162*(9), 1723–1732. https://doi.org/10.1176/appi.ajp.162.9.1723

Bellis, M. A., Hughes, K., Leckenby, N., Jones, L., Baban, A., Kachaeva, M., … Terzic, N. (2014). Adverse childhood experiences and associations with health-harming behaviours in young adults: Surveys in eight eastern European countries. *Bulletin of the World Health Organization*, *92*(9), 641–655. https://doi.org/10.2471/BLT.13.129247

Blackwell, D. L., Lucas, J. W., & Clarke, T. C. (2014). *Summary Health Statistics for U.S. Adults: National Health Interview Survey, 2012*. *Vital and health statistics,10*. https://doi.org/24819891

Brockie, T. N., Dana-sacco, G., Wallen, G. R., Wilcox, H. C., Campbell, J. C., Gwenyth, G. D., … Campbell, J. C. (2015). The relationship of adverse childhood experiences to PTSD, depression, poly-drug use and suicide attempt in reservation-based Native American adolescents and young adults. *American Journal of Community Psychology*, *55*(3–4), 411–421. https://doi.org/10.1007/s10464-015-9721-3

Campbell, J. A., Farmer, G. C., Nguyen-Rodriguez, S., Walker, R., & Egede, L. (2018a). Relationship between individual categories of adverse childhood experience and diabetes in adulthood in a sample of US adults: Does it differ by gender? *Journal of Diabetes and Its Complications*, *32*(2), 139–143. https://doi.org/10.1016/j.jdiacomp.2017.11.005

Campbell, J. A., Farmer, G. C., Nguyen-Rodriguez, S., Walker, R. J., & Egede, L. E. (2018b). Using path analysis to examine the relationship between sexual abuse in childhood and diabetes in adulthood in a sample of US adults. *Preventive Medicine*, *108*(June 2017), 1–7. https://doi.org/10.1016/j.ypmed.2017.12.013

Campbell, J. A., Walker, R. J., & Egede, L. E. (2016). Associations between Adverse Childhood Experiences, High-Risk Behaviors, and Morbidity in Adulthood. *American Journal of Preventive Medicine*, *50*(3), 344–352. https://doi.org/10.1016/j.amepre.2015.07.022

Center for Disease Control and Prevention. (2013). *CDC Health Disparities and Inequalities Report- United States, 2013*. *Morbidity and mortality weekly report. Surveillance summaries (Washington, DC : 2002)* (Vol. 62). https://doi.org/PMID: 24264501

Chae, D. H., & Walters, K. L. (2009). Racial discrimination and racial identity attitudes in relation to self-rated health and physical pain and impairment among two-spirit American Indians/Alaska Natives. *American Journal of Public Health*, *99*, AJPH.2007.126003. https://doi.org/10.2105/ajph.2007.126003

Chapleski, E. E., Lichtenberg, P. A, Dwyer, J. W., Youngblade, L. M., & Tsai, P. F. (1997). Morbidity and comorbidity among Great Lakes American Indians: Predictors of functional ability. *The Gerontologist*, *37*(5), 588–597. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/9343909

Chapman, D. P., Whitfield, C. L., Felitti, V. J., Dube, S. R., Edwards, V. J., & Anda, R. F. (2004). Adverse childhood experiences and the risk of depressive disorders in adulthood. *Journal of Affective Disorders*, *82*(2), 217–225. https://doi.org/10.1016/j.jad.2003.12.013

Charak, R., Byllesby, B. M., Roley, M. E., Claycomb, M. A., Durham, T. A., Ross, J., … Elhai, J. D. (2016). Latent classes of childhood poly-victimization and associations with suicidal behavior among adult trauma victims: Moderating role of anger. *Child Abuse and Neglect*, *62*, 19–28. https://doi.org/10.1016/j.chiabu.2016.10.010

Collins, L. M., & Lanza, S. T. (2010). *Latent class and latent transition analysis with applicaitons in the social, behavioral, and health sciences*. *Research Methods in Psychology Volume 2 of Handbook of Psychology*. New Jersey: John Wiley & Sons, Inc. https://doi.org/10.1002/9780470567333

Cwik, M., Barlow, A., Tingey, L., Goklish, N., Larzelere-Hinton, F., Craig, M., & Walkup, J. T. (2015). Exploring Risk and Protective Factors with a Community Sample of American Indian Adolescents Who Attempted Suicide. *Archives of Suicide Research*, *19*(2), 172–189. https://doi.org/10.1080/13811118.2015.1004472

DeForge, B. R., Belcher, J. R., O'Rourke, M., & Lindsey, M. A. (2008). Personal resources and homelessness in early life: Predictors of depression in consumers of homeless multiService centers. *Journal of Loss and Trauma*, *13*(2–3), 222–242. https://doi.org/10.1080/15325020701769105

Dinges, N. & Joos, S. (1988). Stress, coping and health: Models of interaction for Indian and Native populations. *American Indian and Alaska Native Mental Health Research, 1*, 8-64.

Dong, M., Anda, R. F., Felitti, V. J., Dube, S. R., Williamson, D. F., Thompson, T. J., … Giles, W. H. (2004). The interrelatedness of multiple forms of childhood abuse, neglect, and household dysfunction. *Child Abuse and Neglect*, *28*(7), 771–784. https://doi.org/10.1016/j.chiabu.2004.01.008

Dunn, E. C., McLaughlin, K. A., Slopen, N., Rosand, J., & Smoller, J. W. (2013). Developmental timing of child maltreatment and symptoms of depression and suicidal ideation in young adulthood: Results from the national longitudinal study of adolescent health. *Depression and Anxiety*, *30*(10), 955–964. https://doi.org/10.1002/da.22102

Edwards, V., Holden, G., Felitti, V., & Anda, R. (2003). Relationship between multiple forms of childhood maltreatment and adult mental health in community respondents: Results from the adverse childhood experiences study. *The American Journal of Psychiatry*, *160*(8), 1453–1460. https://doi.org/10.1176/appi.ajp.160.8.1453

Elias, B., Mignone, J., Hall, M., Hong, S. P., Hart, L., & Sareen, J. (2012). Trauma and suicide behaviour histories among a Canadian indigenous population: An empirical exploration of the potential role of Canada's residential school system. *Social Science and Medicine*, *74*(10), 1560–1569. https://doi.org/10.1016/j.socscimed.2012.01.026

Elm, J. H. L., Walls, M. L., & Aronson, B. D. (under review). Sources of stress among

Midwest American Indians and Alaska Natives. American Indian and Alaska Native Mental Health Research.

Evans-Campbell, T. (2008). Historical trauma in American Indian/Native Alaska communities: A multilevel framework for exploring impacts on individuals, families, and communities. *Journal of Interpersonal Violence*, *23*(3), 316–338. https://doi.org/10.1177/0886260507312290

Felitti, V. J., Anda, R. F., Nordenberg, D., Williamson, D. F., Spitz, A. M., Edwards, V., … Marks, J. S. (1998). Relationship of childhood abuse and household dysfunction to many of the leading causes of death in adults: The adverse childhood experiences study. *American Journal of Preventive Medicine*, *14*(4), 245–258. https://doi.org/10.1016/S0749-3797(98)00017-8

Finkelhor, D., Shattuck, A., Turner, H., & Hamby, S. (2013). Improving the adverse childhood experiences study scale. *JAMA Pediatrics*, *167*(1), 70–75. https://doi.org/10.1001/jamapediatrics.2013.420

Fish, J., Osberg, T. M., & Syed, M. (2017). “This is the way we were raised”: Alcohol beliefs and acculturation in relation to alcohol consumption among Native Americans. *Journal of Ethnicity in Substance Abuse*, *16*(2), 219–245. https://doi.org/10.1080/15332640.2015.1133362

Ford, J. D., Grasso, D. J., Hawke, J., & Chapman, J. F. (2013). Poly-victimization among juvenile justice-involved youths. *Child Abuse and Neglect*, *37*(10), 788–800. https://doi.org/10.1016/j.chiabu.2013.01.005

Gilbert, L. K., Breiding, M. J., Merrick, M. T., Thompson, W. W., Ford, D. C., Dhingra, S. S., & Parks, S. E. (2015). Childhood adversity and adult chronic disease: An update from ten states and the District of Columbia, 2010. *American Journal of Preventive Medicine*, *48*(3), 345–349. https://doi.org/10.1016/j.amepre.2014.09.006

Gone, J. P. (2009). A community-based treatment for Native American historical trauma: prospects for evidence-based practice. *Journal of Consulting and Clinical Psychology*, *77*(4), 751–762. https://doi.org/10.1037/a0015390

Gonzalez, J. S., Peyrot, M., McCarl, L. A., Collins, E. M., Serpa, L., Mimiaga, M. J., & Safren, S. A. (2008). Depression and diabetes treatment nonadherence: A meta-analysis. *Diabetes Care*, *31*(12), 2398–2403. https://doi.org/10.2337/dc08-1341

Gonzalez, V. M., & Skewes, M. C. (2016). Association of the firewater myth with drinking behavior among American Indian and Alaska Native college students. *Psychology of Addictive Behaviors*, *30*(8), 838–849. https://doi.org/10.1037/adb0000226

Great Lakes Inter-Tribal Epidemiology Center. (2012). *Burden of Diabetes Among American Indians and Alaska Natives in Wisconsin*. Lac du Flambeau, WI: Great Lakes Inter-Tribal Epidemiology Center.

Hicken, M. T., Lee, H., Ailshire, J., Burgard, S. A., & Williams, D. R. (2013). “Every Shut Eye, Ain’t Sleep”: The Role of Racism-Related Vigilance in Racial/Ethnic Disparities in Sleep Difficulty. *Race and Social Problems*, *5*(2), 100–112. https://doi.org/10.1007/s12552-013-9095-9

Horejsi, C., Craig, B. H. R., & Pablo, J. (1992). Reactions by Native American parents to child protection agencies: cultural and community factors. *Child Welfare*, *71*(4), 329–342. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/1638907

Hotamisligil, G. S. (2010). Endoplasmic Reticulum Stress and the Inflammatory Basis of Metabolic Disease. *Cell*, *140*(6), 900–917. https://doi.org/10.1016/J.CELL.2010.02.034

Huang, H., Yan, P., Shan, Z., Chen, S., Li, M., Luo, C., … Liu, L. (2015). Adverse childhood experiences and risk of type 2 diabetes: A systematic review and meta-analysis. *Metabolism: Clinical and Experimental*, *64*(11), 1408–1418. https://doi.org/10.1016/j.metabol.2015.08.019

Huffhines, L., Noser, A., & Patton, S. R. (2016). The Link Between Adverse Childhood Experiences and Diabetes. *Current Diabetes Reports*, *16*(6), 1–15. https://doi.org/10.1007/s11892-016-0740-8

Hughes, K., Bellis, M. A., Hardcastle, K. A., Sethi, D., Butchart, A., Mikton, C., … Dunne, M. P. (2017). The effect of multiple adverse childhood experiences on health: A systematic review and meta-analysis. *The Lancet Public Health*, *2*(8), e356–e366. https://doi.org/10.1016/S2468-2667(17)30118-4

Indian Health Service. (2018). *Indian Health Disparities*. Retrieved from https://www.ihs.gov/newsroom/includes/themes/responsive2017/display_objects/documents/factsheets/Disparities.pdf

Jensen, S. K. G., Berens, A. E., & Nelson, C. A. (2017). Effects of poverty on interacting biological systems underlying child development. *The Lancet Child and Adolescent Health*, *1*(3), 225-239. https://doi.org/10.1016/S2352-4642(17)30024-X

Jones, T. M., Nurius, P., Song, C., & Fleming, C. M. (2018). Modeling life course pathways from adverse childhood experiences to adult mental health. *Child Abuse & Neglect*, *80*, 32–40. https://doi.org/10.1016/j.chiabu.2018.03.005

Jun, H.-J., & Rich-Edwards, J. W. (2008). Child Abuse and Smoking Among Young Women: The Importance of Severity, Accumulation, and Timing, *Journal of Adolescent Health*, *43*(1), 55–63. https://doi.org/10.1016/j.jadohealth.2007.12.003.

Jung, J., Zhang, H., Pickering, R. P., & Ruan, W. J. (2015). Epidemiology of DSM-5 Alcohol Use Disorder: Results From the National Epidemiologic Survey on Alcohol and Related Conditions. *JAMA Psychiatry*, *72*(8), 757–766.

https://doi.org/10.1001/jamapsychiatry.2015.0584.

Kessler, R. C., Davis, C. G., & Kendler, K. S. (1997). Childhood adversity and adult psychiatric disorder in the US National Comorbidity Survey. *Psychological Medicine*, *27*(5), 1101–1119. https://doi.org/10.1017/S0033291797005588

Ketring, S. A., & Feinauer, L. L. (1999). Perpetrator-victim relationship: Long-term effects of sexual abuse for men and women. *American Journal of Family Therapy*, *27*(2), 109–120. https://doi.org/10.1080/019261899262005

Keyes, K. M., Eaton, N. R., Krueger, R. F., McLaughlin, K. A., Wall, M. M., Grant, B. F., & Hasin, D. S. (2012). Childhood maltreatment and the structure of common psychiatric disorders. *British Journal of Psychiatry*, *200*(2), 107–115. https://doi.org/10.1192/bjp.bp.111.093062

Kiecolt-Glaser, J. K., Preacher, K. J., MacCallum, R. C., Atkinson, C., Malarkey, W. B., & Glaser, R. (2003). Chronic stress and age-related increases in the proinflammatory cytokine IL-6. *Proceedings of the National Academy of Sciences*, *100*(15), 9090–9095. https://doi.org/10.1073/pnas.1531903100

Kirmayer, L. J. (2007). Psychotherapy and the Cultural Concept of the Person. *Transcultural Psychiatry*, *44*(2), 232–257. https://doi.org/10.1177/1363461506070794

Kisely, S., Alichniewicz, K. K., Black, E. B., Siskind, D., Spurling, G., & Toombs, M. (2017). The prevalence of depression and anxiety disorders in indigenous people of the Americas: A systematic review and meta-analysis. *Journal of Psychiatric Research*, *84*, 137–152. https://doi.org/10.1016/j.jpsychires.2016.09.032

Koss, M. P., Yuan, N. P., Dightman, D., Prince, R. J., Polacca, M., Sanderson, B., & Goldman, D. (2003). Adverse childhood exposures and alcohol dependence among seven Native American tribes. *American Journal of Preventive Medicine*, *25*(3), 238–244. https://doi.org/10.1016/S0749-3797(03)00195-8

Lin, E., Katon, W., Korff, M. Von, & Rutter, C. (2004). Relationship of depression and diabetes self-care, medication adherence, and preventive care. *Diabetes*, *27*(9), 2154–2160. Retrieved from http://care.diabetesjournals.org/content/27/9/2154.short

Link, B. & Phelan, J. (1995). Social Conditions As Fundamental Causes of Disease. *Journal of Health and Social Behavior*, *35*, 80–94. https://doi.org/10.2307/2626958

Luster, T., & Small, S. A. (1994). Factors Associated with Sexual Risk-Taking Behaviors among Adolescents. *Journal of Marriage and the Family*, *56*(3), 622–632.

Macartney, S., Bishaw, A., & Fontenot, K. (2013). Poverty Rates for Selected Detailed Race and Hispanic Groups by State and Place: 2007-2011. *American Community Survey Briefs*, 1–20. Washington, DC: U.S. Census Bureau. Retrieved from https://www2.census.gov/library/publications/2013/acs/acsbr11-17.pdf

Martin, J. A., Hamilton, B. E., Osterman, M. J. K., Driscoll, A. K., … Statistics, V. (2018). Births: Final Data for 2016. *National Vital Statistics Reports, 67*(1). Hyattsville, MD: National Center for Health Statistics. Retrieved from https://www.cdc.gov/nchs/data/nvsr/nvsr67/nvsr67_01.pdf

McLaughlin, K. A., Green, J. G., Gruber, M. J., Sampson, N. A., Zaslavsky, A. M., & Kessler, R. C. (2010). Childhood Adversities and Adult Psychiatric Disorders in the National Comorbidity Survey Replication II. *Archives of General Psychiatry*, *67*(2), 124-132. https://doi.org/10.1001/archgenpsychiatry.2009.187

Mersky, J. P., & Janczewski, C. E. (2018). Racial and ethnic differences in the prevalence of adverse childhood experiences: Findings from a low-income sample of U.S. women. *Child Abuse and Neglect*, *76*, 480–487. https://doi.org/10.1016/j.chiabu.2017.12.012

Mersky, J. P., Janczewski, C. E., & Topitzes, J. (2017). Rethinking the Measurement of Adversity: Moving Toward Second-Generation Research on Adverse Childhood Experiences. *Child Maltreatment*, *22*(1), 58–68. https://doi.org/10.1177/1077559516679513

Mersky, J. P., Topitzes, J., & Reynolds, A. J. (2013). Impacts of adverse childhood experiences on health, mental health, and substance use in early adulthood: A cohort study of an urban, minority sample in the U.S. *Child Abuse & Neglect*, *37*(11), 917–925. https://doi.org/10.1016/j.chiabu.2013.07.011

Miller, G. E., Chen, E., & Parker, K. J. (2011). Psychological stress in childhood and susceptibility to the chronic diseases of aging: Moving towards a model of behavioral and biological mechanisms. *Psychological Bulletin*, *137*(6), 959–997. https://doi.org/10.1037/a0024768.

Molnar, B. E., Berkman, L. F., & Buka, S. L. (2001). Psychopathology, childhood sexual abuse and other childhood adversities: relative links to subsequent suicidal behaviour in the US. *Psychological Medicine*, *31*(6), 965–977. https://doi.org/10.1017/S0033291701004329

Myhra, L. L. (2011). “It runs in the family”: Intergenerational transmission of historical trauma among urban American Indians and Alaska natives in culturally specific sobriety maintenance programs. *American Indian and Alaska Native Mental Health Research*, *18*(2), 17–40. https://doi.org/10.5820/aian.1802.2011.17

Nelson, K., Cross, T., Landsman, M. J., & Tyler, M. (1996). Native American families and child neglect. *Children and Youth Services Review*, *18*(6), 505–521. https://doi.org/10.1016/0190-7409(96)00020-5

Nock, M. K., Green, J. G., Hwang, I., McLaughlin, K. A., Sampson, N. A., Zaslavsky, A. M., & Kessler, R. C. (2013). Prevalence, correlates, and treatment of lifetime suicidal behavior among adolescents. *JAMA Psychiatry*, *70*(3), 300. https://doi.org/10.1001/2013.jamapsychiatry

Norris, T., Vines, P. L., & Hoeffel, E. M. (2012). The American Indian and Alaska Native Population : 2010. Washington DC: U.S. Census Bureau. Retrieved from http://www.census.gov/prod/cen2010/briefs/c2010br-10.pdf

Nylund, K. L., Asparouhov, T., & Muthén, B. O. (2007). Deciding on the number of classes in latent class analysis and growth mixture modeling: A monte carlo simulation study. *Structural Equation Modeling: A Multidisciplinary Journal*, *14*(4), 535–569. https://doi.org/10.1080/10705510701575396

O'Connell, J. M., Wilson, C., Manson, S. M., & Acton, K. J. (2012). The costs of treating American Indian adults with diabetes within the Indian Health Service. *American Journal of Public Health*, *102*(2), 301–308. https://doi.org/10.2105/AJPH.2011.300332

Ogunwole, S. (2006). *We the People: American Indians and Alaska Natives in the United States: Census 2000 Special Reports*. Washington, DC: US Census Bureau. Retrieved from https://www.census.gov/prod/2006pubs/censr-28.pdf

Pearlin, L. I. (1989) The sociological study of stress. *A Journal of Health and Social Behavior, 30*(3), 241–56.

Pearlin, L. I., Menaghan, E. G., Lieberman, M. A. & Mullan, J. T. (1981). The stress process. *Journal of Health and Social Behavior, 22*(4), 337–56.

Pearlin, L. I., Schieman, S., Fazio, E. M., & Meersman, S. C. (2005). Stress, health, and the life course: Some conceptual perspectives. *Journal of Health and Social Behavior*, *46*(2), 205–219. https://doi.org/10.1177/002214650504600206

Phelan, J. C. ., Link, B. G. ., Diez-Roux, A., Kawachi, I., & Levin, B. (2004). "Fundamental Causes" of social inequalities in mortality : A test of the theory. *Journal of Health and Social Behavior*, *45*(3), 265–285.

Phillips, E., Wang, T. W., Husten, C. G., Corey, C. G., Apelberg, B. J., Jamal, A., … King, B. A. (2017). Tobacco Product Use Among Adults — United States, 2015. *MMWR Morbidity and Mortality Weekly Report,* 66(44);1209–1215. http://dx.doi.org/10.15585/mmwr.mm6644a2

Porter, L., Martin, K., & Anda, R. (2016). *Self-Healing Communities*. Princeton, NJ: The Robert Wood Johnson Foundation.

Rich-Edwards, J. W., Spiegelman, D., Lividoti Hibert, E. N., Jun, H. J., Todd, T. J., Kawachi, I., & Wright, R. J. (2010). Abuse in childhood and adolescence as a predictor of type 2 diabetes in adult women. *American Journal of Preventive Medicine*, *39*(6), 529–536. https://doi.org/10.1016/j.amepre.2010.09.007

Richards, J., & Mousseau, A. (2012). Community-based participatory research to improve preconception health among Northern Plains American Indian adolescent women. *American Indian and Alaska Native Mental Health Research*, *19*(1), 154–185.

Roh, S., Burnette, C. E., Lee, K. H., Lee, Y.-S., Easton, S. D., & Lawler, M. J. (2015). Risk and protective factors for depressive symptoms among American Indian older adults: Adverse childhood experiences and social support. *Aging & Mental Health, 19*(4), 371–380. https://doi.org/10.1080/13607863.2014.938603

Roy Wade Jr, Cronholm, P. F., Fein, J. A., Forke, C. M., Davis, M. B., Harkins-Schwarz, M., … Bair-Merritt, M. H. (2016). Household and community-level adverse childhood experiences and adult health outcomes in a diverse urban population. *Child Abuse & Neglect*, *52*(52), 135–145. https://doi.org/10.1016/j.chiabu.2015.11.021

Samaan, R. (2000). The influences of race, ethnicity, and poverty on the mental health of children. *Journal of Health Care for the Poor and Underserved*, *11*(1), 100–110. https://doi.org/10.1353/hpu.2010.0557

Schilling, E. A., Aseltine, R. H., Gore, S., Kendall-Tackett, K., Williams, L., Finkelhor, D., … Morrison-Rodriguez, B. (2007). Adverse childhood experiences and mental health in young adults: a longitudinal survey. *BMC Public Health*, *7*(1), 30. https://doi.org/10.1186/1471-2458-7-30

Scott, K. M., Smith, D. R., & Ellis, P. M. (2010). Prospectively Ascertained Child Maltreatment and Its Association With DMS-IV Mental Disorders in Young Adults. *Archives of General Psychiatry, 67*(7), 712–719.

Scott, W. D., Clapp, J., Mileviciute, I., & Mousseau, A. (2016). Children's Depression Inventory: A unidimensional factor structure for American Indian and Alaska Native youth. *Psychological Assessment*, *28*(1), 81–91. https://doi.org/10.1037/pas0000145

Shiels, M. S., Chernyavskiy, P., Anderson, W. F., Best, A. F., Haozous, E. A., Hartge, P., … de Gonzalez, A. B. (2017). Trends in premature mortality in the USA by sex, race, and ethnicity from 1999 to 2014: an analysis of death certificate data. *The Lancet*, *389*(10073), 1043–1054. https://doi.org/10.1016/S0140-6736(17)30187-3

Shin, S. H., McDonald, S. E., & Conley, D. (2018). Patterns of adverse childhood experiences and substance use among young adults: A latent class analysis. *Addictive Behaviors*, *78*, 187–192. https://doi.org/10.1016/j.addbeh.2017.11.020

Shonkoff, J. P., Garner, A. S., Siegel, B. S., Dobbins, M. I., Earls, M. F., Garner, A. S., … Wood, D. L. (2012). The lifelong effects of early childhood adversity and toxic stress. *Pediatrics*, *129*(1), e232–e246. https://doi.org/10.1542/peds.2011-2663

Sittner, K. J., Greenfield, B. L., & Walls, M. L. (2018). Microaggressions, diabetes distress, and self-care behaviors in a sample of American Indian adults with type 2 diabetes. *Journal of Behavioral Medicine*, *41*(1), 122–129. https://doi.org/10.1007/s10865-017-9898-z

Śliwińska-Mossoń, M., & Milnerowicz, H. (2017). The impact of smoking on the development of diabetes and its complications. *Diabetes and Vascular Disease Research*, *14*(4), 265–276. https://doi.org/10.1177/1479164117701876

Stolbach, B. C., & Anam, S. (2017). Racial and ethnic health disparities and trauma-informed care for children exposed to community violence. *Pediatric Annals*, *46*(10), e377–e381. https://doi.org/10.3928/19382359-20170920-01

Tann, S. S., Yabiku, S. T., Okamoto, S. K., & Yanow, J. (2007). triADD: the risk for alcohol abuse, depression, and diabetes multimorbidity in the American Indian and Alaska Native populations. *American Indian and Alaska Native Mental Health Research (Online)*, *14*(1), 1–23. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/17602410%0Ahttp://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=PMC3040496

Trocmé, N., Knoke, D., Blackstock, C., & Blackstock, C. (2004). Pathways to the Overrepresentation of Aboriginal Children in Canada's Child Welfare System. *Social Service Review*, *78*(4), 577–600.

Turner, R. J. (2010). Understanding Health Disparities : The Promise of the Stress Process Model. In W. Avison, C.. Aneshensel, S. Schieman, & B. Wheaton (Eds.), Advances in the Conceptualization of the Stress Process (pp. 3–21). New York, NY: Springer. https://doi.org/10.1007/978-1-4419-1021-9

Turner, R. J., & Avison, W. R. (2003). Status Variations in Stress Exposure : Implications for the Interpretation of Research on Race , Socioeconomic Status , and Gender. *Journal of Health and Social Behavior*, *44*(4), 488–505.

Turner, R. J., & Lloyd, D. A. (1995). Lifetime traumas and mental health : The significance of cumulative adversity. *Journal of Health and Social Behavior*, *36*(4), 360–376.

Indian Health Service, Office of Public Health Support, & Division of Program Statistics. (2015). *Trends in Indian Health: 2014 Edition*.

Vander Weg, M. W. (2011). Adverse childhood experiences and cigarette smoking: The 2009 Arkansas and Louisiana Behavioral Risk Factor Surveillance Systems. *Nicotine & Tobacco Research: Official Journal of the Society for Research on Nicotine and Tobacco*, *13*(7), 616–622. https://doi.org/10.1093/ntr/ntr023

Vespa, J., Armstrong, D. M., & Medina, L. (2018). Demographic Turning Points for the United States: Population Projections for 2020 to 2060 Population Estimates and Projections, 1–15. Retrieved from https://www.census.gov/content/dam/Census/library/publications/2018/demo/P25_1144.pdf

Walls, M. L., & Whitbeck, L. B. (2011). Distress among Indigenous North Americans: Generalized and culturally relevant stressors. *Society and Mental Health*, *1*(2), 124–136. https://doi.org/10.1177/2156869311414919

Walsh, E. G., & Cawthon, S. W. (2014). The mediating role of depressive symptoms in the relationship between adverse childhood experiences and smoking. *Addictive Behaviors*. https://doi.org/10.1016/j.addbeh.2014.05.020

Walters, K. L., & Simoni, J. M. (2002). Reconceptualizing Native women's health: An "indigenist" stress-coping model. *American Journal of Public Health*, *92*(4), 520–524. https://doi.org/10.2105/AJPH.92.4.520

Walters, K. L., Simoni, J. M., & Evans-Campbell, T. (2002). Substance use among American Indians and Alaska Natives: Incorporating culture in an "indigenist" stress-coping paradigm. *Public Health Reports, 117 Suppl*, S104–S117.

Warne, D., Dulacki, K., Spurlock, M., Meath, T., Davis, M. M., Wright, B., & Mcconnell, K. J. (2017). Adverse childhood experiences (ACE) among American Indians in South Dakota and associations with mental health conditions, alcohol use, and smoking. *Journal of Health Care for the Poor and Underserved*, *28*(4), 1559–1577. https://doi.org/10.1353/hpu.2017.0133

Wheaton, B. (1994). Sampling the stress universe. In W. Avison, I. H. Gotlib (Eds.), *Stress and mental health* (pp. 77–114). New York, NY: Springer. Retrieved from http://link.springer.com/chapter/10.1007/978-1-4899-1106-3_4

Wheaton, B., & Blair Wheaton. (1999). Social Stress. In C. S. Aneshensel & J. C. Phelan (Eds.), *A handbook for the study of mental health* (pp. 277–300). Boston, MA: Springer. https://doi.org/10.1017/CBO9781107415324.004

Wheaton, B., Young, M., Montazer, S., & Stuart-Lahman, K. (2013). Social stress in the twenty-first century. In C. S. Aneshensel, J. C. Phelan, & A. Bierman (Eds.), *Handbook of the sociology of mental health* (2nd ed., pp. 299–323). New York: Springer https://doi.org/10.1007/978-94-007-4276-5

Whitbeck, L. B., Adams, G. W., Hoyt, D. R., & Chen, X. (2004). Conceptualizing and measuring historical trauma among American Indian people. *American Journal of Community Psychology*, *33*(3–4), 119–130. https://doi.org/10.1023/B:AJCP.0000027000.77357.31

Whitbeck, L. B., Hoyt, D. R., McMorris, B. J., Chen, X., & Stubben, J. D. (2001). Perceived discrimination and early substance abuse among American Indian children. *Journal of Health and Social Behavior*, *42*(4), 405–424. Retrieved from http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=11831140

Whitbeck, L. B., Mcmorris, B. J., Hoyt, D. R., & Stubben, J. D. (2002). Perceived discrimination, traditional practices , and depressive symptoms among American Indians in the Upper Midwest. Journal of Health and Social Behavior, *43*(4), 400–418.

Whitesell, N. R., Kaufman, C. E., Keane, E. M., Crow, C. B., Shangreau, C., & Mitchell, C. M. (2012). Patterns of substance use initiation among young adolescents in a Northern Plains American Indian tribe. *American Journal of Drug and Alcohol Abuse*, *38*(5), 383–388. https://doi.org/10.3109/00952990.2012.694525

Wickrama, K. (K A. S.)., Lee, T. K., O'Neal, C. W., & Kwon, J. A. (2015). Stress and resource pathways connecting early socioeconomic adversity to young adults' physical health risk. *Journal of Youth and Adolescence*, *44*(5), 1109–1124. https://doi.org/10.1007/s10964-014-0207-7

Williams, D. R. (1999). Race, socioeconomic status, and health: The added effects of racism and discrimination. *Annals of the New York Academy of Sciences*, *896*(1), 173–188. https://doi.org/10.1111/j.1749-6632.1999.tb08114.x

Appendix: ACES Questionnaire Comparison Table

Domain/ Construct	Adverse Childhood Experiences – International Questionnaire and Modified Adverse Childhood Experiences – International Questionnaire for the Gathering for Health Study *(Gathering for Health Survey modifications are in italics;* language only used in the ACE-IQ is in brackets)	Behavioral Risk Factors Surveillance System: ACE Module 2011	National Survey of Children's Health 2011 - 2012
Sexual Abuse	[These next questions are about certain things YOU may have experienced. When you were growing up, during the first 18 years of your life . . .]	I'd like to ask you some questions about events that happened during your childhood. . . All questions refer to the time period before you were 18 years of age. Now, looking back before you were 18 years of age---.	
	When you were growing up, how often did someone touch or fondle you in a sexual way when you did not want them to?	How often did anyone at least 5 years older than you, or an adult, ever touch you sexually?	
	When you were growing up, how often did someone make you touch their body in a sexual way when you did not want them to?	How often did anyone at least 5 years older than you, or an adult, try to make you touch them sexually?	
	When you were growing up, how often did someone attempt oral, anal, or vaginal intercourse with you when you did not want them to?	How often did anyone at least 5 years older than you, or an adult, force you to have sex?	
	When you were growing up, how often did someone actually have oral, anal, or vaginal intercourse [with you] when you did not want them to?		
Physical Abuse	*When you were growing up, how often* did a parent, guardian, or other household member	How often did a parent or adult in your home ever hit, beat or physically hurt you in any way?	

	spank you, slap you, kick you, punch you, or beat you up?		
	When you were growing up, how often did a parent, guardian, or other household member hit *you with* or cut you with an object, such as a stick, [or] cane, bottle, club, knife, or whip [etc.]?		
Emotional Abuse	*When you were growing up, how often* did a parent, guardian, or other household member yell, scream [or] swear at you, insult *you,* or humiliate you?	How often did a parent or adult in your home ever swear at you, insult you or put you down?	
	When you were growing up, how often did a parent, guardian, or other household member threaten to, or actually, abandon you or throw you out of the house?		
Neglect	[While you were growing up, during your first 18 years of life…]		
	When you were growing up, how often did your parents *or* guardians not give you enough food even when they could easily have done so?		
	When you were growing up, how often were your parents *or* guardians too drunk or intoxicated by drugs to take care of you?		
	When you were growing up, how often did your parents *or* guardians not send you to school even when it was available?		
Witness Household Violence	[These next questions are about certain things you may actually have heard or seen IN YOUR HOME. These are things that may have been done to another household member but not necessarily to you. When you were growing up, during the first 18 years of your life…]		
	When you were growing up, how often did you see or hear a parent or household member in	How often did your parents or adults in your home ever slap, hit, kick, punch or beat each other up?	Did [S.C.][5] ever see or hear any parents, guardians, or any other adults in [his/her]

[5] Sample child (S.C.)

	your home being yelled at, screamed at, sworn at, insulted, or humiliated?		home slap, hit, kick, punch, or beat each other up?
	When you were growing up, how often did you see or hear a parent or household member in your home being slapped, kicked, punched, or beaten up?		
	When you were growing up, how often did you see or hear a parent or household member in your home being hit or cut with an object, such as a stick, [or] cane, bottle, club, knife, *or* whip [etc.]?		
Household Substance Abuse	[When you were growing up, during the first 18 years of your life…]		
	When you were growing up, did you live with a household member who was a problem drinker or alcoholic, or misused street or prescription drugs?	Did you live with anyone who was a problem drinker or alcoholic?	Did [S.C.] ever live with anyone who had a problem with alcohol or drugs?
		Did you live with anyone who used illegal street drugs or who abused prescription medications?	
Household Mental Illness	[When you were growing up, during the first 18 years of your life…]		
	When you were growing up, did you live with a household member who was depressed, mentally ill, or suicidal?	Did you live with anyone who was depressed, mentally ill or suicidal?	[S.C.] ever live with anyone who was mentally ill or suicidal, or severely depressed for more than a couple of weeks?
Household Incarceration	[When you were growing up, during the first 18 years of your life…]		
	When you were growing up, did you live with a household member who was ever sent to jail or prison?	Did you live with anyone who served time or was sentenced to serve time in a prison, jail or other correctional facility?	Did [S.C.] ever live with a parent or guardian who served time in jail or prison after [S.C.] was born?
	These next questions are about BEING BULLIED when you were growing up. Bullying is		

	when a young person or group of young people say or do bad and unpleasant things to another young person. It is also bullying when a young person is teased a lot in an unpleasant way or when a young person is left out of things on purpose. It is not bullying when two young people of about the same strength or power argue or fight or when teasing is done in a friendly and fun way. When you were growing up, during the first 18 years of your life . . .		
	How often were you bullied?		
	These next questions are about how often, when you were growing up, you may have seen or heard certain things in your neighborhood or community. *Please do* not *include things you heard* in your home, or on TV, movies, or the radio. [When you were growing up, during the first 18 years of your life.]		
	When you were growing up, how often did you see or hear someone being beaten up in real life?		
	When you were growing up, how often did you see or hear someone being stabbed or shot in real life?		
	When you were growing up, how often did you see or hear someone being threatened with a knife or gun in real life?[6]		

[6] The ACE-IQ contains additional questions not shown here.

Jessica H. L. Elm,* MSW, PhD ***Curriculum Vitae***

EDUCATION

PhD	University of Washington, Social Welfare Dissertation: *Childhood Stressors and Behavioral Health among American Indian Adults with Type-two Diabetes: A Latent Class Analysis*	2018
MSW	University of California, Berkeley Management and Planning Concentration Thesis: *Foster youth and higher educational enrollment: An exploratory study of youth served by Transitional Housing Placement - Plus*	2009
BA	San Francisco State University, Social Work	2005
AS	Skyline College, Surgical Technology	1999
AA	Santa Rosa Junior College, General Education	1997

AWARDS, HONORS, GRANTS, & FELLOWSHIPS

Tobacco Studies Career Development Award, University of Washington 2017 - 2018

Dissertation Fellowship Award, Graduate Opportunities and Minority Achievement Program, University of Washington 2017 - 2018

ResearchGate's Most Read Publication from University of Washington, School of Social Work (Week Ending May 7, 2017) 2017

Native Children's Research Exchange Scholar, Fellowship Award, Centers for Native American and Alaska Native Health, University of Colorado, School of Public Health 2016 – 2017

Minority Fellowship Program, Council on Social Work Education, Substance Abuse and Mental Health Services Administration 2014 – 2017

American Indian Graduate Center, Conference Travel Award 2016

Native Children's Research Exchange, Travel and Conference Scholarship Centers for Native American and Alaska Native Health, University of Colorado, School of Public Health 2015

Society for Prevention Research 23rd Annual Meeting, National Institute on Drug Abuse Travel Scholarship Recipient 2015

Virtues, Narrative, and Resilience Conference, Participant Award, Sewanee, TN 2015

Canadian Studies, Foreign Language and Area Studies Fellowship, University of Washington (award offered) 2014

National Institutes for Health, Institute for Translational Health Sciences Multidisciplinary Clinical Research Training Program, University of Washington 2014

National Institute of Justice Annual Conference, Participant Award Palm Springs, CA 2014

Tribal Early Childhood Research Center Summer Institute Travel and Tuition Scholarship 2013

Association on American Indian Affairs, Graduate Student Scholarship 2013

Sociometrics, Awarded: 1R43MH098496-01A1, National Institute of Mental Health ($305,526) 2011

American University, Washington Internships for Native Students, Intern of the Year Award 2009

Native American Health Center, Graduate Student Award 2008

National Association of Social Workers, Consuelo W. Gosnell Memorial Scholarship 2008

National Conference for College Women Student Leaders Travel and Tuition Scholarship 2008

University of California, Berkeley, School of Social Work, Myrtle Lytle Award 2007

National Association of Social Workers, Consuelo W. Gosnell Memorial Scholarship 2006

Assistance League of San Mateo County, Scholarship for Re-entry Students 1997

RESEARCH INTERESTS & EXPERIENCE

Interests

Contemporary and historical sociopolitical stressors as determinants of American Indian health inequities; constellations of stressors and cumulative adversity across the life course; multidimensional protective effects, resilience, and post-traumatic growth; community-based participatory and tribally-driven research methodologies; and mixed methods

Experience

Research Affiliate and Trainee, Gathering for Health Study, (Walls PI) 2014 – Present
Department of Biobehavioral Health Population Sciences,
University of Minnesota Medical School, Duluth campus,
Duluth, MN.

Research Assistant and Consultant, Creating Campus Change: Tribal Colleges and Universities Behavior Wellness Project (PI Duran). Indigenous Wellness Research Institute, University of Washington. 2014 – 2017

Fellow, Native Children's Research Exchange, Centers for Native American and Alaska Native Health, University of Colorado, Anschutz Medical Center. 2016 – 2017

Consultant, Breaking Free from the Web of Violence: Asset-Based Approaches for Boys & Men of Color (Hamby PI). RISE for Boys & Men of Color. 2016

Research Fellow, Summer Institute in LGBT Population Health, The Fenway Institute & Northeastern University Institute for Urban Health Research, Boston, MA. 2015

Research Partner and Trainee, University of Michigan Community-Based Participatory Research Partnership Academy, Ann Arbor, MI. 2015

Fellow, Indigenous Substance Abuse, Medicines, and Addictions Research Training Program, Indigenous Wellness Research Institute, University of Washington. 2013—2015

Research Assistant, Mentoring Diverse Scientists in HIV Research on Substance Abuse and Mental Health (PI Walters). Indigenous Wellness Research Institute, University of Washington. 2014

Clinical Research Summer Trainee, Institute of Translational Health Sciences Multidisciplinary Pre-Doctoral Clinical Research Training Program (TL1), University of Washington. 2014

Trainee, Tribal Early Childhood Research Center Summer Institute: Early Childhood Research with Tribal Communities, Johns Hopkins Center for American Indian Health, Baltimore, MD and Tribal Early Childhood Research Center, University of Colorado, Anschutz Medical Center. 2013

Consultant, Multimedia American Indian Skills Training, (PI Raghupathy & LaFramboise). Sociometrics, Los Altos, CA. 2011

Trainee, Graduate coursework in Maternal Child Health Epidemiology University of Arizona, Tucson, AZ. 2010-2012

Policy Research Fellow, National Congress of American Indians, Washington, DC 2009

Research Assistant Intern, U.S. Department of Health and Human Services, Substance Abuse and Mental Health Services Administration, Washington, DC 2009

Graduate Student Researcher, Office of the Vice Chancellor of Equity and Inclusion, University of California, Berkeley, CA. 2008

Research Assistant, Columbia University, for Unclaimed Children Revisited: California Case Study in Oakland, CA. 2007

Research Assistant, The San Francisco Department of Aging and Adult Services, Partnership for Community-based Care and Support*,* San Francisco, CA. 2004 – 2005

PUBLICATIONS

Peer Reviewed Publications

Brockie, T., **Elm, J. H. L.**, & Walls, M. (under review). Examining protective and buffering effects of social and cultural factors on adverse childhood experiences among American Indian adults with type 2 diabetes: A quantitative, community-based participatory research approach. *British Medical Journal.*

Elm, J. H. L., Walls, M., & Aronson, B. (under review). Sources of stress among Midwest American Indian adults with type two diabetes. *American Indian and Alaska Native Mental Health Research*.

Elm, J. H. L., Lewis, J., Walters, K. L., & Self, J. (2016). "I'm in this world for a reason": Resiliency, recovery, and two-spirit women. *Journal of Lesbian Studies. 20(*3-4) 352-371. doi.10.1080/10894160.2016.1152813

Walker, R. D., Bigelow, D. A., **LePak, J. H.**, & Singer, M. J. (2012). Demonstrating the process of community innovation: The Indian country methamphetamine initiative. *Journal of Psychoactive Drugs. 43*(4), 325-330. doi.10.1080/02791072.2011.629140

Manuscripts in Preparation

Elm, J. H. L. & Walters, K. L. (in preparation). Child abuse and suicide attempt among male and female sexual minority American Indians and Alaska Native two-spirits. *Journal of Interpersonal Violence.*

Sarche, M., Narayan, A., Croy, C., **Elm, J. H. L.,** and Beaulieu, S. (in preparation). Maternal adversity and attachment and impact on children's early social emotional development in an American Indian sample.

Book Chapter

Walters, K. L., Evans-Campbell, T., Town, M., Schultz, K., **Elm, J. H. L.,** & Beltrán, R. E. Incorporating cultural worldviews into oncology social work practice with American Indian and Alaska Native populations. (2015). In G., Christ, C., Messner, & L., Behar, L. (Eds.). *Handbook of Oncology Social Work*. New York, NY: Oxford University Press.

Policy Briefs, Commentaries, & Reports

Williams Institute. (Research Report in progress). LGBTQ Youth of Color in Child Welfare and Juvenile Justice Systems: Crafting an Intersectional Research Agenda to Promote Opportunities and Wellbeing.

7 Directions Architects and Planners. (2017). *Residential Substance Abuse Treatment Facility Feasibility Study: Report to the Business Council of the Confederated Tribes of the Colville Reservation.* Nespelem, WA: Confederated Tribes of the Colville Reservation.

Elm, J. H. L., Walters, K. L., & The Indigenous Wellness Research Institute, National Center of Excellence. (2015). Response to federal Indian Health Services' request for public comment on the Indian Health Service's request for information on the health needs of the American Indian/Alaska Native LGBT community, Document Number: 2015-13774.

Native American Health Center: Native American California Reducing Disparities Project. (2012). *Native vision: A focus on improving behavioral health wellness for California Native Americans. California reducing disparities project, Native American population report.* Sacramento, CA: Office of Multicultural Services.

National Congress of American Indians. (2009). *American Indian and Alaska Native youth and teen pregnancy: A White House policy brief.* Washington, DC: Author.

LePak, J. H. (2009). *Same day billing case study: Report to U.S. Department of Health and Human Services.* Washington, DC: Substance Abuse and Mental Health Services Administration

LePak, J. H. (2009). *Assessment and recommendations on students, staff, and faculty with disabilities: Report to the University of California, Berkeley, Office of Equity & Inclusion.* Berkeley, CA: University of California, Berkeley.

LePak, J. H. (2005). Native American pressures. *Multicultural Voices*, *9*(1), 1-5. San Francisco, CA: San Francisco State University.

PRESENTATIONS

Peer-Reviewed Conference Presentations & Posters

Elm, J. H. L. (2018, May). Composition and Accumulation of Childhood Stressors and Associations with Health Outcomes among American Indian Adults with Type-Two Diabetes. Poster presentation at the 26th Annual Meeting of the Society for Prevention Research: Optimizing the Relevance of Prevention Science to Systems. Washington, DC.

Elm, J. H. L. (2018, May). We're All in This Together: Using Indigenous and Decolonizing Approaches in Mainstream PhD Programs in Canada and the US. Roundtable presented at the 10th Annual Meeting of the Native American and Indigenous Studies Association. Los Angeles, CA.

Elm, J. H. L. & Ulrich, J. (2018, April). Expanding Resilience in Indigenous Research for Policy and Practice Change. Presented at the 36th Annual Protecting our Children Conference. Anchorage, AK.

Elm, J. H. L. (2017, September). Toward identifying Native-specific adverse childhood experiences: A latent class analysis. Presented at the Native Children's Research Exchange 2017 Annual Conference. Denver, CO.

Elm, J. H. L. (2017, June). Suicide attempt and childhood risk factors among urban lesbians, gay, bisexual and two-spirit American Indians and Alaskan Natives. Presented at the Native American and Indigenous Studies Association Conference 2017. Vancouver, British Columbia.

Elm, J. H. L. (2017, April). High (but not as high as expected) prevalence of suicide attempt among American Indian and Alaska Native sexual minority two-Spirits. Poster presented at the 2nd Annual ResilienceCon 2017: The Science of Strength. Nashville, TN.

Elm, J. H. L. (2016, September). Developing an adverse childhood experiences measure for Indian Country: Early considerations. Presented at the Native Children's Research Exchange 2016 Annual Conference. Denver, CO.

Walls, M. L., Aronson, B., & **Elm, J. H. L.** (2016, June). Stress and diabetes among American Indian adults: First results from a longitudinal study. Presented at the 15th International Conference on Social Stress Research. San Diego, CA.

Ignacio, M. & **Elm, J. H. L.** (2016, March). Exploring Native LGBTQ/Two-Spirit health issues. Presented at the Queer I Am Summit. Olympia, WA.

Elm, J. H. L. & Aronson, B. (2015, September). Adverse childhood experiences, depression, and diabetes: Is there a link? Poster presented at Native Children's Research Exchange 2015 Annual Conference. Denver, CO.

Elm, J. H. L. (2015, June). Substance use: Origins, consequences, and implications in American Indian Vocational Rehabilitation Services. Workshop presented at the Consortia of Administrators for Native American Rehabilitation Annual Mid-Year Conference. Myrtle Beach, NC.

Elm, J. H. L. (2015, June). Stressors and health inequities within American Indian tribal communities. In **J. H. L. Elm** (Chair), *Stress, Resiliency, and Health Disparities among American Indian, Alaska Native, and Two Spirit Populations: Understanding Complex Stress, Trauma, and Wellness in an Affordable Care Act Era.* Paper and symposium presented at the 23rd Annual Meeting of the Society for Prevention Research. Washington, DC.

Elm, J. H. L. & Villegas, M. (2015, May). Adverse childhood experiences: Using data to inform policy and design interventions. Workshop conducted at the 36th Annual Protecting Our Children National Indian Child Welfare Association Conference. Portland, OR.

LePak, J. H., Walters, K., Evans-Campbell, T., & Huh, D. (2014, November). Embodiment of historical trauma among sexual minority American Indian and Alaska Native women. In Zimmerman, L. (Chair), *The Impact of Sexual Identity, Lifetime Trauma Exposure, Intergenerational Trauma and Family Factors on Mental Health and Substance Abuse among Diverse Samples of Women.* Paper symposium conducted at the International Society for Traumatic Stress Studies 30th Annual Meeting. Miami, FL.

Walters, K. L., Simoni, J. M., Pearson C. R., Evans-Campbell, T., Charles, C. D., & **LePak, J. H.** (2014, October). *Developing a community grounded HIV preventative intervention using technology, for American Indian and Alaska Native men who have sex with men.* Symposium accepted at the International Network of Indigenous Health Knowledge and Development, 6th Biennial Conference, Winnipeg, MB, Canada.

Select Professional Presentations

Elm, J. H. L. (2017, July). *Resiliency and Recovery among American Indian and Alaska Native Two-Spirit Women & Child Abuse & Suicide Attempt Among American Indian and Alaska Native Two-Spirits.* Delivered online to the LGBTQ-Two Spirit Work Group. Indian Health Service, Rockville, MD.

Elm, J. H. L. (2017, June). *Child Abuse and Suicide Attempt among Male and Female American Indian and Alaska Native Two-Spirits.* Center for Behavioral Health Statistics and Quality, Substance Abuse and Mental Health Services Administration, Rockville, MD.

7 Directions Architects and Planners & **Elm, J. H. L.** (2017, March). *Colville Substance Use Treatment Facility: Data Collection and Pre-design Feasibility Study.* Nespelem, WA: Colville Business Council, Confederated Tribes of the Colville Reservation.

Elm, J. H. L. & Parker, S. (2016, August). *Principles of Community-Based Participatory Research.* Quarterly Tribal Health Committee Meeting. Oneida Nation, Oneida, WI.

Elm, J. H. L. (2015, April). *Indigenizing Mentoring for PhD students.* Indigenous Wellness Research Institute. Indigenous Substance Abuse, Medicines, and Addictions Research Training Program Annual Retreat. Albuquerque, NM.

TEACHING

Interests

Macro practice social work; child and family, and health policy; program evaluation; social determinants of health; historical trauma and resilience

Course Experience

Instructor, Historical Trauma and Healing *(MSW),* 2016
University of Washington, School of Social Work.

Co-Instructor, Child and Family Services and Policy *(MSW)* 2013
University of Washington, School of Social Work.

Instructor, Urban Indian Experience, (*BA*), College of Ethnic Studies, 2010
San Francisco State University, San Francisco, CA.

Training Experience

Trainee, Health Sciences Interprofessional Education Initiative, 2013—2014
University of Washington, Seattle, WA.

Invited University Lectures

CBPR with tribal communities: Mixed methods studies and evaluation. Guest 2018
lecture for Indigenous and Qualitative Research Methods course.
School of Social Work, Humboldt State University, Arcata, CA.

Historical trauma and healing: Health inequities & the stress process. 2018
Guest lecture for Social Work course: Historical Trauma and Healing.
University of Washington.

Historical trauma: Theory, practice and policy. Guest Lecture for Social Work 2017
course: Advanced Practice with Diverse Multigenerational Families.
University of Washington.

Historical trauma and healing: Health inequities & the stress process. Guest 2017
lecture for Social Work course: Historical Trauma and Healing.
University of Washington.

Colonization, substance "misuse," and "recovery." Guest lecture for Gender, 2016
Women, and Sexuality Studies course: Criminality and "Deviance"
in Native Communities. University of Washington.

Intergenerational resiliency: Recovering from stress through braiding our strengths. 2015
American Indian Graduate Program and School of Social Welfare,
University of California, Berkeley.

Historical trauma and resilience. Guest lecture for cohort of first year MSW 2015
students. University of Washington.

Historical trauma, coping, and resilience. Guest lecture for MSW course: Social 2015
Work for Social Justice Developing a Personal-Professional Stance.
University of Washington.

Social justice in macro practice. Guest lecture for BASW course: Introduction to 2013
Social Work Practice. University of Washington.

ADDITIONAL PROFESSIONAL EXPERIENCE

Consultant, The Confederated Tribes of The Colville Reservation, 2016 – 2017
Nespelem, WA. Colville residential substance abuse treatment
feasibility study.

Consultant, Wisconsin Inter-Tribal Child Care Association Spring Conference, Red Cliff Reservation, WI. Training: *Adverse childhood experiences from a tribal perspective*. 2016

Consultant, American Indian Child Resources Center, Oakland, CA. Awarded California Office of Emergency Services, The American Indian Child Abuse Treatment Program grant, California Office of Emergency Services ($125,000). 2015

Adviser, 2015 U.S. Transgender Survey report on the experiences of American Indian and Alaska Native people. National Center for Transgender Equality. 2015

Youth and Family Advocate, Federated Indians of Graton Rancheria, Rohnert Park, CA. Awarded U.S. Department of Justice, Justice Systems and Alcohol and Substance Abuse grant ($730,902) & U.S. Department of Justice, Tribal Youth Program grant ($429,053). 2011

Program Coordinator, Native American Health Center, Oakland, CA. Awarded Substance Abuse and Mental Health Services Administration, Youth Suicide Prevention and Early Intervention Grant ($736,000) & U.S. Department of Health and Human Resources, Office of the Administration for Children and Families, Tribal Home Visiting ($2,045,000). 2010—2011

Senior Operating Room Technician, Kaiser Permanente, San Rafael, CA. 2001—2011

Legislative Associate, National Congress of American Indians, Washington, DC 2010

Legislative Fellow, National Congress of American Indians, Washington, DC 2009

Research & Policy Associate, John Burton Foundation for Children without Homes, San Francisco, CA. 2008

Management and Planning Assistant, California Department of Education, Foster Youth Services Program, Sacramento, CA & Alameda County Office of Education, Foster Youth Services Program, Oakland, CA. 2007—2008

Planning Assistant, American Indian Child Resource Center, Oakland, CA. 2006

Community Health Educator, St. Kitts Life Services Association, West Indies. 2004

REVIEWER ACTIVITIES

Journal of Primary Prevention

Transcultural Psychiatry

Journal of Consulting and Clinical Psychology

Journal of Psychoactive Drugs

UNIVERSITY SERVICE

Student Representative, School of Social Work Awards Committee, University of Washington 2015—2016

Student Representative, School of Social Work PhD Steering Committee, University of Washington 2013—2015

Senator, Graduate and Professional Student Senate, University of Washington 2013—2014

Co-chair, Native Organization of Indigenous Scholars, University of Washington 2013—2014

Member, School of Social Work PhD Curriculum Committee, University of Washington 2012—2013

Member, School of Social Work PhD Social Justice Committee, University of Washington 2011—2013

Advisory Board Member, American Indian Graduate Program, University of California, Berkeley 2007—2012

Chair, American Indian Graduate Student Association, University of California, Berkeley 2007—2009

Advisory Board Member, Tang Health Center, University of California, Berkeley 2007—2009

Delegate, Graduate Assembly: Graduate Student Government, University of California, Berkeley 2007—2009

Advisory Board Member, Office of the Vice Chancellor of Equity and Inclusion, Strategic Advisory Group, University of California, Berkeley 2007—2008

PUBLIC ENGAGEMENT & MEDIA MENTIONS

Lee, N. & MacLean S. J. (2016, August 28). How big of a problem is ice use among Indigenous Australians? *The Conversation.* http://theconversation.com/how-big-a-problem-is-ice-use-among-indigenous-australians-57977

Cheney-Rice, Z. (2016, April 26). Oklahoma Republican apologizes for saying Native Americans are predisposed to alcoholism. *Mic. & Yahoo.* https://mic.com/articles/141824/oklahoma-republican-apologizes-for-saying-native-americans-are-predisposed-to-alcoholism#.AHMMTa9Kp

Mousseau, A., **Elm, J. H. L.,** & Sierra, A. (2016, February 14). Valentine's Day edition with Andrew Ironshell: Healthy relationships. *Thunder Valley Community Development Corporation Radio Hour*, *KILI Radio*. Pine Ridge Reservation, SD. https://soundcloud.com/andrew-ironshell/thunder-valley-cdc-radio-hour-valentines-day-special

Doctorow, C. (2015, October 6). Genocide, not genes: Indigenous peoples' genetic alcoholism is a racist myth. *Boing.* https://boingboing.net/2015/10/06/genocide-not-genes-indigenou.html

Szalavitz, M. (2015, October 2). No, Native Americans aren't genetically more susceptible to alcoholism. *The Verge.* http://www.theverge.com/2015/10/2/9428659/firewater-racist-myth-alcoholism-native-americans

LePak, J. H. (2010, September 29). California's AB 12: Good for Indian foster children. *Indian Country Today.*

COMMUNITY SERVICE

Research Development Volunteer, Oneida Tribe of Indians of Wisconsin 2015—2016

Member, California Mental Health Services Act Multicultural Coalition, Sacramento, CA 2011—2016

Volunteer, American Indian Child Resource Center, Oakland, CA 2011—2015

Volunteer, National Association of Tribal Historic Preservation Officers, Washington, DC 2009—2010 & 2014

Board Member, University of California, Davis, Research and Education Community Advisory Board 2011—2012

Research Volunteer, Center for Reducing Health Disparities, University of California, Davis 2011—2012

Board Member, Seva Foundation, Native American Community Health Program, Berkeley, CA 2011—2012

Chair, First 5 Alameda County, Systems of Care Cultural and Linguistics Responsiveness Committee 2011

Volunteer Grant Reviewer, Alameda County, Department of Mental Health, Innovations Program 2011

Member, Bay Area Collaborative of American Indian Resources, Oakland, CA 2008—2011

Board Member and Volunteer, Intertribal Friendship House, Oakland, CA 2007—2009

Volunteer Surgical Technologist and Circulating Nurse, Hospital De la Familia, Guatemala 2002 & 2006

PROFESSIONAL AFFILIATIONS

Member, Society for Prevention Research 2015 - Present

Member, American Academy of Pediatrics, Council on Community Pediatrics, Indian Health Special Interest Group	2017 - Present
Member, Native Children's Research Exchange	2015-Present
Member, National Indian Child Welfare Association	2015-Present
Member, Racial & Ethnic Mental Health Disparities Coalition	2014-Present
Member, Native American and Indigenous Studies Association	2014-Present
Member, American Association of University Women	2008-Present
Member, National Association of Social Workers	2003-2009
Member, Council on Social Work Education	2012-2017

REFERENCES

Karina Walters, PhD, Professor, Committee Chair
UW School of Social Work, Associate Dean of Research
Director of Indigenous Wellness Research Institute
4101 15th Avenue NE
Seattle, WA 98105-6299
kw5@uw.edu
(206) 543-5647

Melissa Walls, PhD, Associate Professor, Committee Member
Department of Family Medicine & Behavioral Health
236 SMED, 1035 University Drive
Duluth, MN 55812-3031
mlwalls@umn.edu
218-726-8367

Peter Pecora, PhD, Professor
Managing Director of Research Services, Casey Family Programs
UW School of Social Work
4101 15th Avenue NE,
Seattle, WA 98105-6299
ppecora@casey.org
(206) 270-4936