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WASHINGTON UNIVERSITY IN ST. LOUIS

Brown School of Social Work

Dissertation Examination Committee:

Melissa Jonson-Reid, Chair

Brett Drake

Bret Gustafson

Phillip Marotta

David Patterson Silver Wolf

Lindsay Stark

Protecting Native Motherhood:

A Longitudinal Investigation of Interpersonal Violence Among Alaska Native Women

by

Autumn Asher

A dissertation presented to
the Brown School
of Washington University in
partial fulfillment of the
requirements for the degree
of Doctor of Philosophy

May 2022

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This work is for the Indigenous mothers that have carried our cultures across generations, to honor and thank the ancestors that came before us, and the dedication to making the path better for those that have yet to come.

Autumn Asher BlackDeer

Washington University in St. Louis

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ABSTRACT OF THE DISSERTATION

Alaska Native mothers and their children are continually impacted by present day disparities resulting from decades of historical oppression. Indigenous women face a substantially greater risk for experiencing violence during pregnancy. Further, Alaska Native children are disproportionately represented in the child welfare system, including both overrepresentation in out of home care, and underrepresented in preventative and restorative services in comparison to the general population.

The present work utilizes data from the Alaska Longitudinal Child Abuse and Neglect Linkage Project (ALCANLink) which follows children of Alaska mothers originally sampled in the Pregnancy Risk Assessment Monitoring System (PRAMS). The ALCANLink is a longitudinal project which annually checks if children have been reported to child welfare or other social services from public programs within the state of Alaska. The present work also uses three-year follow-up data to the PRAMS in the Childhood Understanding Behaviors Survey (CUBS). There are a total of 1,236 Alaska Native mothers who responded to the PRAMS in Cohort 1 and 1,738 Alaska Native mothers who responded to the PRAMS in Cohort 2. Several outcomes of interpersonal violence, maternal-child health, and involvement with the child welfare system were assessed. Three outcomes of involvement with the child welfare system were evaluated. Child protective services (CPS) contact (report of alleged maltreatment regardless of screening or outcome determination) may serve as a proxy for potential or experienced harm to child, indicating child risk or vulnerability.

Accounting for complex survey design, 21 total multilevel models were conducted to analyze these outcomes. Key independent variables include maternal interpersonal violence, mental health and substance use, socioeconomic status indicators, and maternal-child health

measures like prenatal care and neonatal outcomes. Several significant associations emerged throughout the models.

The most common pattern of interpersonal violence reported was surrounding pregnancy. Alaska Native mothers who experienced interpersonal violence surrounding their pregnancies were more likely to be reported for child maltreatment. This demonstrates the intergenerational impact of trauma as mothers who experienced violence surrounding pregnancy also had children who experienced some form of harm, thus leading to them being reported for child maltreatment. Native children in Alaska have high rate of child removal from their families and placement in out of home care, demonstrating a legacy of harm against Indigenous mothers and their children.

Findings suggest the need of integrated care models that can connect mothers to social services to alleviate poverty, provide substance use treatment without criminalization, and ultimately treat trauma of both mothers and their children. In order to ensure the continuance of Native families and survivance of Native nations, it is vital to interrupt the transmission of intergenerational trauma.

Chapter 1: Introduction

American Indian and Alaska Native mothers and their children are continually impacted by present day disparities resulting from decades of historical oppression. There is a higher prevalence of violence against American Indian and Alaska Native¹ women during pregnancy when compared to the general population (Sapra et al., 2014; Raglan et al., 2015). Research has also found that American Indian and Alaska Native women experience a greater number of major stressors than other racial or ethnic groups in both the 12 months prior to pregnancy and in the 12 months prior to delivery (Lu & Chen, 2004; Whitehead et al., 2003) and are 3-4 times more likely to die during pregnancy or childbirth complications than white women (Peterson et al., 2019). The World Health Organization has focused attention specifically on intimate partner violence during pregnancy due to the increased prevalence, adverse health consequences, and intervention potential (WHO, 2011). Informed by a historical oppression framework, the present study uses longitudinal data to examine interpersonal violence, behavioral health, and maternal-child health outcomes among Alaska Native mothers surrounding pregnancy and at a three-year follow up.

Research on interpersonal violence within the United States typically takes a Euro-American perspective and ignores the historical, sociopolitical, and cultural contexts of survivors (Matamonasa-Bennett, 2015). The impact of collective trauma on American Indian/Alaska Natives (AI/AN) health and wellbeing is a direct result of changes in social and economic contexts resulting from colonialism (Austin et al., 2019). Researchers have identified both

¹ The present work uses the terms Native, Indigenous, and the acronym AI/AN interchangeably to refer to American Indian and Alaska Native communities unless otherwise specified.

historic (colonization, subjugation, oppression, and trauma) and contemporary (poverty, racism, alcohol and drug use, and rural isolation) contributions to disproportionate occurrences of interpersonal violence (Jones, 2008; Dennis, 2018; Austin et al., 2019). These experiences of collective trauma further contribute to disproportionate exposure to multiple risk factors such as poverty and parental mental health and substance use (Austin et al., 2019). Similarly, collective trauma is linked to experiences of sexual violence, interpersonal violence, and behavioral health problems (Dennis, 2018).

Prior work with Native community members demonstrates the importance of acknowledging the historical social context in researching IPV among Indigenous communities (Matamonasa-Bennett, 2015). This contextualization challenges or rejects Eurocentric criminological approaches by centering colonization as a root cause of the problem resulting in current level of sexual violence and subsequent mental health issues (Braithwaite, 2018). The present work is informed by the historic and ongoing influences of settler colonialism including collective and intergenerational trauma, structural violence, and the contemporary manifestations of both.

In addition to high rates of violence and related mental health consequences, Native women face both historic and contemporary disparities in maternal health outcomes. For example, reproductive justice is defined as the right to have or not have children, parent the children they have, and the ability to parent in a safe, supportive environment (Lauen et al., 2017). Historically, Native women have struggled for reproductive justice as they faced forced sterilization and infant separation, both of which contribute significantly to a present-day distrust with care providers (National Partnership for Women and Families, 2019). Both historic and contemporary adverse maternal health outcomes and healthcare distrust can also be attributed to

the historical trauma of systemic racism, colonization, genocide, reproductive coercion, and cultural erasure (National Partnership for Women and Families, 2019). Further systemic barriers exist in present day Native maternal health manifested through high rates of poverty, food insecurity, and overall lack of health insurance (National Partnership for Women and Families, 2019). The present work will investigate several aspects of maternal-child health including prenatal care, food security, social support, neonatal outcomes, and developmental concerns.

Social inequities such as poor legal response, poor quality education, rigid gender norms, and economic hardships, in conjunction with racism and other forms of discrimination, contribute to experiences of interpersonal violence (Scheeringa & Zeanah, 1995) and limit reproductive justice for Native women. Interpersonal violence is defined through family, partner, and community instances of violence perpetrated by related and non-related individuals. According to the American Psychological Association, interpersonal violence encapsulates child abuse, domestic and sexual violence, and community violence (2019). Despite Native women experiencing a higher prevalence of violence within the general population and during pregnancy, little is known about the relationships between pregnancy violence, risks, and subsequent outcomes for Native women. Moreover, contextual factors (e.g., community poverty and crime and macro-economic factors) surrounding Indigenous women who experience interpersonal violence are mostly unknown. Ecological frameworks are the primary theoretical perspective utilized in order to understand factors related to interpersonal violence across micro, mezzo, and macro systems. The present study combines tenants of ecological theory and historical oppression to examine all three levels of exposure to violence among Indigenous women in Alaska: family, partner, and community. This dissertation also examines potential comorbid issues of poverty, mental health and substance use Alaska Native mothers and their

children and then extends this work to examine select parenting and child level outcomes some years following childbirth.

The present study will seek to address the following aims and research questions:

Aim 1: Understand factors surrounding Alaska Native mothers who experience interpersonal violence compared to those who do not.

RQ1: What individual factors discriminate between Alaska Native mothers who self-report experiencing interpersonal violence and those who do not?

1a: What is the prevalence of self-report experiences of interpersonal violence among Alaska Native mothers?

1b: What is the prevalence of behavioral health issues (mental health and substance use) among Alaska native mothers who self-report experiencing interpersonal violence and those who do not?

Aim 2: Understand the role of stress surrounding Alaska Native mothers who experience interpersonal violence compared to those who do not.

RQ2: How are stress and behavioral health issues related to prenatal care access and timing for Alaska Native mothers who experience interpersonal violence and those who do not?

RQ3: How are stress and behavioral health issues related to social supports for Alaska Native mothers who experience interpersonal violence and those who do not?

Aim 3: Investigate potential intergenerational impacts of trauma among children of Alaska Native mothers who experience interpersonal violence and those who do not.

RQ4: How do neonatal outcomes differ among children of Alaska Native mothers who experience interpersonal violence and those who do not?

RQ5: What is the prevalence of maltreatment among children of Alaska Native mothers who experience interpersonal violence compared to those who do not?

Interpersonal violence is a marker for several other adverse maternal and fetal outcomes. Addressing interpersonal violence surrounding pregnancy is pertinent for both mother and child's physical, mental, and economic outcomes. Increased lifetime rates of physical and sexual abuse have been linked to a myriad of adverse outcomes such as preterm birth rates, health risks, substance use, psychological disorders, and delayed or total lack of prenatal care (Shah & Shah, 2010; Bohn, 2003; Raglan et al., 2015). Gaps in the literature regarding these experiences and outcomes make it unclear if pregnancy is a protective time or a time of increased vulnerability for Native motherhood. These gaps in knowledge also hamper program and policy development that can improve care at this time of heightened vulnerability for mother and child. Through the evaluation of both individual and community level factors, this work can inform strategies to create supportive environments, build healthy public policies, strengthen community action, and reorient health and social services by developing culturally competent and safe services (WHO, 1986). The present study's findings have implications for improved delivery of pregnancy supports for Indigenous mothers such as prenatal care and home visiting programs to address maternal mental health and substance use and ultimately prevent interpersonal violence. Results help further identify particular leverage points that may be used to target and tailor interventions for Native mothers experiencing interpersonal violence to prevent future violence and improve overall wellbeing for both mother and child.

Chapter 2: Background and Significance

Throughout several Native nations, Indigenous women were traditionally seen as the carriers of culture, often serving as political advisors and selecting the tribal leadership (Yellow Horse Brave Heart et al., 2016); however, present day Native women are frequently impacted by experiences of violence with subsequent worsened mental health outcomes. Prior research has indicated that American Indian and Alaska Native women experience higher annual incidence rates and lifetime prevalence rates of violence against women, compared to both Black women and white women, with an increased likelihood to experience sexual and interpersonal violence overall (Bachman et al., 2008).

2.1 Interpersonal Violence and Maternal-Child Health

Intimate partner violence during pregnancy has gained increasing attention due to the greater prevalence, severe adverse health consequences to both mother and child, and the potential for intervention (WHO, 2011), as pregnancy is often the most interaction with healthcare systems that women have across their lifespan. Intimate partner violence is associated with several adverse maternal health outcomes including maternal mental health issues and adverse neonatal outcomes for the child (Udo et al., 2016). The effects of maternal intimate partner violence persist beyond pregnancy and birth and have been found to negatively impact child development (Udo et al., 2016) and parenting (Kobayashi et al., 2021). Violence against women is a substantial factor in maternal and reproductive health.

Intimate Partner Violence in Native Communities

The National Congress on American Indians has recognized intimate partner violence as one of the most important issues in Indian Country (Matamonasa-Bennett, 2015). Intimate partner violence may be defined as a relationship characterized by power and control with manifestations including controlling behaviors, physical and sexual violence. The majority of women who are physically assaulted by an intimate partner have been sexually assaulted by that same partner (Taylor & Gaskin-Laniyan, 2007). Sexual violence within intimate relationships typically begins with controlling behavior that escalates into forms of physical, sexual, and emotional abuse.

At its worst, intimate partner violence results in homicide. According to the Department of Justice's 2008 report on violence against American Indian and Alaska Native women, Native women had the second highest rate of homicide victimization compared to Black women (1st) and white women (3rd) (Bachman et al., 2008). In this same report, however, some counties surveyed were solely tribal lands and reported homicide victimization rates nearly 10 times higher than the national average (Bachman et al., 2008). American Indian and Alaska Native women are more likely to be killed by intimate partners than by others (Bachman et al., 2008).

According to the National Intimate Partner and Sexual Violence Survey (NISVS), roughly 1 in 4 women and 1 in 10 men have experienced either physical violence, sexual violence, or stalking by an intimate partner (Breiding et al., 2014). Native women experience higher rates of intimate partner violence victimization across their lifetime (52%) compared to 51% of multiracial, 41% of Black women, and 31% of white women (Breiding, 2014). One of the few population-based studies of victimization across IPV, physical and emotional domains was the 2001 Behavioral Risk Factor Surveillance System (BRFSS) of Natives in Montana living

on or near a reservation (n=1,006), This study found that among Native male participants, 9% experienced physical violence, 1% experienced intimate partner violence, and 12% experienced emotional abuse within the past year (Harwell, Moore, & Spence, 2003). Among female participants, 5% reported physical abuse, 3% reported intimate partner violence, and 18% reported emotional abuse within the past year (Harwell, Moore, & Spence, 2003). Physical violence and intimate partner violence reflect similarities within the general population as roughly 4-8% experience physical violence and 0.3-6% experience intimate partner violence (Harwell, Moore, & Spence, 2003). However emotional abuse for both Native men (12%) and Native women (18%) were significantly higher than the general population range (6-10%) (Harwell, Moore, & Spence, 2003).

Several local surveys have found similarly high prevalence of sexual violence for Native women (Bachman et al., 2010). Yuan et al. (2006) interviewed 1,374 women from 6 tribes and found that the majority of rapes were perpetrated by a male relative (55%) or romantic partner (46%). Previous research reported similar findings in a study of 110 urban Native women in California, with 26% reporting being forced to have sex since age 18 and 3/4ths of these victimizations perpetrated by an intimate partner (Zahnd et al., 2000). Simoni et al.'s 2004 survey of 155 urban Native women in New York City also found majority of sexual abuse perpetrated by known acquaintances: 20% by an intimate partner, 34% by a non-partner, and 15% by both an intimate partner and non-partner. Sexual violence is more prevalent among clinical populations, such as domestic violence shelters or substance abuse treatment centers. Within a domestic violence shelter, 16 Native women were interviewed and 38% reported experiencing completed partner rape and 12% had experienced attempted partner rape within the past year (Norton & Manson, 1995).

A qualitative systematic review of 12 articles and one dissertation compiled four main themes regarding intimate partner violence among Native communities: 1) IPV is fueled by the erosion of Indigenous ways, 2) IPV is entrenched and repressed within families, 3) service agencies and associated barriers, and 4) work with Native culture to resolve IPV (Finfgeld-Connett, 2015). Intimate partner violence fueled by the erosion of Indigenous ways was described as situated within the historic context of colonization, racism, oppression, relocation, and loss (Finfgeld-Connett, 2015). This theme was further described as traditional Native social structures being replaced with economic, educational, social, relational, and governmental systems that are largely incompatible with Indigenous ways of living (Finfgeld-Connett, 2015), thus leading to present day disparities such as poverty, unemployment, substance use, and violence. The second theme was attributed to the commonality of multigenerational interpersonal violence which affects all members of the family (Finfgeld-Connett, 2015). Respondents describe this normalization over time of omnipresent abuse which impacts children, manifested through anxiety, PTSD, sleep problems, low self-esteem, depression, and suicide attempts (Finfgeld-Connett, 2015). The third theme assessing service agencies and related barriers found a general sense of a laissez faire attitude within the criminal justice system and further barriers within social services and healthcare systems such as interference, criticism, mistreatment, and confidentiality concerns (Finfgeld-Connett, 2015). The final theme recommended researchers and practitioners establish trust through a holistic response, seek to leverage cultural strengths through the promotion of nonviolent environments, and adapting services through agency collaborations (Finfgeld-Connett, 2015).

In an ethnographic, grounded theory study of nine Native men from a Great Lakes reservation community, respondents reported IPV as an increasing problem within the

community (Matamonasa-Bennett, 2015). Respondents reported that intimate partner violence was not part of their culture pre-contact and further attributed IPV to colonization and alcohol (Matamonasa-Bennett, 2015). These Native men recommended returning to tribal values as the key to sobriety and non-violence, citing cultural values as the key to prevention and treatment (Matamonasa-Bennett, 2015).

Further qualitative work has described Native communities as isolated, lacking in services, lack of jobs, and lack of recreation that would both keep youth active and provide families respite (Jones, 2008). Descriptions of domestic violence in the community included attributions to the high prevalence of poverty, isolation enabling violence to be easily hidden, and substance use as the foundation of child maltreatment and domestic violence (Jones, 2008). Most alarming was the perception of family denial or community reluctance to intervene, stating that DV is seen as a private family matter (Jones, 2008).

Native women experience the highest rates of family violence; however, few studies and services exist to address victim needs (Fox et al., 2018). Scholars have also stated that intimate partner violence estimates among Native women are based on limited research (Duran et al., 2009). There remains a lag in understanding interpersonal violence within Indigenous communities with significant gaps in knowledge surrounding potential intimate partner violence connections with mental health outcomes, substance use patterns, and differential periods of risk or protection, such as during pregnancy.

Interpersonal Violence and Pregnancy

Pregnant women may be especially vulnerable to violence due to an increase in physical, social, emotional, and economic needs during pregnancy (Taillieu & Brownridge, 2010).

Intimate partner violence during pregnancy is particularly alarming due to the danger to both the

mom and fetus (Jamieson, 2020). Intimate partner violence during pregnancy has an estimated prevalence between 3-9% (Agu et al., 2020; Grady et al., 2019); however, the true prevalence of intimate partner violence is unknown due to underreporting (Kapaya et al., 2019). During pregnancy, past or current intimate partners are the most common perpetrators of violence (Breiding, 2014). Ultimately intimate partner violence during pregnancy is a heterogeneous phenomenon, with differing types of abuse (psychological, physical, and sexual), severity of violence, frequency of abuse, perpetrator relationship, and potential exposure to polytrauma (Jamieson, 2020).

Research indicates that intimate partner violence during pregnancy is a risk factor for severe violence (Taillieu & Brownridge, 2010). Intimate partner violence during pregnancy is the leading cause of maternal death, with the odds of becoming a femicide victim are 3x higher for those who experience violence while pregnant (Taillieu & Brownridge, 2010). Even in studies where victims saw a healthcare provider in the year prior to death, most providers were unaware of violent victimization experiences among their patients (Taillieu & Brownridge, 2010). One of the strongest predictors of violence during pregnancy is a history of violence pre-pregnancy; between 60-90% of women abused during pregnancy report a history of past abuse (Taillieu & Brownridge, 2010).

The severity of intimate partner violence may escalate during pregnancy, possibly due to the fear of disclosing violence, increased frustration or jealousy in relation to lifestyle and relationship change (Kita et al., 2020). While initiation of violence during pregnancy is the least common pattern, some studies suggest that the type of violence may change during pregnancy, such as a decrease in physical forms and an increase in psychological or sexual forms of violence (Taillieu & Brownridge, 2010). Women who were abused during pregnancy reported an increase

in both frequency and severity of abuse when compared to abused women who were not pregnant (Taillieu & Brownridge, 2010). Increased conflict during pregnancy can indicate underlying social or financial stress associated with the transition to parenthood (Austin et al., 2020b).

Physical violence during pregnancy may be recurrent, with 60% of women reporting experiencing two or more episodes of violence while pregnant (Taillieu & Brownridge, 2010). Some researchers have found that pregnant women experienced one violence-related injury per month while gestating (Taillieu & Brownridge, 2010). Utilizing data from the 2009-2015 Pregnancy Risk Assessment Monitoring System (PRAMS) of 37 states and New York City, researchers found that 3.8% of women experienced physical intimate partner violence before and during pregnancy (Kapaya et al., 2019).

Indigenous women and IPV during pregnancy. Indigenous women face a substantially greater risk for experiencing violence during pregnancy. Roughly 1 in 10 Native Alaskan women who recently gave birth reported experiencing physical violence within the 12 months prior to pregnancy (Kemberling & Avellaneda-Cruz, 2013). Despite some evidence indicating overall estimates of physical violence decreasing from 16% in 2000 to 9% in 2010 among Alaska Native women (Kemberling & Avellaneda-Cruz, 2013), significant work must be undertaken to continue this downward trend where it exists and work toward elimination of violence against Native women.

Among a sample of 312 low-income pregnant and childbearing aged Native women at a tribal clinic in Oklahoma, roughly 59% reported lifetime physical or sexual intimate partner violence, 39% reported severe physical IPV, 12% reported partner-forced sexual activity, and 40% reported partner-perpetrated injuries (Malcoe et al., 2004). Of the 273 partnered women,

59% reported having a non-Native partner (Malcoe et al., 2004). Partnered women reported 30% physical or sexual IPV, 16% severe physical IPV, 3.3% forced partner-perpetrator sexual activity, and 16% partner-perpetrated injuries (Malcoe et al., 2004). Roughly 9% reported experiencing IPV during pregnancy; however, pregnancy was not statistically significantly associated with past year IPV (Malcoe et al., 2004).

In a study of 43 Native teenage mothers, 61% reported experiencing intimate partner violence, with 73% of those being perpetrated by their boyfriends (Mylant & Mann, 2008). Nearly 40% of the sample reported experiencing abuse during their pregnancy, with 75% of these perpetrated by their boyfriends (Mylant & Mann, 2008). Participants further reported that nearly 23% had experienced forced sex (rape) within the past year and nearly half (46%) had a substance use or smoking problem (Mylant & Mann, 2008). These findings indicate a need to screen teens for intimate partner violence and sexual trauma.

2.2 Mental Health Among Indigenous Populations

The Congressional Research Service report defines behavioral health as both mental health disorders and substance use disorders (2016). According to the American Psychiatric Association, in 2014 approximately 21% of American Indian and Alaska Native populations aged 18 and up reported mental illness within the past year, compared to 17.9% among the general population (Zein, 2017). Similarly, in 2014, roughly 9% of AI/ANs aged 18 and up had co-occurring mental illness and substance use disorders within the past year, which is nearly three times the rate as the general population (Zein, 2017). The increase in behavioral health problems within the Native population is largely attributable to deeply rooted issues of economic adversity and social conditions ranging across areas such as poverty, education, and discrimination (Library of Congress, 2016).

American Indian and Alaska Natives have a lifetime prevalence of 35-54% for any mental health disorder (Yellow Horse Brave Heart et al., 2016a). The Indian Health Service reports mental health diagnoses are among the top 10 causes of hospitalization for AI/AN populations (Yellow Horse Brave Heart et al., 2016a). Previous research holds that roughly 21% of the entire American Indian / Alaska Native population is impacted by mental health issues (Duran et al., 2004). There is, however, considerable variability in mental health research among AI/ANs across geographic regions, cultures, and genders (Yellow Horse Brave Heart et al., 2016a).

Results of the 2001-02 National Epidemiology Study on Alcohol and Related Conditions found nearly half of the Native sample (n=701) had experienced a psychiatric disorder within the previous year (Yellow Horse Brave Heart et al., 2016b). When split by gender, both Native men (70%) and women (63%) had roughly 10% higher lifetime mental health diagnosis prevalence rates compared to non-Hispanic white men (63%) and women (53%) respectively (Yellow Horse Brave Heart et al., 2016b). Yellow Horse Brave Heart et al. (2016b) also found that Native participants within this study did not have higher rates of conduct disorders, pathological gambling, or psychotic disorders. However, AI/ANs in the sample had higher rates for any lifetime personality disorder, with both male and female more likely to qualify for paranoid or antisocial personality disorder and men being more likely to qualify for schizoid personality disorder (Yellow Horse Brave Heart et al., 2016b). This study was the first to provide national estimates by gender of prevalence and treatment for Indigenous psychiatric disorders, demonstrating an overall relatively higher prevalence of psychiatric disorders within AI/AN populations than non-Hispanic whites (Yellow Horse Brave Heart et al., 2016b); however, there

was no measure of posttraumatic stress disorder within this wave, thus limiting the scope of mental health issues represented.

Primary care facilities within the Indian Health Service are an ideal area to research Native mental health for urban populations. In an examination of lifetime and past year previous mental health diagnoses, 489 Native women in primary care participated in the research study (Duran et al., 2004). Participants reported high rates of alcohol use disorder, anxiety disorder, and comorbid anxiety and depression (Duran et al., 2004). Primary care IHS research reports that 14% of Native service users met criteria for past year alcohol use disorder, with 4% meeting criteria for past year drug use disorder, marijuana constituting 80% of past year drug use (Duran et al., 2004). Within the same study, 44% met criteria for lifetime mood disorder, major depression being the most common (Duran et al., 2004). Anxiety was the most common mental disorder, with specific phobias and PTSD being the most common type of anxiety disorders as 15% met criteria for both (Duran et al., 2004). These mental health outcomes were then linked with demographic variables, finding that anxiety, mood, and substance use disorders are associated with larger amounts of debt, lower education levels, and lower self-ratings of health (Duran et al., 2004). Findings were consistent with previous literature demonstrating high comorbidity between anxiety and depression, along with high comorbid substance-related disorders and mood or anxiety disorders (Duran et al., 2004). Additional prior research has examined depressive symptoms within an Indigenous primary care setting (n=106), finding that 20% of participants met criteria for a depressive syndrome and 89% met ICD-9 criteria for major depressive syndrome (Wilson et al., 1995). Similarly, Napholz (1995) found that Native women with more rigid gender roles had higher depression scores and role conflicts resulting in decreased self-esteem and life satisfaction.

Prior research indicates that as a result of experiencing violence, Native women's mental health suffers (Evans-Campbell, Lindhorst, Huang, & Walters, 2006). These findings are consistent with the larger body of research linking poor mental health outcomes as a result of IPV for a variety of survivors from various racial and ethnic backgrounds (Tarzia et al., 2017; Honda et al., 2018; Rai & Rai, 2019). In a systematic review of perinatal mental health of Indigenous women in Canada, United States, New Zealand, Australia, and Taiwan, Indigenous women had an increased odds of experiencing any mental health problem during the perinatal period, namely depression, anxiety, or substance use around pregnancy (Owais et al., 2020).

In a southwest, urban sample of AI/AN women in a primary care setting, Duran et al. (2009) found that those with severe intimate partner violence were 60% more likely to have an anxiety disorder than those with no IPV. Severe IPV, defined as lifetime psychological aggression and no physical or sexual injury, and family history of alcohol were 2.5x more likely to have an anxiety disorder and 5x more likely to have PTSD compared to those with no IPV; however, intimate partner violence had no relationship with anxiety without a family history of alcohol (Duran et al., 2009). This study is somewhat limited due to the characterization of severe IPV involving no physical or sexual injury.

Postpartum Depression

Postpartum depression (PPD) is a major depressive episode that occurs anytime up to one-year post birth and affects nearly 1 in 7 new mothers in the US (Heck, 2018). The relationship between IPV and depression during and post pregnancy is well-established, as postpartum depression has been consistently linked with all forms of intimate partner violence (Argawal et al., 2014; Kothari et al., 2016). Women who experience violence while pregnant are 2.5x more likely to report depression, with overall depression rates being 3x higher during the

postpartum period (Taillieu & Brownridge, 2010; Kothari et al., 2016). Research has found that postpartum depression follows IPV more than it precedes it, with the severity of postpartum depression increasing as intimate partner violence increases (Kothari et al., 2016).

Research with Native women has found a prevalence of postpartum depression of 18-29% among Native women which is significantly higher than the 10-15% prevalence within the general population (Heck, 2018); however, the incidence of postpartum depression among Native women may be over- or underestimated due to problems with measurement scales. Heck (2018) compared the Edinburgh Postnatal Depression Scale and the Patient Health Questionnaire-9 for Native woman in an analysis of 58 articles. While both had internal consistency, there was low discriminative validity for detecting postpartum depression in women from non-Western cultures and both had low predictive accuracy. This indicates a need to adapt such measures to avoid culturally biased estimates (Heck, 2018).

Among the 2004-07 Oregon PRAMS, nearly 30% of Native mothers reported depression symptoms in their second postpartum year (Ness et al., 2017). Partner-related and traumatic stressful life events were significantly associated with an increased risk of postpartum depression symptoms among Native mothers (Ness et al., 2017). Native mothers who experienced depression symptoms in their second year postpartum were more likely to experience interpersonal violence, have low or no social support, have less than a high school education, and experience at least one partner-related stressful life event (Ness et al., 2017). Interpersonal violence was significantly associated with self-report of postpartum depression symptoms within their second year, thus indicating a need to screen for depression beyond the first postpartum year (Ness et al., 2017).

In a multistate analysis of the 2009-2011 PRAMS (n=87,565) researchers found that 10-20% of postpartum women experienced depression symptoms (Mukherjee et al., 2018). While Natives represented less than 1% of the overall sample (n=2,757), Native respondents had the highest proportion of women younger than 20 years old and the lowest amount in the highest education category (Mukherjee et al., 2018). Postpartum depression had an overall prevalence of 11% among the sample but was higher among Native mothers (14%); in fact, Native women have the highest prevalence of postpartum depression among all racial/ethnic groups (Mukherjee et al., 2018). Native women had the highest proportion of women reporting pre-pregnancy checkups or treatment for depression (15%) compared to 13% among mixed racial women, 13% of white women, 8% of Hispanic women, and 5% of Asian women (Mukherjee et al., 2018).

Maternal Stress

Contending with disparities resulting from structural violence, dealing with historic and present-day oppression, and facing significant levels of violence all contribute to high levels of stress among Indigenous communities (Saunders, 2016; Sarche & Spicer, 2008). This stress has been further attributed to socioeconomic instabilities and economic disparities among Native communities within the United States (Saunders, 2016). Chronic stress can lead to worsened mental health and compromised parenting practices (Saunders, 2018; Danese & McEwen, 2012). Heightened stress can negatively affect parental ability to remain supportive and consistent in their child's development, as parents under high amounts of stress are less likely to parent in effective and nurturing manners which has negative impacts upon the child (Saunders, 2016). In prior research with non-Native samples, poverty and caregiver stress are significant risk factors for negative mental health outcomes among children (Frankel et al., 2014). Maternal stress among American Indians has been linked to maternal substance use, social support, and their

children's social-emotional development (Sarche et al., 2009). Few studies have examined the effects of stress upon Native parents and their children and scholars call for further research to understand the ways in which stress affects both parental behaviors and child development within Native communities (Saunders, 2016).

Posttraumatic Stress Disorder

Posttraumatic stress disorder (PTSD) is one of the most prevalent mental illnesses examined within the context of interpersonal violence throughout the research literature. American Indians and Alaska Natives experience a higher lifetime incidence of experiencing traumatic events compared to other racial/ethnic groups (Cayir et al., 2018). Some studies argue that Natives have more trauma thus resulting in greater PTSD prevalence (Bassett et al., 2014). According to the National Epidemiology Survey on Alcohol and Related Conditions, Natives represent 3.2% of all US patients with PTSD diagnoses, a number twice as high as Native representation in the US (Bassett et al., 2014). This indicates that although AI/ANs are less than 2% in the US population, they represent a higher prevalence in PTSD than in the population. While there are significant intergroup differences in Native populations, aggregated data from national surveys demonstrate a consistently high risk of experiencing trauma than any other racial/ethnic group (Bassett et al., 2014). American Indians and Alaska Natives are two times more likely than any other racial / ethnic group to develop posttraumatic stress disorder (Bassett et al., 2014). There is a consistent public health concern to understand the Indigenous trauma exposure and its subsequent effects of the trauma on an individual's health (Cayir et al., 2018).

Risk factors for PTSD include neuroticism, family history of depression or substance use, childhood trauma, anxiety and depression, previous exposure to trauma, lower education, and urban residence (Bassett et al., 2014). This later risk factor is especially important for Native

populations, as more than 70% of Indigenous populations within the United States reside in urban areas. Community based studies also report risk factors such as nicotine dependence, sexual trauma, and exposure to trauma (Bassett et al., 2014). For AI/AN populations, the most common inciting events are military combat, interpersonal violence, childhood sexual abuse, environmental disasters, and bereavement (Bassett et al., 2014).

Suicide

Suicide during the perinatal period is a leading cause of maternal mortality in the United States with 54.3% of pregnancy-associated suicides involving intimate partner violence and roughly one fourth of low-income urban pregnant women expressing suicidal ideation within the past week (Alhusen et al., 2015). Some research suggests women experience decreased risk of suicide during pregnancy; however, suicidal ideation is known to increase in unplanned pregnancies and during depressive episodes (Alhusen et al., 2015). The most common traumatic inciting events for PTSD among AI/AN communities were interpersonal violence, including rape and physical assault, and childhood sexual abuse (Bassett et al., 2014).

2.3 Substance Use

Substance use is both a cause and consequence of interpersonal violence (Duran et al., 2009; Taillieu & Brownridge, 2010). Survivors of sexual violence are more likely to engage in substance use (Tillman et al., 2010). Male perpetrators of violence with alcohol and drug problems abuse their partner regardless of being intoxicated or sober; some say that substances may serve as a disinhibitor for violence-prone individuals or may provide justification or an excuse for violence (Matamonasa-Bennett, 2015).

Researchers are unsure of the patterns of violence in relation to substance use among Indigenous populations. National studies like the NCVS report that 68% of attackers were under the influence in a sexual attack of a Native woman, compared to only 34% for white and 35% for Black victims (Bachman et al., 2010); however, in a sample of urban, southwest Native women, substance abuse was not statistically significantly associated with experiences of intimate partner violence (Duran et al., 2009). There is an overall lack of consensus regarding the role of substance use in IPV for Native communities.

The Alaska Native Commission of 1994 reported drinking as an epidemic among Alaska Natives and stated alcohol abuse is the #1 health problem (Seale et al., 2006). Results of the 2013 NSDUH found that among Native respondents, 40% reported tobacco use, 12% reported illicit drug use, and 8.9% reported heavy drinking, compared to 25.5%, 9.4%, and 6.3% of all ethnic groups combined respectively (Novins et al., 2018). In an epidemiological study of two American Indian reservation populations (n=2,070) increased substance use was associated with parental substance use, younger age at first use, beginning substance use with or without alcohol, and adolescent conduct problems (O'Connell et al., 2007). Respondents were more likely to use marijuana compared to alcohol only if they had experienced sexual abuse, witnessed family violence, or experienced other trauma before the age of 18 (O'Connell et al., 2007).

Cultural norms influence alcohol consumption (Montag et al., 2019) and it is unclear what these norms are and how they vary from community to community among Native populations. Montag, Calac, & Chambers (2019) surveyed 343 Native women in a southern California Native community and found that drinking behaviors were associated with female friend and relatives influence; respondents were more likely to drink with a girlfriend and 40% reported feeling pressure to drink (Montag et al., 2019). Depression was associated with risky

alcohol consumption, less effective birth control, and greater likelihood of testing positive for risky drinking (Montag et al., 2019). Native women who endorsed depression were more likely to be exposed to trauma, including sexual assault, and were more likely to binge drink because of stress, trauma, and to escape their problems (Montag et al., 2019).

Substance Use and Pregnancy

Substance use is a risk factor for IPV during pregnancy (Taillieu & Brownridge, 2010). Maternal substance use and partner stress may be proxies for underlying household dysfunction (i.e.: arguing with partner more than usual) (Austin et al., 2020b). Intimate partner violence cooccurs with other risk factors for adverse maternal health outcomes such as smoking, alcohol and substance abuse, and depression (Kapaya et al., 2019).

There is contradictory literature regarding Native substance use during the perinatal time. While some say alcohol and other drug use increases during and post pregnancy, others say that use is lower and new mothers are more likely to be abstinent (Schultz et al., 2018). Maternal substance use may indicate an unmet treatment need or potential coping mechanism (Austin et al., 2020b). Among a 2007-2012 North Dakota study (n=5,776), Native adults were 13.3x more likely to use illicit substances and 2.1x more likely to drink alcohol during pregnancy when compared to white women (Danielson et al., 2018). Mothers of Alaska Native children were more likely to report substance use (52%) compared to mothers of non-Native children (28%) (Austin et al., 2020). In an examination of Native and white mothers (n=2,124) in the Northern Plains (South and North Dakota), more white mothers (63%) consumed alcohol during pregnancy than Natives (52%); however, more Native mothers reported binge drinking (41%) than white mothers (28%) (Ye et al., 2020). Native mothers had lower risk of drinking during their 2nd and 3rd trimesters and postpartum compared to white mothers; however Native mothers

again had a higher risk of binge drinking in their first trimester compared to white mothers (Ye et al., 2020). For Native women, frequent relocation was the sole significant risk factor for increased prenatal alcohol use; for white women, age, marriage, income, parity, fertility treatment, and risky drinking were all associated with increased prenatal alcohol use (Ye et al., 2020).

According to the 2010 PRAMS, Native women had the highest prevalence of smoking during pregnancy (26%) (Patten et al., 2018). A study of 5,776 Natives in North Dakota found that Native mothers were 2.7x more likely to smoke during pregnancy when compared to white women (Danielson et al., 2018). Roughly 26-30% of Alaska Native women smoked during their pregnancy, with a higher rate of postpartum smoking relapse compared to non-Native women (57% to 41% respectively) (Bronars et al., 2018). Stress is a major reason for tobacco use in pregnancy (Patten et al., 2018).

Smoking during pregnancy has negative health consequences such as pregnancy complications, adverse pregnancy outcomes, child developmental difficulties, and neonatal mortality (Bronars et al., 2018). Adult offspring of mothers who smoked while pregnant are 2x more likely to develop nicotine dependence as adults (Bronars et al., 2018). In a survey of 118 pregnant Native women, 60% of smokers acknowledged the negative impacts smoking during pregnancy has on the baby (Bronars et al., 2018). Similarly, 63% of smokers identified addiction as their main reason of smoking during pregnancy; however, 73% of the overall sample said smoking can help ease a negative affect (Bronars et al., 2018).

Criminalization of Substance Abuse

Within the past 30 years, substance use during pregnancy has been criminalized through laws at the federal, state, and tribal levels (Simon et al., 2020). Native women are

disproportionately impacted because of race and socioeconomic status impact access to substance use treatment (Simon et al., 2020). The Child Abuse Prevention and Treatment Act of 1974 requires states with federal grant funding to have policy and procedures to notify child protective services of infants affected by maternal substance use (Simon et al., 2020); however, most states have a notification process for this but it is not considered maltreatment. This process typically triggers a public health check, so it is not the same as a report to the Child Welfare system and in some cases may go to a special division.

Some states have even gone as far as passing laws related to fetal personhood, fetal assault, and chemical endangerment in order to prosecute people who use drugs during pregnancy (Simon et al., 2020). Tribes across the country cite substance use as a public health priority (Simon et al., 2020). Not all tribes respond to substance use during pregnancy in a uniform manner. Some tribes mandate substance use treatment while others identify it as child abuse and require child protective services involvement (Simon et al., 2020).

Native women are particularly vulnerable to criminalization during pregnancy due to racism, poverty, and minimal access to substance use treatment. Native women are jailed and imprisoned at higher rates than whites in the general population, with one national survey reporting that 23% of Native respondents experiencing discrimination within a healthcare setting (Simon et al., 2020). Native women are more likely to be involved with state-sponsored public health or social services, thus making them more likely to be subject to public reporting (Simon et al., 2020). Similarly, the Indian Health Service has limited obstetric capacity, often shuttling Native women to state-funded agencies whereby exposing them to several jurisdictions that they can potentially be prosecuted under the authority of all three (tribal, state, and federal) (Simon et al., 2020). Finally, Native women have minimal access to substance use treatment, with IHS

being perilously underfunded and limited access to care, Native women are often untreated for their substance use and remain at high risk during their pregnancies (Simon et al., 2020).

Engaging in treatment. Utilizing a CBPR approach, Schultz et al. (2018) conducted 20 in-depth interviews and one focus group with Native mothers presently enrolled in substance use treatment or on the waitlist. Participants reported on the cyclical nature between violence and substance misuse, the value of traditional healing as treatment as an effective pathway to recovery, and a desire to integrate these traditions into treatment services (Schultz et al., 2018). Native mothers reported on the difficulties they faced avoiding others using drugs and alcohol due to the tight knit nature of their communities and extended family situations common on the reservation; participants reported it felt like they had to abandon their community in order to seek sobriety (Schultz et al., 2018). Mothers also endorsed the need to acknowledge and celebrate recovery throughout the community and how motherhood was a motivator to decrease substance use, seek treatment, or maintain recovery overall (Schultz et al., 2018). While there is a common sentiment that child protective services will have an adversarial relationship with participants (fear of breaking up the family), for many CPS served as a pathway, either directly or indirectly, to access services, seek help, and maintain recovery (Schultz et al., 2018). While this study represented a significant innovation in understanding motherhood, pregnancy or motherhood remains underexplored in Native women's substance use decisions (Schultz et al., 2018).

McCarron et al. (2018) conducted qualitative interviews with 10 Native and 8 non-Native pregnant and parenting women following their substance use treatment. Several themes emerged from these interviews centering on cultural implications and the recovery process. Native participants reported on cultural aspects of treatment such as religion, traditional Native practices

such as smudging, dancing, pow wows, and sweats and how cultural values such as family and tribe specific values helped their recovery (McCarron et al., 2018). Participants reported group recovery resources were more helpful than individual resources (McCarron et al., 2018). Native mothers cited their family and children most frequently as their main reason to continue their recovery, while non-Native mothers stated more intrinsic, individualistic reasons (McCarron et al., 2018). Participants also described their recovery support systems such as family supports, service providers, and friends, and emotional support with individuals who have experienced similar situations (McCarron et al., 2018).

2.4 Prenatal Intervention

Pregnancy is the ideal intervention point as for many women it is the only time they obtain regular healthcare (McFarl, 2006). This makes the prenatal period an optimum time for prevention given the frequent interaction with health and social systems (Austin et al., 2018). In addition to increased interaction with care providers and multiple intervention points, pregnancy and postpartum periods are ideal for intervention or prevention as women are especially motivated during this time to change their behavior or life circumstances for their babies (Dauber et al., 2017).

Prenatal Care

One such intervention point for pregnant women is prenatal care appointments. Bloch (2009) defined four essential components of prenatal care: 1) any prenatal care is better than no care, 2) early entry is better than late entry, 3) more visits is better than fewer visits, and 4) care should be of quality. Nearly all prenatal care guidelines recommend starting care in the first trimester, offering continuous and inclusive educational content along with medical and behavioral screens (Jamieson, 2020). There is a common sentiment among researchers and

practitioners alike that prenatal care is necessary, but not sufficient for achieving desirable outcomes (Jamieson, 2020). Further, it is difficult to evaluate the adequacy of prenatal care as differences exist across healthcare systems (Taillieu & Brownridge, 2010) and can vary widely by geographic location and related health organization standards (Jamieson, 2020).

Pregnancy abuse is associated with late entry into prenatal care (Taillieu & Brownridge, 2010), with women who use substances and experience prenatal violence having the greatest difficulty in accessing adequate prenatal care (Jamieson, 2020). Evidence suggests some pregnant women who experience relationship violence may delay or never enter prenatal care (Jamieson, 2020), and a lack of prenatal care during the first trimester has been linked with an increase in both maternal and infant mortality (Partridge et al., 2012). Different types of abuse effect care differently. Increased physical violence often leads to an increase in emergency room visits but does not necessarily translate into increased prenatal care access (Jamieson, 2020). Increased psychological abuse may lead to restricted access to finances and transportation issues may block prenatal care attendance overall, whereas women experiencing interpersonal violence encounter emergency services and legal systems more than primary care (Jamieson, 2020).

While prenatal care is put forth as an ideal intervention point for pregnant women experiencing interpersonal violence, providers often fail to screen for violence or discuss risks with the women they serve. Based on a national survey, only 17% of prenatal care providers routinely screen for IPV on the first visit and only 5% screen on follow-up visits (Chamberlain & Perham-Hester, 2000). Despite a concerted effort and multiple organizations and healthcare entities calling for IPV screening, evidence suggests that the actual screening rates in health care settings unfortunately remains low (Alhusen et al., 2015). Previous multistate PRAMS analyses from 2004-2008 found that over half of the sample had no discussion of IPV with their prenatal

care providers, and data from the 2009-2015 PRAMS of 37 states and New York City found that only 51% of received prenatal counseling regarding intimate partner violence (Kapaya et al., 2019).

Failing to screen for violence and/or failing to provide counseling regarding interpersonal violence during prenatal visits may indicate inadequacies within prenatal care. Scholars have pondered if inadequate prenatal care may be the mechanism between violence exposure and adverse maternal and child outcomes (Jamieson, 2020); however, significant gaps in the literature exist in examining the role of prenatal care as a mediating or moderating factor. Further gaps in the literature exist in examining whether type of abuse, severity of violence, frequency of abuse, perpetrator relationship, and exposure to polytrauma may moderate the use of prenatal care (Jamieson, 2020).

Racial identity is increasingly associated with inadequate prenatal care, as IPV in pregnancy is more common among minority women (Jamieson, 2020), especially within the United States. Results from a multistate analysis of the 2009-11 PRAMS found that 19% of Native mothers (n=2,757) had inadequate prenatal care utilization compared to less than 9% of white mothers (Mukherjee et al., 2018). Natives in one North Dakota study (n=5,776) were 8.3x more likely to have inadequate prenatal care when compared to white women (Danielson et al., 2018). Baldwin et al. (2002) evaluated National Linked Birth-Death databases from 1989-1991 with a Native sample of 148,482 and found comparable rates of inadequate prenatal care to Black moms (16%) with urban Natives having a rate of 14% and rural Natives at 18%. While the inadequate prenatal care rate significantly improved for Natives from 1985-87 (36%) to 1995-97 (26%) (n=217,064) (Baldwin et al., 2009; Baldwin et al., 2002), further work is needed to

improve prenatal care for Indigenous women in order to address interpersonal violence surrounding pregnancy.

Native women face additional barriers when seeking prenatal care such as lack of insurance, financial issues, and experiences of discrimination. Pregnant women without insurance are more likely to skip prenatal care altogether, and national estimates posit that roughly 21% of Native women of reproductive age are uninsured, compared to only 8% of white women (NPWF, 2019). Facing lack of insurance or being underinsured, financial burdens of prenatal care may restrict access for Indigenous mothers. 41% of Native women cite cost as a barrier to prenatal care (Kaiser Family Foundation, 2019). Further barriers to prenatal care include long wait times, with up to a 2 hour wait for a 15-minute appointment (NPWF, 2019). Discrimination increases stress and cortisol levels within the body, which impacts both maternal and infant health; Native mothers are more likely to experience discrimination, delays in care, and see a different provider at each attempt to access prenatal care (Fiscella & Sanders, 2016). In one report, over one fourth of Native mothers reported experiencing discrimination when attempting to access prenatal care (Fiscella & Sanders, 2016).

Overall, there are high rates of inadequate prenatal care among American Indian and Alaska Native mothers (Baldwin et al., 2002). Facing substantial barriers to accessing care may lead to Native women delaying or even foregoing prenatal care altogether. Mothers of Alaska Native children were more likely to have their first prenatal care visit in the 2nd or 3rd trimester (26%) compared to mothers of non-Native children (17%) (Austin et al., 2020). Recent studies have found that Native women are more likely to have late or no prenatal care at all (13%) in comparison to only 4.5% of white mothers (Johnson, 2020). Overall, American Indian women are 3-4x more likely to begin prenatal care in their third trimester (Partridge et al., 2012).

Home Visitation

Home visiting has short- and long-term positive changes for maternal and child health such as decreasing maternal substance use; increasing maternal educational attainment, income, and self-sufficiency; and increasing child social and emotional development, educational attainment, and employment (Novins et al., 2018). Benefits of home visitation programs include the opportunity for early intervention for prenatal and perinatal women (Dauber et al., 2017). Home visitation programs are long-term and typically last into the child's 2nd or 3rd year (Dauber et al., 2017). Further, home visiting is voluntary and inherently strengths-based to capitalize on maternal motivation to change their behavior and life circumstances for their new baby (Dauber et al., 2017).

Congress authorized the Maternal, Infant, & Early Childhood Home Visiting (MIECHV) in 2010 and set 3% aside of the \$1.5 billion to support home visitation programs operated by tribes (Novins et al., 2018). The Tribal Maternal, Infant, and Early Childhood Home Visiting (Tribal MIECHV) provides federal grants to tribes and tribal organizations to implement evidence-based home visiting services for Native communities (Hiratsuka et al., 2018). There are a total of 27 Tribal MIECHV programs (Novins et al., 2018); examples of successful Tribal MIECHV programs include the Ina Maka Family Program, Katishtya Eh-Wahs Valued Always home visiting program, and the Nutaqsvik/Nurse-Family Partnership program in Alaska (Hiratsuka et al., 2018). Tribal MIECHV programs have been funded in 14 states and served over 3,100 families through nearly 55,000 home visitations (Novins et al., 2018). Despite the existence of these programs, not much is known on the benefit of home visitation in tribal settings (Novins et al., 2018). Future work should evaluate the benefits of Native specific home visitation models.

Models of home visitation differ in the professional background of the home visitor (Johnson, 2020). Nurses as home visitors are more likely to focus on infant development while a trained paraprofessional as a home visitor is more likely to focus on maternal wellbeing (Johnson, 2020). Previous research has found that a reservation home visiting program chose to train paraprofessionals due to the nurse shortage and lower cost for paraprofessionals (Barlow et al., 2015). Through a community-based participatory research framework, the content and materials were culturally adapted (Barlow et al., 2015). Results found an increase in maternal knowledge surrounding infant care (Barlow et al., 2015). A similar process was utilized to develop the Family Spirit home visiting program and found both an increase in parental knowledge and decrease in depression (Johnson, 2020; Barlow et al., 2015).

2.5 Child Maltreatment

The intersection of mental health, substance use, and intimate partner violence converge to pose significant risks to maternal and infant health (Dauber et al., 2017). Domestic violence is a common indicator for child abuse; child abuse is 15x more likely to occur in domestic violence homes (Cunningham, 2010). Approximately 25% of children witness intimate partner violence in the lifetime (Agu et al., 2020); infants, toddlers, and preschoolers who witness threat to caregivers (IPV) are more likely to experience posttraumatic symptoms (Grady et al., 2019). Estimations of the cooccurrence of witnessing IPV and experiencing child maltreatment are between 30-60% (Kimball, 2016). In 2009, 31% of adults reported witnessing violence as a kid within Alaska (Kemberling & Avellaneda-Cruz, 2013).

The mechanism for understanding IPV during pregnancy and subsequent poor maternal and child outcomes is poorly understood within the literature (Jamieson, 2020). Among a sample of 479 Native adults, experiences of child maltreatment were found to be associated with

intimate partner violence victimization with depression mediating this relationship (Kong et al., 2018). Postpartum depression has negative impacts on maternal-child bonding, child cognitive-behavioral delays, and neglect and abuse (Kothari et al., 2016). There is a lack of consensus regarding the relationship between interpersonal violence during pregnancy and outcomes on the child. Some scholars posit that children can imitate abusive behaviors or engage in violent behaviors in efforts to protect their mothers (Finfgeld-Connett, 2015). While some studies have found statistically significant relationships between parental mental health and substance use, exposure to violence, poverty, and alleged or experienced maltreatment with poor child development (Austin et al., 2019), other comparison studies have found differences in child developmental risks between mothers of Alaska Native children and mothers of non-Native children (Austin et al., 2020). In a systematic review of 50 studies assessing the relationship between IPV and perinatal health outcomes, the most frequent outcomes reported were 50% pre-term birth, 46% low birthweight, 30% miscarriage, 20% perinatal death, and 20% premature rupture of membranes (Pastor-Moreno et al., 2020).

Child protective services contact (report of alleged maltreatment regardless of screening or outcome determination) may serve as a proxy for potential or experienced harm to child (Parrish et al., 2015). Previous studies say CPS reports function as an indicator of child risk or vulnerability (Jonson-Reid et al., 2009; Putnam-Hornstein et al., 2015; Putnam-Hornstein et al., 2014). Previous research has demonstrated the possibility of identifying factors close to pregnancy that may increase likelihood of future child protective service (CPS) contact (Austin et al., 2018). Children of moms from a minority race or ethnicity or lower education level have disproportionate contact with CPS (Drake et al., 2009; Parrish et al., 2011); however, it is unclear whether differences are due to other maltreatment risk factors, racial bias in CPS reports, or both

(Parrish et al., 2011; Putnam-Hornstein, 2013). Several maternal factors prior to giving birth were found to be significant predictors of time to first child protective services among Alaskan children such as experiences of interpersonal violence, low education, being unmarried, increased number of living children, increased number of stressful life events, and maternal age (Austin et al., 2018). Austin, Parrish, and Shanahan (2018) found that low socioeconomic status, maternal smoking during pregnancy, urban residence, and being from Alaska Native/American Indian race were all significant predictors of time to first child protective services contact among Alaskan children. Maternal alcohol and drug use during pregnancy, poverty, maternal education and marital status, and experiences of intimate partner violence and stressful life events are several prenatal predictors of CPS involvement (Austin et al., 2018).

2.6 Poverty

American Indian and Alaska Native populations' health and health disparities cannot be understood without the larger perspective of socioeconomic gaps and the overall impact of poverty (Sarche & Spicer, 2008). Literature on poverty among AI/AN communities points to a multitude of associations with health outcomes and socioeconomic conditions such as interpersonal violence (Masho et al., 2019; Schneider et al., 2016;) and maternal mental health (Kothari et al., 2016). Poverty is a known correlate of intimate partner violence and depression among pregnant women and may even exacerbate the impact of IPV on depression (Kothari et al., 2016). Women in poverty are more likely to experience depression, including postpartum depression, and their depression is more likely to be severe and chronic (Kothari et al., 2016). Poverty is often described as a pathway to depression given the stress from inadequate material resources (ex: housing, food, transportation, healthcare), inadequate social resources such as poor social support, and limited access to therapeutic services (Kothari et al., 2016). In a

telephone survey of 301 postpartum women 2 months after delivery, Kothari et al. (2016) found that 10% of participants experienced postpartum depression, with 21% endorsing current or previous intimate partner violence and 32% reporting living in poverty. Intimate partner violence and poverty were statistically significant associated with one another, and both were associated with postpartum depression (Kothari et al., 2016). Women experiencing IPV were two times more likely to live in poverty compared to women not experiencing IPV (Kothari et al., 2016). Postpartum depression often cooccurs with poverty in the research literature; however, the impact of socioeconomic status on postpartum depression resulting from intimate partner violence is unclear (Kothari et al., 2016).

The Supplemental Nutrition Program for Women, Infants, and Children (commonly referred to as WIC) is often utilized as a proxy to measure poverty as it is available to low-income pregnant women (Masho et al., 2019). Results of the 2004-2011 PRAMS (n=319,689) found that nearly half of study participants accessed WIC services, with 4% experiencing physical abuse prior to pregnancy and 3% during their pregnancy (Masho et al., 2019). Women reporting IPV prior to and during pregnancy were more likely to utilize WIC services; however, when the analysis stratified by race, this association was only significant for non-Hispanic white women (Masho et al., 2019). This lack of significance for racial groups may be attributable to underreporting and is discussed further in the limitations section.

Beyond individual indications of socioeconomic stress, larger societal level economic experiences have varied influence on interpersonal violence. Prior longitudinal research utilizing the Fragile Families and Child Wellbeing Study found associations between unemployment and economic hardship with maternal experiences of abuse; rapid increases in unemployment led to an increase in controlling behavior toward romantic partners (Schneider et al., 2016). Two major

pathways to violence were found, with the first resulting directly from economic hardship and the second through an increased amount of stress. The primary pathway posited that direct experiences of job loss and material hardship led to increase abuse (Schneider et al., 2016). The second pathway indicated that male employment issues led to abuse through increases of stress in combination with decreased feelings of control and economic security creating an urge to exert greater control over one's partner (Schneider et al., 2016). Female employment may be seen as a further risk factor to male partners if they feel lessened levels of control, power, and feeling like they are not fulfilling the male breadwinner norm (Stark, 2007).

Declining macroeconomic conditions increase abuse through increased uncertainty and fear in the broader population, not just in individual households (Stark, 2007); several researchers have found a relationship between disadvantaged neighborhoods, namely those with higher unemployment and poverty, and interpersonal violence (Golden et al., 2013). Research suggests that the loss of control in one area, such as economic circumstances, may lead to increased efforts to control other areas, such as intimate relationships (Aizer, 2010). The overall uncertainty resulting from adverse macroeconomic conditions affects everyone, even those who do not directly lose their jobs, such as individuals who anticipate job loss or experience other anxiety related to the deteriorating economic conditions (Schneider et al., 2016). These findings demonstrate how uncertainty and anticipatory anxiety associated with sudden macroeconomic downturns have negative impacts on relationship quality, beyond job loss and economic hardship (Schneider et al., 2016). The present study will examine both individual measures of poverty including residing below the federal poverty line and WIC use as well as community measures of living in a poor neighborhood.

This chapter established the background and significance of the present work by describing the current state of research among both interpersonal violence and behavioral health in the general population and among AI/AN populations where available. This chapter presented empirical evidence surrounding interpersonal violence, behavioral health (mental health and substance use), maternal-child health, prenatal intervention, and poverty among American Indian and Alaska Native communities. The following chapter will delineate a theoretical framework for the present work and conclude with gaps within the research.

Chapter 3: Theoretical Framework and Research Gaps

Most paradigms created for the general population tend to be exclusionary, with limited applicability to Native samples, and further decontextualize these acts of violence against women (Wasco, 2003). Researchers report the need for a conceptual framework to reflect how intimate partner violence within Native communities functions as a result of colonization by patriarchal colonizers, leading to the subsequent loss of traditional cultural values and social structures (Matamonasa-Bennett, 2015). Current social inequities are embedded in the historical, political, social, cultural, and economic contexts which influence violence against women (Matamonasa-Bennett, 2015).

One such way to examine these structural inequalities contributing to IPV is through the theory of structural violence. Structural violence is built into the fabric of society, both creating and maintaining inequalities (Montesanti & Thurston, 2015). The broader theory of structural violence (Galtung, 1969) posits that society is structured in such a way that enforces and sustains inequalities particularly for minority and historically disadvantaged groups such as American Indian and Alaska Natives. Conceptual models of structural violence can help guide examination of the everyday nature of violence, moving beyond the victim and perpetrator relationship to view the complex political, social, historical, and economic processes (Montesanti & Thurston, 2015), essentially examining the causes of the causes. Societal violence is created through the norms that devalue women and people of color and is manifested through racism, patriarchy, and misogyny in order to maintain the acceptance of violence against Native women (Matamonasa-Bennett, 2015). Structural violence can be examined within each level of the ecological

framework as seen within both structural and symbolic institutions at the macro level, in group interactions in the meso levels, and ultimately within individual factors within the micro levels (Montesanti & Thurston, 2015).

Ecological frameworks have helped widen understanding of IPV, expanding the breadth of focus; however, research must consider structural inequalities in conjunction with IPV and the power dynamics which shape women's lived experiences (Montesanti & Thurston, 2015). Basic ecological frameworks explaining interpersonal violence consist of concentric circles ranging from micro, mezzo, and macro levels of systems, starting with individual attributes and developing out into external sources of support (Narayanan & Weng Onn, 2016). The framework centers on the interactions of internal individual factors with the individual's external social environment which influences the experience of and recovery from trauma (Tillman et al., 2010). Multiple internal factors exist and may include, but are not limited to, constructs such as self-efficacy, empathy, intelligence, and self-esteem (Lereya et al., 2016). External factors represent both mezzo and macro levels such as friend and family relationships, external sources of support such as school or work environment, gender norms, and the greater societal context and culture (Narayanan & Weng Onn, 2016).

There is an adapted ecological framework by Heise that attributes four levels of systems specifically to understanding why gender-based violence occurs (Sabbah et al., 2017). According to Heise, the ontogenic level consists of individual level personality traits, skills, and personal histories that influence one's behavior and response patterns that ultimately inform an individual's risk of becoming a victim or perpetrator of violence (Heise, 1998). The next level, the microsystem, is the immediate context surrounding an intimate partner relationship such as the family unit (Heise, 1998). The greater two levels, the exosystem and the macrosystem, represent

formal and informal social structures and the societal or cultural values that create and enforce the climate which either encourages or discourages violence (Heise, 1998; Sabbah et al., 2017).

Oetzel and Duran (2004) have put forth a social ecological framework to understand interpersonal violence specific to Native communities. There are five main domains: individual, interpersonal, institutional/organizational, community, and policy. The first two levels follow the typical ecological framework for understanding violence whereas the individual level constitutes immediate determinants of victimization while the interpersonal level centers on interactions between couples, families, and small groups (Oetzel & Duran, 2004). The tertiary level captures the cultural or institutional practices such as hospitals, clinics, or multi-national corporations (Oetzel & Duran, 2004). The community level allows for Native specificity as it encapsulates the current and historical relationships of members of a specific physical or psychological community (Oetzel & Duran, 2004). Finally, the policy level covers government laws and statutes (federal, state, and tribal) about violence (Oetzel & Duran, 2004). Causes and outcomes of interpersonal violence are a result of factors interacting at multiple levels.

Additionally, Oetzel and Duran (2004) have delineated specific determinants of interpersonal violence corresponding to each level of the social ecological framework. For the individual level, sex, age, socioeconomic status, substance use, and cultural identity predict interpersonal violence; namely for women, those between 16-24 years of age, unemployment or low-income, low education, or governmental assistance, and alcohol are at increased risk for victimization (Oetzel & Duran, 2004). Culture is presented as a buffer or protective factor at the individual level (Oetzel & Duran, 2004). The interpersonal level encapsulates concepts such as gender roles, family bonds, male dominance, staying for the kids, and when kids bond with the abuser (Oetzel & Duran, 2004). Organizational factors include the lack of routine screenings in

healthcare settings, lack of infrastructure to address IPV, and inadequate legal or victim services (Oetzel & Duran, 2004). The final levels posit colonization as a historical and contemporary community risk factor and the limited relationship between laws and IPV at the policy level (Oetzel & Duran, 2004). Colonization includes the historic policies from the federal government against Native populations as well as the contemporary policies that create and perpetuate systemic issues facing Indigenous communities.

3.1 Risk and Protective Factors

Micro Level

The majority of research investigating interpersonal violence during pregnancy focuses on individual level risk factors for experiencing abuse. Most studies cite maternal age, marital status, and education level as putting women at risk for interpersonal violence during pregnancy, as those who are younger, unmarried, and with lower levels of education being most at risk for experiencing violence. The present study will account for maternal age, marital status, and education.

Maternal age

One of the main risk factors for violence during pregnancy is young age (Taillieu & Brownridge, 2010; Tjaden & Thoennes, 2000). Adolescents are more at risk than adults as they could be abused by both parents and partners (Taillieu & Brownridge, 2010). In a meta-analysis of risk and protective factors for women experiencing IPV, older age was found to be a protective factor, indicating younger mothers were more at risk (Yakubovich et al., 2018). Maternal age is also a significant predictor of pregnancy violence among Native women. Utilizing data from the ALCANLink study with administrative data (n=593), mothers of Native

children were more likely to be significantly younger at childbirth and more likely to report partner stress in the 12 months prior to giving birth (Austin et al., 2020). McCarron et al. (2018) found that 39% of Native women began child rearing before the age of 20 compared to 21% of the general population, with one study among Natives in North Dakota (n=5,776) found a 3.6x greater likelihood for Native women to be teenage mothers (Danielson et al., 2018).

Marital status

Pregnant women who are single or divorced are at higher risk for interpersonal violence (Tjaden & Thoennes, 2000; Taillieu & Brownridge, 2010). Divorced women may be at greater risk while pregnant if their separation is occurring while they are gestating (Taillieu & Brownridge, 2010). In a meta-analysis of risk and protective factors for women experiencing IPV, being married was found to be a protective factor, indicating single or divorced women face greater risk for interpersonal violence (Yakubovich et al., 2018). In an analysis of the North Dakota Vital Records from 2007-2012, only 18% of Natives were married (Danielson et al., 2018); future work should seek to examine the relationship between marital status and interpersonal violence during pregnancy for Native women.

Education

Lower levels of education have been associated with increased risk for interpersonal violence (Taillieu & Brownridge, 2010). Analyzing the North Dakota Division of Vital Records from 2007-2012 for Natives (n=5,776), Danielson et al. (2018) found that 58% of Natives had only a high school diploma and were 2.5x more likely to have no more than a high school education. Mothers of Alaska Native children were more likely to have less than 12 years of education (22%) compared to mothers of non-Native children (7%) (Austin et al., 2020).

Mezzo Level

Individual determinants associated with violence ignore the roles of larger structural systems that shape interpersonal violence, such as economic, legal, and political factors that impact women's health (Montesanti & Thurston, 2015). Scholars recommend ecological frameworks to examine interpersonal violence against women, which encapsulate mezzo level factors like intimate relationships and the potential social support they may provide and macro level factors such as the societal context of poverty often prevalent within Native communities.

Social support

Social support is important to help individuals cope with stress and life events (Kita et al., 2020) and serves as a protective factor for violence during pregnancy (Taillieu & Brownridge, 2010). Perceived partner support throughout pregnancy, specifically emotional support from a partner and the maternal mother, is associated with decreased complications in pregnancy/labor and mediates the relationship between stress and prenatal health (Scrafford et al., 2019). Researchers posit that the quality of social support is more important than the quantity of supporters for preventing negative maternal mental health outcomes (Kita et al., 2020). Examinations of Alaska Native women residing in Alaskan shelters for women who have experienced intimate partner violence, Alaska Native survivors reported high amounts of social support from family and that lifetime history of interpersonal violence was significantly negatively related to social support across several domains (Burrage et al., 2021).

Intimate partner violence shrinks women's social activities and networks, and social isolation becomes a major risk factor for experiencing violence (Taillieu & Brownridge, 2010). Abusive behaviors such as humiliation, belittlement, isolation from family and friends, and restricting financial resources (Kita et al., 2020) all have deleterious effects on a woman's

potential access to social supports. Research has found that pregnant women experiencing IPV report lower amounts of social support (Scrafford et al., 2019), thus leading to perinatal mental health problems, such as depressive symptoms, and maladaptation to maternal roles that may impact the maternal-child bond (Kita et al., 2020).

Indigenous women may face difficulty in receiving social support from their communities. Utilizing Alaska PRAMS data linked with administrative data (n=593), researchers found that mothers of Alaska Native children were significantly less likely to feel comfortable asking for help when needed or know where to go for parenting information or child developmental concerns (Austin et al., 2020). Substance use may further complicate social support among Indigenous women who are pregnant or parenting. In a qualitative examination of Native mothers who recently completed substance abuse treatment researchers noted Indigenous moms lacked recovery support because many individuals in their social support circles were still using drugs or alcohol (McCarron et al., 2018). The present study will investigate social support among Alaska Native mothers (Figures 9 and 10).

Parenting

Parents are vital to their children's development (Al'Uqdah et al., 2015), with interpersonal violence serving as a significant barrier to positive parenting. Mothers who experience interpersonal violence during pregnancy may distort their perception of parenting during early childhood (Kobayashi et al., 2021). Previous research has found that mothers who experienced interpersonal violence during pregnancy had decreased positive parenting for their children between years 1-4 but had higher levels of positive parenting around age 4 (Kobayashi et al., 2021).

Intergenerational trauma. Parents with a history of child maltreatment victimization are more at risk for substance use, interpersonal violence, poor mental health, and face a greater likelihood of experiencing parental stress, poor parenting, and low parental warmth (Chamberlain et al., 2019). The perinatal period, defined as pregnancy through two years postpartum, is critical for parents with a history of child maltreatment, as a parent's trauma response may be triggered during the perinatal period as they begin parenting and caring for a newborn (Chamberlain et al., 2019). The perinatal period offers a unique opportunity for parental healing and is an ideal time for prevention strategies to support parents as they nurture their children (Reid et al., 2021); however, there is limited guidance overall on trauma-specific care and support interventions in the perinatal period for parents with a history of child maltreatment (Chamberlain et al., 2019).

Research surrounding child maltreatment perpetration among Indigenous communities is largely missing, with existing studies providing a mixed view. A recent review of parenting after a history of child maltreatment found a lack of evidence on Indigenous parents overall as scholars posit that child maltreatment and interpersonal violence among Indigenous communities has not been thoroughly examined (Chamberlain et al., 2019; Brownridge et al., 2017). Among Indigenous Australian mothers, Kuluk and colleagues (2021) found that those who were younger, had more children, were Indigenous, and those that had experienced child maltreatment were more likely to become mothers that maltreated their children. The strongest predictor for child maltreatment perpetration was having a history of child maltreatment victimization (Kuluk et al., 2021). Specific to Alaska Native mothers, Parrish and colleagues (2011) found several risk factors associated with child protective services involvement including marital status, maternal tobacco use, interpersonal violence, and substance use.

Macro Level

Poverty

Interpersonal violence often occurs within the larger context of socioeconomic disparities. Poverty is both a cause and effect of intimate partner violence due to perpetrators' economic exploitation, employment interference, and movement restriction (Kothari et al., 2016). Poverty is often cited as a risk factor for experiencing interpersonal violence during pregnancy (Tjaden & Thoennes, 2000). Previous research has found that women in poverty experience an increased risk for experiencing IPV with a 5-6x greater incidence of IPV compared to high socioeconomic status women (Kothari et al., 2016).

Very little is known about the true nature or extent of IPV with Native women across variable socioeconomic conditions. Among a sample of 312 low-income pregnant Native women at a tribal clinic in Oklahoma, low socioeconomic status was associated with past year experiences of IPV when controlling for age, relationship status, and household size (Malcoe, Duran, & Montgomery, 2004). The study further stratified the analysis to investigate the relationship of IPV among Native women experiencing poverty. Nearly 43% of low-income pregnant women reported past year IPV compared to only 10% in the reference group (Malcoe, Duran, & Montgomery, 2004). Overall results of the study found exceptionally high lifetime and past year prevalence for intimate partner violence among low-income pregnant Native women, with significant variability existing across socioeconomic status (Malcoe, Duran, & Montgomery, 2004).

Poverty is a macro-level societal factor that helps create and sustains IPV. Adverse macroeconomic conditions affect everyone as feelings of uncertainty and anticipatory anxiety create relationship strain, even beyond experiences of job loss and economic hardship

(Schneider, Harknett, & McLanahan, 2016). It is unclear how Native women experiencing IPV have been impacted by macroeconomic events as the majority of existing literature measures poverty as an individual attribute rather than a societal context.

Community Violence

While parents play a substantial role in their child's development, the surrounding community may provide a context of risk or protection that can affect both the child's development as well as the caregiver's ability to positively parent (Al'Uqdah et al., 2015). Community violence is an important indicator for social contexts as it has the potential to reflect both the extent of community danger as well as indicate the prevalence of violence within a given community (Zhang & Anderson, 2010). Community violence has the potential to impact not only the parent and child, but the overall family environment (Al'Uqdah et al., 2015). Previous research has found a significant relationship between community violence and subsequent impact upon parenting (Zhang & Anderson, 2010). Overall, existing research on community violence and parenting is mixed. Some studies have found that mothers with increased levels of community violence were more likely to have greater amounts of both physically and psychologically aggressive parenting (Zhang & Anderson, 2010). Other studies have found that community violence led to heightened levels of fear among children, thus leading to overly protective or hypervigilant parents, while still others have found that community violence led to poor psychological functioning which then in turn led to poor parental monitoring (Al'Uqdah et al., 2015).

Community violence is also associated with parental mental health. Previous work has found that community violence led to greater levels of depression and PTSD among parents, which then led to difficulty in providing protective and nurturing parenting (Al'Uqdah et al.,

2015). Further, previous research has found that community violence led to higher levels of parental stress and that these higher levels of stress led to lessened levels of parental engagement (Al'Uqdah et al., 2015). While it remains unclear what the relationship between community violence and subsequent adult outcomes are, Al'Uqdah and colleagues (2015) found a pathway between parental community violence affecting parental mental health which then affected the child's social and emotional competency. There is an overall need to better understand the association between community violence and family wellbeing (Zhang & Anderson, 2010; Al'Uqdah et al., 2015). While the majority of previous work focuses on the impact of community violence upon the child, very little work exists that examines parental exposure to violence (Zhang & Anderson, 2010). The present study examines parental experiences of community violence in conjunction with interpersonal violence and behavioral health measures.

3.2 Gaps in Literature

While interpersonal violence encapsulates family, partner, and community domains, and several ecological frameworks have been put forth to conceptualize these issues, the majority of existing research typically focuses only on violence at the individual level. Further, interpersonal violence varies along several avenues including type of abuse, severity, frequency, perpetrator relationship, and polyvictimization. In addition to lack of analyzing multi-level factors, most research of IPV among pregnant women takes a cross-sectional approach. The proposed study is unique as it will take a longitudinal approach to analyzing family, partner, and community and economic factors related to interpersonal violence among Indigenous women.

Despite Native women experiencing a higher prevalence of violence within the general population and during pregnancy, little is known about the relationships between pregnancy

violence, risks, and subsequent outcomes for Native women and their children as they begin parenting. Moreover, contextual factors surrounding Indigenous women who experience interpersonal violence are mostly unknown. The proposed study seeks to examine mental health outcomes, substance use behaviors, prenatal care access, and socioeconomic indicators surrounding Alaska Native mothers experiencing interpersonal violence.



Figure A. Social Ecological Framework.

The present study will utilize a modified version of Oetzel & Duran's (2004) social ecological framework to investigate interpersonal violence among Alaska Native mothers (Figure A above). At the individual level, the present work will assess maternal age, marital status, and education, behavioral health including mental health and substance use, and individual socioeconomic status indicators such as residing below the federal poverty line and WIC use. At the interpersonal level, the present work will evaluate partner violence (maternal physical and psychological violence from the partner or husband), family violence (child interpersonal violence), stress, and social support. At the organizational level, the present study will evaluate prenatal care, home visitation, child welfare system involvement, and neonatal and developmental outcomes of the child. At the community level, the present study will account for both community violence and rurality. Finally, at the policy level, the present study will

investigate macro level poverty and both alcohol and marijuana restrictions by borough. Figure B on the following page outlines the outcomes assessed in the present work by aim.



Figure B. Social Ecological Framework by Measures in the Present Study.

Chapter 4: Methods

This dissertation utilized longitudinal linked administrative and survey data from the state of Alaska limited to female respondents who identify as Alaskan Native in two cohorts (Phase 6 and 7) of the Pregnancy Risk Assessment Monitoring System (PRAMS). According to the Healthy Native Families report, the first step to addressing domestic violence and sexual violence in Alaska is to understand the depth and breadth of the problem (Kemberling & Avellaneda-Cruz, 2013). This study sought to further scientific understanding of interpersonal violence and its impact on parenting, both at the individual and community levels, to help achieve this aim. By linking a set of community level data, data from the Child Understanding Behavioral Risk Survey (from the same women following birth), child maltreatment reporting and PRAMS, this study examined the experiences of interpersonal violence among Alaska Native pregnant and parenting women.

The inclusion of two cohorts provides additional insights. Additional linkages available only for phase 6 allows for exploration of longer-term parenting function with linkages to official reports to child protection. While the data are pre-existing, exact dates allow for prospective analysis of women reporting IPV immediately prior to and during pregnancy and later. Data were acquired by permission from the state of Alaska's Department of Health and Social Services Division of Public Health Section of Women's, Children's, and Family Health. This work was approved by Washington University in St. Louis' Institutional Review Board (ID#:202101038). Guided by a modified social ecological framework described in the previous chapter, informed from a structural violence theoretical background, and situated within the

context of historical oppression, this dissertation sought to answer the following aims and research questions surrounding Alaska Native mothers' experiences of interpersonal violence.

4.1 Study Aims and Research Questions

Aim 1: Understand factors surrounding Alaska Native mothers who experience interpersonal violence compared to those who do not.

RQ1: What individual factors discriminate between Alaska Native mothers who self-report experiencing interpersonal violence and those who do not?

1a: What is the prevalence of self-report experiences of interpersonal violence among Alaska Native mothers?

1b: What is the prevalence of behavioral health issues (mental health and substance use) among Alaska native mothers who self-report experiencing interpersonal violence and those who do not?

Aim 2: Understand the role of stress surrounding Alaska Native mothers who experience interpersonal violence compared to those who do not.

RQ2: How are stress and behavioral health issues related to prenatal care access and timing for Alaska Native mothers who experience interpersonal violence and those who do not?

RQ3: How are stress and behavioral health issues related to social supports for Alaska Native mothers who experience interpersonal violence and those who do not?

Aim 3: Investigate potential intergenerational impacts of trauma among children of Alaska Native mothers who experience interpersonal violence and those who do not.

RQ4: How do neonatal outcomes differ among children of Alaska Native mothers who experience interpersonal violence and those who do not?

RQ5: What is the prevalence of maltreatment among children of Alaska Native mothers who experience interpersonal violence compared to those who do not?

4.2 Data

Core Administrative Datasets

PRAMS: Pregnancy Risk Assessment Monitoring System

The Pregnancy Risk Assessment Monitoring System (PRAMS) has been conducted in Alaska since 1990 and is a collaborative effort with the CDC and Alaska's Division of Public Health. The PRAMS dataset collects information on Alaskan mothers and their infants around pregnancy and the postpartum period through mail surveys and phone interviews. Approximately 1 in 6 mothers in Alaska are sent the PRAMS. The sampling frame is pulled from birth certificates via the Bureau of Vital Statistics and are weighted in order to represent the entire population of women who deliver a live-born infant in Alaska in a given year, regardless of whether the baby subsequently died or was adopted. Demographic information like maternal race, age, and residence are pulled from the birth certificate and linked with survey responses to allow for stratification by maternal characteristics. The unit of analysis for this study is mothers of newborn infants (Alaska Dept. of Health and Social Services, 2015). Two phases of the PRAMS datasets will be utilized in this study: Phase 6 for data collected between 2009-2011 and Phase 7 for data collected between 2012-2015, specific measures are detailed below.

CUBS: Childhood Understanding Behaviors Survey

The Childhood Understanding Behaviors Survey (CUBS) is the three-year follow-up survey to the PRAMS, typically administered through mail or phone interviews for women who do not respond by mail. The CUBS began sending out surveys in 2006 and sends out about 90

surveys every month. The CUBS data attempts to follow up with all mothers who participated in the original PRAMS, asking questions about the 3-year-old child, the mother, and the household. CUBS data can be linked to the PRAMS survey and are weighted to represent the entire population of mothers who delivered a baby in Alaska in the three years prior to the year of data collection (Alaska Dept. of Health and Social Services, 2015b). Two phases of the CUBS datasets will be utilized in this study: Phase 3 for data collected between 2009-2011, and Phase 4 for data collected between 2012-2014, specific measures are detailed in the following pages.

ALCANLink: Alaska Longitudinal Child Abuse and Neglect Linkage Project

Utilizing Phase 6 of the PRAMS data, the Alaska Longitudinal Child Abuse and Neglect Linkage Project (ALCANLink) annually checks to see whether any of these children have been reported to child welfare or receive services from other public programs. The ALCANLink is able to calculate the cumulative incidence of children in each age group who have ever been involved with child welfare during their lifetime. Further details about data sources, linkages, and censoring are available in Parrish et al. (2017). This study will utilize ALCANLink data as an indicator of longer-term caregiver functioning, with involvement with child protective services, substantiated or not, to be utilized as a proxy for household dysfunction. Although official child protection reports may not always be reflective of maltreatment, prior studies have found that reports do signal risk for longer-term child-development outcomes (Jonson-Reid et al., 2009). This provides an ability to triangulate with parent self-report of child development and parenting available in CUBS.

Linked Community Datasets

ACS: US Census Bureau's Alaska Community Survey

The American Community Survey is conducted annually via the U.S. Census Bureau. More than 12,000 addresses in Alaska are selected to respond to the ACS each year. The American Community Survey includes information from these household surveys to describe the population and characteristics such as age, education, housing, and income (Department of Labor and Workforce Development Research and Analysis, n.d.). This study will utilize measures such as borough, persons in poverty, household income and earnings, households with public assistance, etc. to investigate socioeconomic indicators that may be associated with interpersonal violence.

UCR: FBI Uniform Crime Reporting

The Uniform Crime Reporting (UCR) Program collects data on crime throughout the nation since 1929. The UCR records data for eight serious crimes, called Part I offenses, and over twenty less serious offenses, called Part II offenses. Throughout the country, UCR reporting to the FBI is voluntary; however, AS §12.62.130 requires Alaska law enforcement agencies to submit their crime data to the Department of Public Safety. The Alaska Department of Public Safety's Division of Statewide Services has administered the UCR program in Alaska since 1982. Data from Alaska law enforcement agencies are then collected, tabulated, and reported in publicly available publications via the Alaska Justice Information Center (Alaska Justice Information Center, n.d.). This study will utilize UCR data to indicate community levels of violence through the measures of aggravated assault and forcible rape by community and population.

Restrictions: Alaska Department of Commerce, Community, and Economic Development

Data on county level restrictions on alcohol and marijuana use across Alaska were provided as a service in the online information portal hosted by the Alaska Department of Commerce, Community, and Economic Development Division of Community and Regional Affairs. Limitations of these data include unclear time constraints as it is possible these policies may have been different during the years the PRAMS cohort surveys were collected.

4.3 Study Setting

Alaska is generally regarded as a wealthy state since the majority of its income is derived from natural resource extraction; the federal government is responsible for health and social services of Alaska Natives, but over the years has transferred this responsibility to Native Alaskan private nonprofit corporations and private volunteer groups (Cunningham, 2010). Alaska social services are characterized by a mix of private and public services (Cunningham, 2010). Government services are provided via the state as there are no county divisions; the next sub-level is municipality (Cunningham, 2010). The state of Alaska has several organizations responsible for responding to violence such as the Department of Public Safety (law enforcement), the Office of Children's Services (child protection), and the Council on Domestic Violence and Sexual Assault (Cunningham, 2010). The 1996 Alaska Domestic Violence and Victim Protection Act was created in response to the Violence Against Women Act (Cunningham, 2010). This policy expanded protective order protections and created a central registry for offenders within Alaska (Cunningham, 2010). However, services remain unavailable in many areas of the state, forcing victims to leave their communities in order to seek help (Cunningham, 2010).

Alaska ranks as one of the most violent states in the nation. The Federal Bureau of Investigation in 2005 reported Alaska among the top five states in the country for domestic violence (2006). The rape rate in Alaska is 2.5x the national average, with the rate of child sexual assault nearly 6x the national average (Bureau of Justice Statistics, 2006). Approximately 18% of the population in Alaska identify as Alaska Native or American Indian (Austin et al., 2019). Further, Alaska has the highest rate per capita of men murdering women, with Native Alaskan women being 7x more likely to be raped or sexually assaulted within Anchorage alone (Bureau of Justice Statistics, 2006). Within Alaska, half of all Alaska Native women and one fourth of Alaska Native men will experience physical and/or sexual violence within their lifetime (Kemberling & Avellaneda-Cruz, 2013).

Barriers to services and safety in Alaska include the geographic isolation and weather, lack of law enforcement, lack of sexual assault response teams and child advocacy centers, lack of resources or blocks to prosecution, and trust issues with “the system” (Kemberling & Avellaneda-Cruz, 2013). Alaska’s physically and socially isolated geography can contribute to a milieu of adverse health conditions. Given the remote geography and long winters, seasonal affect disorder and cabin fever are common, all of which may increase substance use (Cunningham, 2010). Additional barriers include the fear of offender retaliation or community ostracism, and fear of seeking services where an offender family member is employed due to fear of confidentiality breach (Kemberling & Avellaneda-Cruz, 2013).

4.4 Data Sovereignty

The Center for Disease Control and Prevention (CDC) investigated the feasibility of investigating maternal and infant health outcomes among American Indian and Alaska Native communities with existing data; however, this investigation resulted in the report Data for

Surveillance of Maternal and Infant Morbidity Among American Indians and Alaska Natives which found that no single source of existing data held adequate comprehensive perinatal monitoring (CDC, n.d.). This report ultimately recommended PRAMS protocol intentionally oversample American Indian and Alaska Native communities to establish sufficient data. The Alaska PRAMS oversamples Native communities in Alaska through a collaborative partnership with the Alaska Native Tribal Health Consortium (ANTHC).

Indigenous data sovereignty is defined as the inherent right for Native nations to govern the collection, ownership, and application of their own data (Native Nations Institute, n.d.). Data sovereignty is a component of the overall movement to decolonize data. The Urban Indian Health Institute (n.d.) has mandated best practices for AI/AN data collection which specifies the mandated collection of race and ethnicity in health data at the state, federal, territorial, local, and tribal levels, collecting tribal affiliation, and oversampling AI/AN populations. The intentional oversample within the Alaska PRAMS is an example of a best practice for Native data collection in support of data sovereignty.

The overall movement for decolonizing data is the reclamation of Indigenous nations to tell their own stories through their data. In conducting the present work with a particular focus on American Indian and Alaska Native communities within the state of Alaska, the primary investigator sought to honor the labor and contributions of the collaboration between Alaska PRAMS and the ANTHC and the inherent sovereignty of all Alaska Native participants' stories reflected in the data. Upon inquiry, a representative of the ANTHC reported that the present work is exempt from tribal review due to it being a secondary analysis of pre-existing data. The researcher will continue to prioritize data sovereignty through the ANTHC and Alaska PRAMS

collaboration in all reporting of results and findings, seeking input and approval prior to any dissemination or presentation of the final work.

4.5 Measures

Cohort 1: PRAMS – Time 1

The total sample size for Cohort 1 of the PRAMS (2009-2011) is 1,256 Alaska Native women. There are 21 mothers that identify as American Indian who are not included in the overall Alaska Native count of 1,236 due to weighting issues and the inability to subset data without disrupting standard errors. Additionally, because these 21 American Indian mothers would add less than 2% to the Alaska Native sample, the author decided to exclude them. There are 190 missing observations for maternal race identification.

This sample of Alaska Native mothers is predominantly young, well-educated, and nearly one-third were married at the time of survey. Women who are separated or single are more at risk for experiencing interpersonal violence (Tjaden & Thoennes, 2000; Taillieu & Brownridge, 2010). Marital status was provided from vital records – 30% (n=376) of mothers reported being married. Research demonstrates that mothers with less than or no more than a high school education are more at risk for experiencing interpersonal violence (Taillieu & Brownridge, 2010). Maternal education was dichotomized to represent mothers who had at least 12 years of school (equivalent to a high school education) compared to those who did not. Mothers who reported having between 0-8 years and 9-11 years of school were coded as No, while mothers who had 12, 13-15, and 16+ years of school were coded as Yes. A total of 1,209 Alaska Native mothers reported their total years of education at the time of survey, with a total of 27 missing values. Nearly 3/4ths of Alaska Native mothers reported having at least a high school education (74%, n=896). Finally, younger mothers are at greater risk for experiencing interpersonal

violence (Taillieu & Brownridge, 2010; Tjaden & Thoennes, 2000). The average age range is between 20-29 years old. Only 5% (n=57) were less than 18 and less than 2% (n=20) were older than 40, see Figure C on the following page.

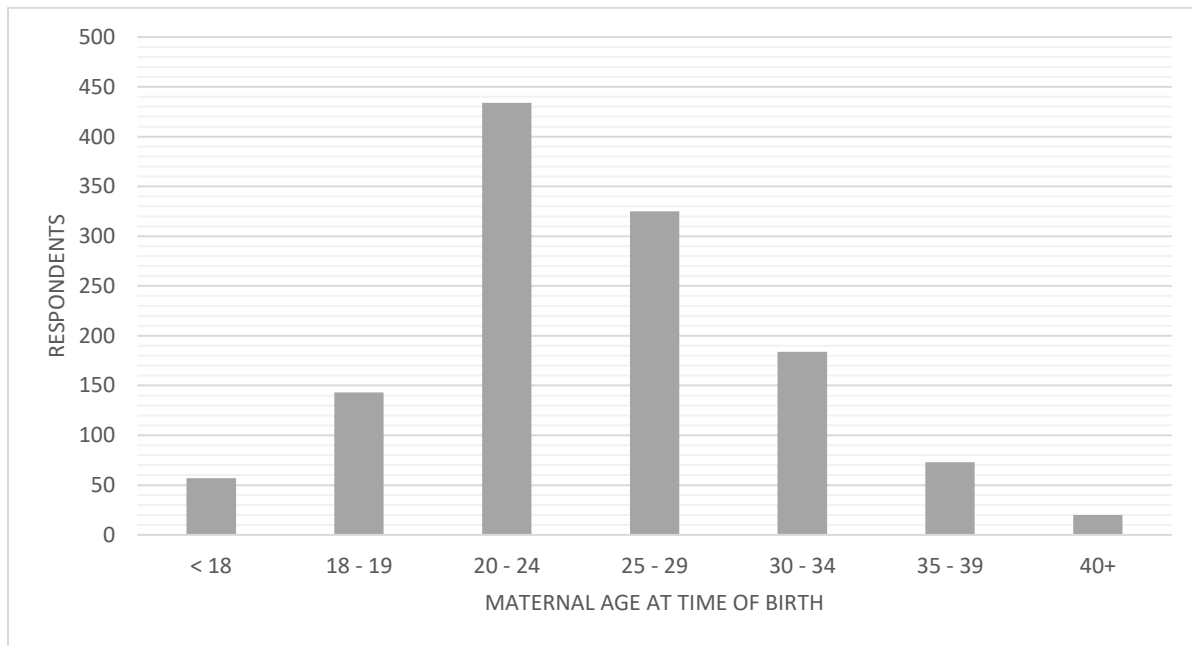


Figure C. Cohort 1 Alaska Native Maternal Age Distribution.

Behavioral Health

Depression or Anxiety. Maternal mental health is assessed within the PRAMS through the question, *During the 12 months before you got pregnant, did you visit a healthcare worker to be checked or treated for depression or anxiety?* Within Cohort 1, less than 10% (n=124) of Alaska Native mothers reported seeking treatment for depression or anxiety within the year before they became pregnant, indicating that the majority of Alaska Native mothers (90%) did not visit a healthcare worker for depression or anxiety. Limitations of this question include relying on seeking treatment as compared to self-reported symptoms, assuming treatment is available, and assuming mothers have access to such treatment.

Postpartum Depression. Three questions assess postpartum depression within the PRAMS -- *Since your new baby was born, have you felt down, depressed, or sad? Hopeless? Slowed down?* Original response profiles ranged from 1-5, with 1 being never, 2-rarely, 3-sometimes, 4-often, and 5-always. These were dichotomized to yes/no with never and rarely combined into the No response and sometimes, often, and always combined to the Yes response. A total of 1,152 Alaska Native mothers responded to the question, with 84 missing values. Approximately 59% (n=683) Alaska Native mothers reported experiencing postpartum depression symptoms.

Alcohol Use. Maternal alcohol use is assessed both during pregnancy and within the prior two years before the time of survey. Alcohol use during pregnancy was assessed with a yes/no question. A total of 5.3% (n=65) Alaska Native mothers reported using alcohol during their pregnancy, with 5 missing. The vast majority (95%, n=1,166) of Alaska Native mothers did not report drinking alcohol during their pregnancy, with 57 missing. The PRAMS inquires whether participants have had any alcoholic drinks within the prior two years from the time of survey. Among Alaska Native participants, 35% (n=418) reported they had not consumed alcohol within the previous two years, while the majority of participants (65%, n=776) indicated they had, with 42 missing.

Marijuana Use. Marijuana use is assessed at three different time points through the question, *Did you smoke marijuana or hash during 1) the 12 months before you became pregnant? 2) during your pregnancy? and 3) since your new baby was born? (yes/no).* Alaska Native mothers who responded yes at any time point were coded as using marijuana. A total of 1,169 Alaska Native mothers responded to the items, with a total of 67 missing values. Roughly 25% (n=297) Alaska Native mothers reported using marijuana.

Tobacco Use. Tobacco use is assessed through the question, *Have you smoked any cigarettes in the past 2 years? (yes/no)*. A total of 1,206 Alaska Native mothers responded to the question, with 30 missing. The majority of participants (63%, n=759) reported they have smoked tobacco within the past two years. It is unclear whether this tobacco use is related to ceremonial use or recreational. Full distribution of behavioral health variables among Cohort 1 mothers can be seen in Table 1 below.

Table 1

PRAMS Cohort 1 Behavioral Health

	Yes	%	No	%	N-size	Missing
Depression or Anxiety	124	9%	1,101	91%	1,225	11
Postpartum Depression	683	59%	469	41%	1,152	84
Alcohol Use						
During Pregnancy	65	5%	1,166	95%	1,179	57
Past Two Years	776	65%	418	35%	1,194	42
Marijuana Use	297	25%	872	75%	1,169	67
Tobacco Use	759	63%	447	37%	1,206	30

Stress. There are 13 items (Table 2) on the following page that assess various stressful life events that participants may have experienced during the year prior to their new baby's birth, including time both before and during pregnancy (yes/no). Mothers who experienced 0-3 stressful life events were coded as low stress, while mothers who experienced 4 or more stressful life events were coded as high stress. A total of 1,201 Alaska Native mothers responded to the stressful life event items, leaving a total of 35 missing values. Approximately 21% of Alaska Native mothers (n=251) indicated high stress levels, while the majority reported low stress (79%, n=950).

Table 2

PRAMS Cohort 1 Stressful Life Events

	Yes	%	No	%	N-size	Missing
A close family member was sick and had to go into the hospital	229	19%	967	81%	1196	40
I got separated or divorced from my husband or partner	120	10%	1075	90%	1195	41
I moved to a new address	382	32%	815	68%	1197	39
I was homeless	68	6%	1128	94%	1196	40
My husband or partner lost his job	123	10%	1063	90%	1186	50
I lost my job even though I wanted to go on working	115	10%	1073	90%	1188	48
I argued with my husband or partner more than usual	306	26%	883	74%	1189	47
My husband or partner said he didn't want me to be pregnant	83	7%	1107	93%	1190	46
I had a lot of bills I couldn't pay	240	20%	951	80%	1191	45
I was in a physical fight	64	5%	1132	95%	1196	40
My husband or partner or I went to jail	115	10%	1080	90%	1195	41
Someone very close to me had a problem with drinking or drugs	328	27%	869	73%	1197	39
Someone very close to me died	317	27%	877	73%	1194	42

Prenatal Care

Prenatal care was provided as a grouped variable from vital records indicating the total number of prenatal care visits. Three categories of the variable were presented: <9, 9-11, and 12+ (Figure D on the following page). While the World Health Organization recommends at least 8 prenatal care visits, previous work in the United States has found that the median number of prenatal care visits is 11 (Carter et al., 2016). These were then dichotomized into three separate variables, with those who had less than 9 prenatal care visits coded as 1 and all others coded as 0 representing less than adequate prenatal care visits, those with 9-11 total prenatal care

visits representing the median or average prenatal care visits, and those with 12 or more total visits representing high utilization of prenatal care. A total of 1,191 Alaska Native mothers indicated their total number of prenatal care visits, with 65 missing values. Approximately 55% (n=656) of Alaska Native mothers had less than 9 total prenatal care visits, indicating less than adequate prenatal care visits. Approximately 24% (n=290) of Alaska Native mothers had between 9-11 total prenatal care visits, indicating an average prenatal care visitation. Approximately 21% (n=180) of Alaska Native mothers had more than 12 total prenatal care visits, indicating high utilization of prenatal care.

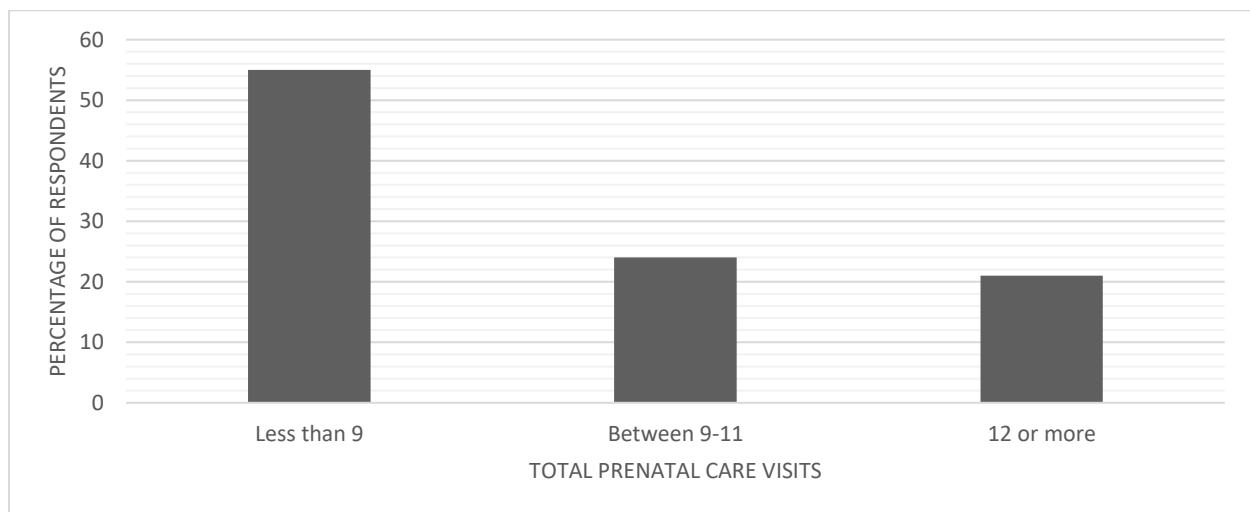


Figure D. Cohort 1 (2009-2011) – Grouped Total Prenatal Care Visits.

Socioeconomic Indicators

Poverty. Individual poverty level was calculated by accounting for household income prior to the new baby being born and total number of dependents relying upon this income. This figure was then compared to the 2010 federal poverty guidelines (U.S. Dept of Health and Human Services, 2010) in order to decide whether participants were experiencing poverty or not. Data were centered on the 2010 federal poverty guidelines given the timespan of PRAMS Cohort

1 collection, 2009-2011. Mothers whose income and corresponding number of dependents fell beneath the federal poverty level were coded as being in poverty, while those who had higher incomes or less number of dependents were coded as not being in poverty. A total of 987 Alaska Native mothers responded to the question, with a total of 249 missing values. Approximately 67% of Alaska Native mothers (n=662) met the federal poverty level, indicating a majority of Alaska Native mothers experienced poverty.

WIC. *During your most recent pregnancy, were you on WIC (the special supplemental nutrition program for women, infants, and children)? (yes/no).* A total of 1,210 Alaska Native mothers responded to the question, with a total of 26 missing. Roughly 71% (n=855) reported receiving WIC assistance during their most recent pregnancy.

Community Measures

Community Violence. Data from the Federal Bureau of Investigation's Uniform Crime Reports (FBI UCR) were linked to PRAMS and CUBS Cohort 1 datasets by linking village code and borough (the Alaska equivalent of county/census area). These data were aggregated across the corresponding PRAMS Cohort 1 collection time: 2009-2011 and CUBS Cohort 1 collection time: 2012-2014. Data from these six years were averaged to produce the violent crime rate for Alaska communities included within the PRAMS and subsequent CUBS.

Violent crime is operationalized by the UCR as face-to-face offenses of murder and non-negligent manslaughter, rape, robbery, and aggravated assault. Crime rates are typically calculated by the number of violent crimes divided by the total county population that reported crimes and then multiplied by 100,000. Thus, crime rates are typically interpreted as X individuals per 100,000; for example, if the crime rate was 460, it would be interpreted as 460 of 100,000 will experience this crime. However, since the majority of the state of Alaska has rural

populations with significantly less than 100,000 individuals per community, this work will utilize a violent crime rate of per 1,000 individuals. This lower threshold allows for better comparison of crime likelihood across cities with vastly different populations (Edwards, 2021).

According to archived FBI Uniform Crime Reports, the average crime rate within the United States from 2009-2011 was 4.06 individuals per 1,000 (US Dept of Justice, 2010; US Dept of Justice, 2011; US Dept of Justice, 2012a). Community crime rates were calculated from FBI UCR data and aggregated across three years corresponding to the PRAMS Cohort 1 (2009-2011). From there, crime rates were coded into one of three categories based upon their relation to the average crime rate within the United States at the time: 1 – low/safe (CR range 0-3.9), 2 – average (CR range 4.0 – 6.0), and 3 – high/violent (CR range 6.1+). A total of 954 Alaska Native mothers responded to the item, with 282 missing values. Based upon the country's average crime rate, the majority of Alaska Native mothers resided in high crime/violent areas at the time of survey (75%, n=713). Roughly 15% of Alaska Native mothers resided in medium/average areas (n=147) and 10% (n=94) lived in low crime/safe areas at the time of survey.

Rurality and Poverty. Data from the U.S. Census Bureau's American Community Survey (ACS) from the state of Alaska were linked to PRAMS + CUBS Cohort 1 datasets by linking boroughs (the Alaska equivalent of county/census area). For the PRAMS, these data were pulled from the 2008-2012 ACS 5-year estimates, centering the data on 2010 as the midpoint as it corresponds with the midpoint of the PRAMS Cohort 1 dataset collected from 2009-2011. For the CUBS, these data were pulled from the 2011-2015 ACS 5-year estimates, centering the CUBS Cohort 1 dataset collected from 2012-2014.

Rurality. Using data from the 2008-2012 ACS 5 Year Estimates, borough rural status was established by categorizing data from the Total Population size. Boroughs with greater than

or equal to 50,000 people were considered urban (rurality=0) according to the United States Census Bureau's urban boundaries (Alaska Department of Transportation and Public Facilities, n.d.). Boroughs with 49,999 people or less were considered rural (rurality=1). A total of 1,111 Alaska Native mothers' PRAMS data were matched with ACS data, resulting in 125 missing values. Roughly 63% (n=695) of Alaska Native mothers indicated they live in rural areas at the time of survey.

Poverty. Using data from the 2008-2012 ACS 5 Year Estimates, poverty was dichotomized utilizing the proportion of American Indian and Alaska Native individuals below the poverty line, divided by the total population of the borough and multiplied by 100. These data were then compared to the average poverty line in the state of Alaska from 2009-2011 (corresponding to PRAMS collection times). The average poverty line in the state of Alaska was 9.8 (Statista, 2020). Data that had a poverty rate of 9.8 or greater were coded as experiencing poverty (poverty=1), while those that were at 9.7 or below were coded as not experiencing poverty (poverty=0). A total of 1,111 Alaska Native mothers' PRAMS data were matched with ACS data, resulting in 125 missing values. Approximately 43% of Alaska Native mothers lived in impoverished communities at the time of survey (n=476).

Restrictions. The final community level variable measured county level restrictions on alcohol and marijuana use across Alaska. Data were provided as a service in the online information portal hosted by the Alaska Department of Commerce, Community, and Economic Development Division of Community and Regional Affairs.

Alcohol Restrictions. Using data from the Alaska Department of Commerce, alcohol restriction status was established into a categorical variable. Boroughs with no restrictions were coded as 0, boroughs with total ban of alcohol sales were coded as 1 (dry county), and boroughs

with restrictions based upon license type were coded as 2. A total of 1,168 Alaska Native mothers' PRAMS data were matched with restrictions data, resulting in 68 missing values. Approximately 56% (n=651) of Alaska Native mothers resided in areas with no alcohol restrictions. Roughly 39% (n=459) of Alaska Native mothers resided in dry counties at the time of survey, with only 5% residing in counties with restricted license types (n=58).

Marijuana Restrictions. Using data from the Alaska Department of Commerce, marijuana restriction status was coded into a binary variable. Listed restrictions include ordinances prohibiting the sale, cultivation, and manufacturing of marijuana, restrictions of retail operating hours for marijuana facilities, and the prohibition of edibles. Boroughs with any of these restrictions were coded as 1, and boroughs lacking restrictions was coded as 0. A total of 1,168 Alaska Native mothers PRAMS data were linked with restrictions data, resulting in 68 missing values. Approximately 40% (n=473) of Alaska Native mothers resided in boroughs with marijuana restrictions at the time of survey, while 60% (n=695) did not.

Cohort 1: CUBS – Time 2

PRAMS Cohort 1 data were merged with the 3-year follow up CUBS dataset. While the PRAMS had a total of 3,549 observations (1,236 Alaska Native), the CUBS has an n-size of 1,699 (584 Alaska Native). Datasets were linked using the ID variable and applied CUBS weights for the following descriptive statistics. A comparison of Cohort 1 PRAMS and CUBS demographics can be seen on the following page in Table 3.

Table 3

Cohort 1 PRAMS and CUBS Demographics Comparison

	PRAMS (09-11) n = 1,256		CUBS (12-14) n = 584	
	n-size	%	n-size	%
Maternal Age (20-29 Years)	759	63%	353	60%
Marital Status (Married)	376	30%	177	30%
Maternal Education (High School or Equivalent)	896	74%	481	84%

This subset of cohort 1 remained young, well-educated, and partnered. A total of 585 Alaska Native mothers indicated their age. The majority of mothers were between 20-29 years old (60%, n=353). A total of 584 Alaska Native mothers indicated their marital status. Roughly 30% (n=177) indicated being married. A total of 571 Alaska Native mothers indicated their highest level of education completed, with 13 missing values. The majority of mothers (84%, n=481) reported being a high school education equivalent or higher. Less than 16% reported having less than a high school education (n=90).

Behavioral Health

Mental Health. If respondents indicated yes to *feeling down, depressed, or sad, hopeless, or slowed down*, their score on mental health was marked as yes. Everyone else was marked no. A total of 560 Alaska Native mothers responded to the question, with a total of 24 missing values. Approximately 53% (n=295) of Alaska Native mothers reported feeling down, depressed, sad, hopeless, or slowed down within the past 3 months.

Treatment Seeking. Treatment seeking for mental health concerns is assessed through the question: *During the past 12 months, did a doctor, nurse or other health care or mental health worker talk to you about depression or how you are feeling emotionally? (yes/no)*. A total

of 567 Alaska Native mothers responded to the question, with 17 missing values. A little more than 1/4th of Alaska Native mothers indicated they had spoken to a health care professional about depression or how they're feeling emotionally within the past 12 months (26%, n=148).

Depression Diagnosis. Being diagnosed with depression was assessed through the item: *Since your 3-year-old baby was born, I was diagnosed with depression (yes/no)*. A total of 569 Alaska Native mothers responded to the question, with 15 missing values. Ten percent of respondents (n=55) indicated they had been diagnosed with depression within the last three years (since their new baby was born). The vast majority of participants (90%, n=514) reported they were not diagnosed with depression in the past 3 years.

Alcohol Use. Alcohol use is assessed with the question: *During the past 30 days, how many days per week on average did you have any alcoholic drinks? (None-Daily)*. A total of 559 Alaska Native mothers responded to the question, with 25 missing values. The majority of mothers (64%, n=357) reported they did not drink any alcoholic beverages within the past 30 days. Nearly 1/4th reported drinking between one (13%, n=70) or less than one (8%, n=47) day per week on average within the last 30 days. Less than 1% of Alaska Native mothers reported drinking 5 or more days on average within the last 30 days (n=10).

Tobacco Use. Tobacco use is assessed through the question: *Have you smoked any cigarettes in the past two years? (yes/no)*. A total of 572 Alaska Native mothers responded to the question, with 12 missing values. Respondents were nearly evenly split, with 55% (n=316) indicating they have smoked within the past two years and 45% (n=256) reporting they have not.

Several measures of behavioral health are assessed within the CUBS (Time 2) measure for Cohort 1. Full breakdown and distribution of these variables can be seen in Table 4 on the following page.

Table 4

CUBS Cohort 1 Behavioral Health

	Yes	%	No	%	N-size	Missing
Mental Health	295	53%	265	47%	560	24
Treatment Seeking	148	26%	419	74%	567	17
Depression Diagnosis	55	10%	514	90%	569	15
Alcohol Use						
None	357	64%	202	36%	559	25
< 1	117	21%	442	79%	559	25
5 +	10	1%	549	99%	559	25
Tobacco Use	316	55%	256	45%	572	12

Stress. Ten items assess various stressful life events respondents may have experiences since their 3-year-old child was born, all measured at yes/no. The full items used to assess maternal stress and their distributions are available in Table 5 on the following page. The total number of stressful life events was dichotomized into low vs. high stress level. Given the decreased amount of stressful life events assessed within the CUBS in comparison to the PRAMS, and the lessened variation, mothers who reported experiencing 6 or more stressful life events were considered high stress, while mothers reporting below 6 stressful life events were considered low stress. A total of 584 Alaska Native mothers indicated their stress level, with no missing values. Approximately 58% (n=341) reported experiencing high stress levels.

Table 5

CUBS Cohort 1 Stressful Life Events

	Yes	%	No	%	N-size	Missing
I got separated or divorced from my husband or partner	99	17%	472	83%	571	13
I moved to a new address	282	49%	291	51%	573	11
I was homeless	33	6%	537	94%	570	14
My husband or partner lost his job	96	17%	466	83%	562	22
I lost my job even though I wanted to go on working	90	16%	475	84%	565	19
Someone very close to me was depressed, mentally ill, or suicidal	101	18%	469	82%	570	14
I had a lot of bills I couldn't pay	160	28%	409	72%	569	15
My husband or partner or I went to jail	97	17%	472	83%	569	15
Someone very close to me had a problem with drinking or drugs	157	28%	411	72%	568	16
Someone very close to me died	230	40%	342	60%	572	12

Socioeconomic Status Indicators

Poverty. Mother's poverty level was calculated by accounting for household income during the past 12 months and total number of dependents relying upon this income. This figure was then compared to 2013 federal poverty guidelines (U.S. Department of Health and Human Services, 2013) in order to decide whether participants were living below the poverty line or not. Data were centered on the 2013 federal poverty guidelines given the timespan of CUBS Cohort 1 collection, 2012-2014. Mothers whose income and corresponding number of dependents fell beneath the federal poverty level were coded as being in poverty, while those who had higher incomes or less number of dependents were coded as not being in poverty. A total of 534 Alaska Native mothers responded to the question, with a total of 50 missing responses. Approximately

58% (n=310) Alaska Native mothers met criteria to fall below the federal poverty line, indicating a majority of Alaska Native mothers experienced poverty at the time of survey.

WIC: A total of 567 Alaska Native mothers responded to the question, with 17 missing values. Roughly 58% of respondents (n=330) indicated they have used WIC in the past 3 months feed themselves, their 3-year-old child, or member of their household.

Food Security. Food security is assessed through the following item: *During the past 3 months have you used any of the following to feed you, your 3 yr. old child or household member: (yes/no).* A total of 568 Alaska Native mothers responded to the item, with 16 missing values. Nearly half of all Alaska Native mothers indicated they have used food stamps within the past 3 months to feed themselves, their child, or a member of their household (48%, n=274). A total of 563 Alaska Native mothers responded to the item, with 21 missing values. Approximately 10% of mothers indicated they have accessed a food bank or pantry within the past 3 months to feed themselves, their child, or a member or their household (n=57). A total of 559 Alaska Native mothers responded to the question, with 25 missing values. Nearly one-fourth of respondents indicated using a free or reduced school lunch program within the past 3 months to feed a member of their household (24%, n=136).

Childcare assistance. Childcare assistance is assessed through the item: *Do you now receive childcare assistance to pay for childcare for your child? (no, partly, total).* A total of 189 Alaska Native mothers responded to the question, with 395 missing values. The vast majority of respondents indicated they do not receive childcare assistance to pay for childcare for their child (75%, n=143). Less than 20% (n=35) indicated they receive partial childcare assistance, and only 5% (n=11) indicated they receive total childcare assistance. Several measures of SES were included in the CUBS and can be seen in Table 6 on the following page.

Table 6

CUBS Cohort 1 Socioeconomic Status Indicators

	Yes	%	No	%	N-size	Missing
Poverty	310	58%	224	42%	534	50
Women, Infants, Children (WIC)	330	58%	237	42%	567	17
Food Security						
Food Stamps	274	48%	294	52%	568	16
Food Bank or Pantry	57	10%	506	90%	563	21
Free or Reduced School Lunch	136	24%	423	76%	559	25
Childcare Assistance						
None	143	75%	46	25%	189	395
Partial	35	20%	154	80%	189	395
Total	11	5%	178	95%	189	395

Social Support

Four main items assess maternal social support within Cohort 1 of CUBS [*I know someone who would: (yes/no)*] including items such as loaning money, help when sick, getting a ride to the doctors' office, and having someone to listen if they need to talk (Table 7 on the following page). For those who indicated yes to all four items, social support was coded as high (yes). Those with less than 4 items were coded as low social support (no). A total of 585 Alaska Native mothers responded to these items, with no missing values. Approximately 63% (n=369) reported high levels of social support.

Table 7

CUBS Cohort 1 Social Support

	Yes	%	No	%	N-size	Missing
Loan me money for bills	411	72%	158	28%	569	15
Help me if I was sick	475	83%	96	17%	571	13
Take me to the doctors' office	502	88%	69	12%	571	13
Listen to me if I needed to talk	530	93%	41	7%	571	13

Community Factors

Community Violence. According to archived FBI Uniform Crime Reports, the average crime rate within the United States from 2012-2014 was 3.7 individuals per 1,000 (US Dept of Justice, 2012b; US Dept of Justice, 2014a; US Dept of Justice, 2014b). Community crime rates were calculated from FBI UCR data and aggregated across three years corresponding to the CUBS Cohort 1 (2012-2014). From there, crime rates were coded into one of three categories based upon their relation to the average crime rate within the United States at the time: 1 – low/safe (CR range 0-2.9), 2 – average (CR range 3.0 – 4.9), and 3 – high/violent (CR range 5.0+). A total of 496 Alaska Native mothers responded to the question, with 88 missing values. Based upon the country's average crime rate from 2012-2014, the vast majority (88%, n=435) of Alaska Native mothers resided in high crime/violent areas at the time of survey. Approximately 9% (n=45) resided in average/moderately safe areas and only 3% (n=16) lived in safe areas at the time of survey. Table 8 on the following page shows crime rate comparison of PRAMS and CUBS within Cohort 1.

Table 8

Cohort 1 PRAMS and CUBS Average Crime Rates Comparison

	PRAMS (09-11)		CUBS (12-14)	
	n = 954		n = 496	
	n-size	%	n-size	%
Community Violence				
Low	94	10%	16	3%
Medium	147	15%	45	9%
High	713	75%	435	88%

Note: Average US crime rate for PRAMS = 4.06, for CUBS = 3.70.

Rurality. Using data from the 2011-2015 ACS 5 Year Estimates, borough rural status was established by categorizing data from the total population size. Boroughs with greater than or equal to 50,000 people were considered urban (rurality=0) according to the United States Census Bureau's urban boundaries (Alaska Department of Transportation and Public Facilities, n.d.). Boroughs with 49,999 people or less were considered rural (rurality=1). A total of 584 Alaska Native mothers' CUBS data were matched with ACS data, resulting in no missing values. Similar to PRAMS data, the majority of mothers lived in rural areas at the time of survey (64%, n=375).

Poverty. Using data from the 2011-2015 ACS 5 Year Estimates, poverty was dichotomized utilizing the proportion of American Indian and Alaska Native individuals below the poverty line, divided by the total population of the borough and multiplied by 100. These data were then compared to the average poverty line in the state of Alaska from 2012-2014 (corresponding to CUBS collection times). The average poverty line in the state of Alaska was 10.2 from 2012 to 2014 (Statista, 2020). Data that had a poverty rate of 10.3 or greater were coded as experiencing poverty (poverty=1), while those that were at 10.2 or below were coded as

not experiencing poverty (poverty=0). A total of 584 Alaska Native mothers' CUBS data were matched with ACS data, resulting in no missing values. Roughly 47% of Alaska Native mothers lived in impoverished communities at the time of survey (n=275). Table 9 below shows the comparison of poverty and rurality within Cohort 1 PRAMS and CUBS.

Table 9

Cohort 1 PRAMS and CUBS Poverty and Rurality Comparison

		PRAMS (09-11) n = 1,236		CUBS (12-14) n = 584	
		n-size	%	n-size	%
Poverty					
	Yes	476	43%	275	47%
	No	635	57%	309	53%
Rurality					
	Rural	695	63%	375	64%
	Urban	416	37%	209	36%

Alcohol Restrictions. Using data from the Alaska Department of Commerce, alcohol restriction status was established into a categorical variable. Boroughs with no restrictions were coded as 0, boroughs with total ban of alcohol sales were coded as 1 (dry county), and boroughs with restrictions based upon license type were coded as 2. A total of 554 Alaska Native mothers' CUBS data were linked to restrictions data, resulting in 31 missing values. Approximately 58% (n=321) resided in areas with no alcohol restrictions. Roughly 36% (n=199) of Alaska Native mothers resided in dry counties at the time of survey, with 6% residing in counties with restricted license types (n=34). Comparisons of Time 1 PRAMS and Time 2 CUBS are below in Table 10.

Marijuana Restrictions. Using data from the Alaska Department of Commerce, marijuana restriction status was coded into a binary variable. Listed restrictions include

ordinances prohibiting the sale, cultivation, and manufacturing of marijuana, restrictions of retail operating hours for marijuana facilities, and the prohibition of edibles. Boroughs with any of these restrictions were coded as 1, and boroughs lacking restrictions was coded as 0. A total of 554 Alaska Native mothers' CUBS data were linked to restrictions data, resulting in 31 missing values. Roughly 57% (n=315) of Alaska Native mothers resided in boroughs with marijuana restrictions at the time of survey, while 43% (n=239) did not. Table 10 below shows the comparison of alcohol and marijuana restrictions within Cohort 1 PRAMS and CUBS.

Table 10

Cohort 1 PRAMS and CUBS Alcohol and Marijuana Restrictions

	PRAMS (09-11)		CUBS (12-14)	
	n = 1,236		n = 584	
	n-size	%	n-size	%
Alcohol Restrictions				
Restricted License Type	58	5%	34	6%
Restricted Borough	459	39%	199	36%
No Restrictions	651	56%	321	58%
Marijuana Restrictions				
Yes	473	40%	239	43%
No	695	60%	315	57%

Cohort 2: PRAMS – Time 1

The total sample size for Cohort 2 of the PRAMS (2012-2015) is 1,738 Alaska Native women. This second cohort of Alaska Native women were young, well-educated, and about a third were married. A total of 1,732 Alaska Native mothers indicated their marital status, with 6 missing values. Roughly 35% of Alaska Native mothers (n=611) reported being married. A total of 1,737 Alaska Native mothers indicated their age at the time of survey. The majority of PRAMS respondents were between 20-34 years of age (80%, n=1,381). A total of 1,714 Alaska Native mothers indicated their education level, with 24 missing values. Over three-fourths of the sample had their high school diploma or equivalent education level (78%, n=1,341).

Behavioral Health

Maternal mental health was assessed through several items. Maternal depression was assessed through the question, *Before you got pregnant with your new baby, did a doctor, nurse, or other healthcare worker tell you that you had any of the following health conditions?*

Depression. A total of 1,694 Alaska Native mothers responded to the item, with 44 missing values. Approximately 10% (n=161) of Alaska Native mothers reported being diagnosed with depression prior to their pregnancy.

Depression or anxiety. Further maternal mental health was assessed by the question, *During the 12 months before you got pregnant with your new baby, did you visit a health care worker to get checked for depression or anxiety? (yes/no).* A total of 1,720 Alaska Native mothers responded to the question, with a total of 18 missing values. Less than 20% of Alaska Native mothers indicated they had visited a health care worker to be checked for depression or anxiety (19%, n=325).

Postpartum Depression. In combining the two questions: 1). *Since your new baby was born, how often have you felt down, depressed, or hopeless?* and 2). *Since your new baby was born, how often have you had little interest or little pleasure in doing things?* a collapsed variable of postpartum depression was created. If mothers indicated yes to either measure, they were coded as having postpartum depression. A total of 1,681 Alaska Native mothers responded to these items, with 57 missing values. Approximately 43% (n=729) of Alaska Native mothers reported experiencing postpartum depression.

Alcohol Use. Alcohol use was assessed through the question, *Have you had any alcoholic drinks in the past 2 years?* A total of 1,090 Alaska Native mothers responded to the

question, with 48 missing values. More than half of Alaska Native mothers (62%, n=1,050)

Alaska Native mothers reported alcohol use within the past 2 years.

Tobacco Use. Several items measure tobacco use within the previous two years, and at several timepoints: before, during, and since pregnancy. Tobacco use is first assessed with the item: *Have you smoked any cigarettes in the past two years? (yes/no)*. Approximately 1,695 Alaska Native mothers responded to the item, with a total of 43 missing values. The sample was evenly split, with about 55% reporting tobacco use within the previous two years (n=938).

Marijuana Use. Marijuana use was calculated to encapsulate any marijuana use before, during, or since pregnancy. A total of 1,631 Alaska Native mothers responded to these items, with 107 missing values. Nearly one quarter (24%, n=392) of Alaska Native mothers reported marijuana use surrounding their pregnancy.

Several measures of behavioral health were assessed within Cohort 2 PRAMS including maternal depression, depression and anxiety, and postpartum depression, in addition to alcohol, tobacco, and marijuana use. See Table 11 for full distribution of these measures below.

Table 11

PRAMS Cohort 2 Behavioral Health Measures

	Yes	%	No	%	N-size	Missing
Mental Health						
Depression Diagnosis	161	10%	1,533	90%	1,694	44
Depression or Anxiety	325	19%	1,395	81%	1,720	18
Postpartum Depression	729	43%	952	57%	1,681	57
Substance Use						
Alcohol Use	1,050	62%	640	38%	1,690	48
Tobacco Use	938	55%	757	45%	1,695	43
Marijuana Use	392	24%	1,239	76%	1,631	107

Stressful Life Events

Several items assess various stressful life events mothers may have experienced during the 12 months before their new baby was born. The most commonly reported events experienced by Alaska Native mothers include moving to a new address (36%, n=602), having someone very close to the mother die (26%, n=428), and having someone close to the mother have a problem with drinking or drugs (26%, n=429). The full array of stressful life events experienced by Alaska Native mothers can be seen in Table 12 below. Given the distribution of responses, stressful life events were totaled and grouped into high stress (three or more events – between the 1st and 2nd quartile) or low stress (0-2 events). A total of 1,696 Alaska Native mothers responded to the items, with 42 missing values. Approximately 36% (n=608) of Alaska Native mothers indicated high levels of stress.

Table 12

PRAMS Cohort 2 Stressful Life Events

	YES	%	NO	%
Homeless	92	5%	1600	95%
Argue With Partner	373	22%	1309	78%
Deployed Or Apart from Partner	120	7%	1563	93%
Problems Paying Bills	309	18%	1371	82%
Death Of Someone Close	428	26%	1251	74%
Substance Use Problem	429	26%	1252	74%
Separated or divorced	197	12%	1490	88%
Sick Family Member	360	21%	1324	79%
Incarceration	167	10%	1515	90%
Partner Job Loss	183	11%	1497	89%
Moved To New Address	602	36%	1087	64%
Cut In Work Hours or Pay	181	11%	1493	89%
Partner Didn't Want Me to Be Pregnant	130	8%	1548	92%
Lost Job	153	9%	1526	91%

Socioeconomic Status Indicators

Medicaid health coverage was utilized to create a socioeconomic status indicator variable. Those who indicated their primary health coverage as Medicaid were coded as low SES. A total of 1,725 Alaska Native mothers responded to the item, with 13 missing values. Roughly 44% of Alaska Native mothers indicated low SES or high levels of poverty (n=761).

Prenatal Care

Prenatal care is provided from vital records as a grouped variable (<9, 9-11, 12+) totaling the number of prenatal care visits. These were then dichotomized into three separate variables, with those who had less than 9 prenatal care visits coded as 1 and all others coded as 0. A total of 1,691 Alaska Native mothers were included in the item, with 47 missing values. Approximately 42% (n=707) of Alaska Native mothers had less than 9 total prenatal care visits. Approximately 26% (n=441) of Alaska Native mothers had between 9-11 total prenatal care visits. Approximately 32% (n=543) of Alaska Native mothers had more than 12 total prenatal care visits. Table 13 below shows a comparison of total prenatal care visits across Cohort 1 PRAMS and Cohort 2 PRAMS.

Table 13

PRAMS Prenatal Care Comparison by Cohort

	COHORT 1 PRAMS (09-11) n = 1,256		COHORT 2 PRAMS (12-15) n = 1,738	
	n-size	%	n-size	%
Total Prenatal Care Visits				
< 9	656	55%	707	42%
9 – 11	290	24%	441	26%
12 +	180	21%	543	32%

Home Visitation

Home visiting programs can assist maternal outcomes as they transition throughout pregnancy and into parenthood. This study may have significant implications for future home visitation programs. In combining both measures of home visitation during and since pregnancy, *During your most recent pregnancy, did a home visitor come to your home to help you prepare for your new baby? (yes/no)* and *Since your new baby was born, has a home visitor come to your home to help you learn how to take care of yourself or your new baby? (yes/no)*, Alaska Native mothers who replied yes to either item were coded as yes. A total of 1,707 Alaska Native mothers responded to the items, with 31 missing values. Approximately 12% of Alaska Native mothers (n=204) indicated they were seen by a home visitor either during or since their pregnancy.

Cohort 2: CUBS – Time 2

PRAMS Cohort 2 data (2012-2015) were merged with the 3-year follow up CUBS dataset (2015-2018). While the PRAMS had a total of 1,738 Alaska Native respondents, the CUBS has an n-size of 847 Alaska Natives. Datasets were linked using the ID variable and applied CUBS weights for the following descriptive statistics.

This subset of cohort 2 remained young, highly educated, however a greater proportion of the CUBS subset were married. A total of 817 Alaska Native mothers indicated their marital status at the time of survey, with 30 missing values. Approximately 48% of Alaska Native mothers reported being married (n=390). A total of 847 Alaska Native mothers indicated their age at the time of survey. The majority of CUBS respondents were between 20-34 years of age (80%, n=673). A total of 807 Alaska Native mothers indicated their education level at the time of survey, with 40 missing values. Approximately 88% (n=711) had a high school diploma

or equivalent education level. A comparison of Cohort 2 PRAMS and CUBS demographics can be seen below in Table 14.

Table 14

Cohort 2 PRAMS and CUBS Demographics Comparison

	PRAMS (12-15) n = 1,738		CUBS (15-18) n = 847	
	n-size	%	n-size	%
Maternal Age (20-34 Years)	1,381	80%	673	80%
Marital Status (Married)	611	35%	390	48%
High School Education	1,341	78%	711	88%

Behavioral Health

Mental Health. Maternal mental health is assessed through three main items. The first question asks if mothers have felt down, depressed, or hopeless during the past 3 months (yes/no). A total of 818 Alaska Native mothers responded to the question, with 29 missing values. Approximately 68% of Alaska Native mothers (n=556) reported feeling down, depressed, or hopeless during the past 3 months. A second question asks if mothers have had little interest or little pleasure in doing things you usually enjoyed during the past 3 months (yes/no). A total of 814 Alaska Native mothers responded to the item, with 33 missing values. Nearly three-fourths of the sample (73%, n=591) reported having little interest or pleasure in doing things they usually enjoyed. A third and final question asks if during the past 12 months has a doctor, nurse, or other health care or mental health provider talked to you about depression or how you are feeling emotionally? (yes/no). A total of 823 Alaska Native mothers responded to the item, with 24 missing values. Nearly one-third of the sample (31%, n=258) reported speaking with a healthcare worker about depression within the previous year.

Tobacco Use. Tobacco use is assessed through the question, *Have you smoked any cigarettes in the past two years? (yes/no)*. A total of 821 Alaska Native mothers responded to the question, with 26 missing values. The sample was split fairly evenly, with 48% (n=394) indicated smoking cigarettes within the previous two years and 52% (n=427) not.

Marijuana Use. Marijuana use is assessed through the question, *Have you used marijuana or hash in any form during the past two years? (yes/no)*. A total of 819 Alaska Native mothers responded to the item, with 28 missing values. Approximately 17% of Alaska Native mothers (n=138) indicated marijuana use within the past two years.

Several measures of behavioral health were assessed within the CUBS for Cohort 2 including mental health items like feeling down, depressed, or hopeless; loss of interest or pleasure; depression; and tobacco and marijuana use seen below in Table 15.

Table 15

CUBS Cohort 2 Behavioral Health Measures

	Yes	%	No	%	N-size	Missing
Mental Health						
Down, depressed, hopeless	556	68%	262	32%	818	29
Loss interest or pleasure	591	73%	223	27%	814	33
Depression	258	31%	565	69%	823	24
Substance Use						
Tobacco Use	394	48%	427	52%	821	26
Marijuana Use	138	17%	681	83%	819	28

Stressful Life Events

Several items assess various stressful life events mothers may have experienced since their new baby was born. The most commonly reported events experienced by Alaska Native mothers were moving to a new address (46%, n=380) and having problems paying the rent, mortgage, or other bills (28%, n=229). The full array of stressful life events experienced by Alaska Native mothers can be seen in Table 16. Stressful life events were totaled and grouped into high stress (two or more events) or low stress (0-1 events). A total of 847 Alaska Native mothers responded to these items with no missing values. The sample was nearly evenly split with 49% experiencing high levels of stress and 51% experiencing low levels of stress.

Table 16

CUBS Cohort 2 Stressful Life Events

	YES	%	NO	%	N-SIZE	MISSING
Problems Paying Bills	229	28%	593	72%	822	25
Care For Sick Family Member	111	14%	710	86%	821	26
Substance Use Problem	205	25%	615	75%	820	27
Homeless	40	5%	783	95%	823	24
Incarceration	94	12%	723	88%	817	30
Job Loss	162	20%	657	80%	819	28
Change Marital Status	144	18%	670	82%	814	33
Moved To New Address	380	46%	441	54%	821	26
Mental Health Problem	166	20%	654	80%	820	27
Cut In Work Hours or Pay	146	18%	673	82%	819	28

Socioeconomic Status Indicators

Poverty. Medicaid health coverage was utilized to create a socioeconomic status indicator variable. Those who indicated their primary health coverage as Medicaid were coded as low SES. A total of 791 Alaska Native mothers responded to the item, with 56 missing values. Roughly 63% of Alaska Native mothers indicated low SES or high levels of poverty (n=502).

Food Security. Four main items assess food security. *During the past 3 months did you use any of the following services to feed you or other household members? Food bank or food pantry; food stamps; free or reduced school lunch program; WIC. (yes/no).* The most commonly reported food security related social services were WIC (50%, n=408) and food stamps (46%, n=373). The full array of socioeconomic status indicators including both poverty status and WIC use as well as food security responses including food stamps, food bank or poverty, and qualifying for free or reduced school lunch programs can be seen below in Table 17.

Table 17

CUBS Cohort 2 Socioeconomic Status Indicators

	Yes	%	No	%	N-size	Missing
SES						
Poverty	502	63%	289	37%	791	56
WIC	408	50%	404	50%	812	35
Food Security						
Food Stamps	373	46%	438	54%	811	36
Food Bank or Pantry	86	11%	699	89%	785	62
Free or Reduced School Lunch	220	28%	567	72%	787	60

4.6 Analyses

Data cleaning, management, and analyses were completed in SAS 9.4 software. This dissertation utilizes predominantly cross-sectional logistic regression analyses to examine interpersonal violence prevalence (Figures 1-4), the role of stress upon prenatal care (Figures 7 and 8) and social support (Figures 9 and 10), and the intergenerational impact of trauma (Figures 11-14). Longitudinal investigations were examined from PRAMS (Time 1) to CUBS (Time 2) using the %SURVEYGENMOD macro (Figures 5, 6, and 16). Finally, several survival analyses were conducted to examine maternal covariates relationship with subsequent child maltreatment outcomes (Figure 15).

Due to the complex survey design of the core instruments PRAMS and CUBS, the PROC SURVEY features within SAS were utilized in order to account for stratified sampling, weights, and related clusters. Clustering and survey weights were adjusted for by using PROC SURVEYLOGISTIC (Allison, 2012). PROC SURVEYLOGISTIC can be utilized with binary, ordinal, or nominal responses as it fits the model by maximum likelihood and adjusts variances using the cluster structure of the data by including a CLUSTER statement (Allison, 2012).

Cross-sectional Logistic Regression with PROC SURVEYLOGISTIC

Aim 1: Figures 1-4, Aim 2; Figures 7-10, Aim 3: Figures 11-13

The researcher checked bivariate associations of independent variables with the dependent variable using PROC SURVEYFREQ to adjust for the domain of Alaska Native mothers only while still applying appropriate sample weights and not subsetting the data. The researcher then assessed multicollinearity between independent variables before entering final model. Finally, PROC SURVEYLOGISTIC was utilized to conduct logistic regression models with significant bivariate associations.

Longitudinal Analysis with %SURVEYGENMOD Macro

Aim 1: Figures 5 and 6, Aim 3: Figure 15 and 16

The %SURVEYGENMOD macro for SAS accounts for complex survey design for longitudinal data. Without accounting for stratification, clustering, or the unequal probability of selection, point estimates and standard errors are incorrect. Silva (2017) developed a SAS macro named %SURVEYGENMOD to deal with complex survey design in generalized linear models. Data must meet certain requirements in order for the macro to run correctly, including the inclusion of only numeric variables (at the 0 and 1 level), creating dummy variables for categorical measurement, and the removal of missing values.

Survival Analyses with PROC SURVEYPHREG

Aim 3: Figure 15

Survival models were conducted examining the relationship between PRAMS and ALCAN outcomes to predict involvement with CPS, including reports of maltreatment, report substantiation, and removal from home. While the original analysis plan was to include CUBS variables in these models, the sample size was too small to link to PRAMS and ALCAN data. SAS also offers the ability to control for clustering and weights through PROC SURVEYPHREG (Hosmer, Lemeshow, & May, 2008). This allows for changes in risk of an outcome given time elapsed from prior measures. The PHREG procedure performs regression analysis of survival data using the Cox proportional hazards model in order to explain the effect of explanatory variables on survival times (SAS, 1999; SAS Support 2013). The Cox Proportional Hazard Model can be used when the underlying data distribution of time to event is unknown (Goldstein & Ottesen, 2017).

Chapter 5: Results

5.1 Aim One: Prevalence of Interpersonal Violence

Aim 1, Figure 1: PRAMS Prevalence Cohort 1

Aim 1 focuses on the prevalence of interpersonal violence among Alaska Native mothers and compare individual factors that discriminate between those who experience IPV and those who do not. Figure 1 below investigates the prevalence of interpersonal violence among Alaska Native mothers surrounding pregnancy within the PRAMS (time 1) among Cohort 1 (2009-2011). Figure 1 further investigates individual factors and community level factors and their relationship to experiences of interpersonal violence among Alaska Native mothers.

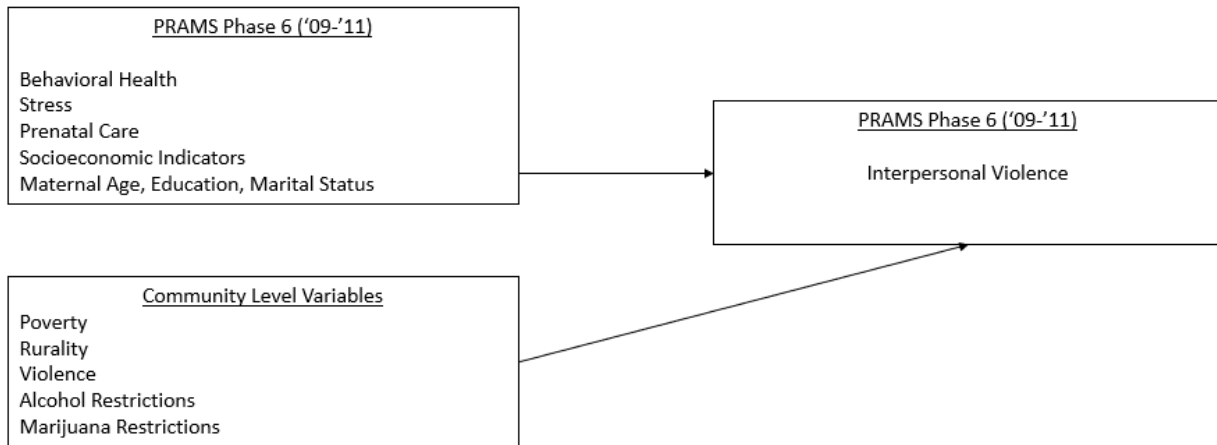


Figure 1. Cohort 1 PRAMS Cross-sectional Interpersonal Violence.

Outcome Variable: Interpersonal Violence

Three questions assess interpersonal violence at three timepoints: before, during, and after pregnancy. Physical violence is assessed through the question at two timepoints: before and during pregnancy, *Did your husband or partner push, hit, slap, kick, choke, or physically hurt you in any way? (yes/no)*. Psychological violence is assessed through the question at three

timepoints: before, during and since pregnancy: *Did your husband or partner threaten you, limit your activities against your will, or make you feel unsafe in any other way during pregnancy?* (yes/no). A final question assessed interpersonal violence before pregnancy, During the 12 months before you got pregnant, *did you ever call the police because you felt threatened?* (include 911, AST, VPSOs). (yes/no). Alaska Native mothers who responded yes to any of these items were coded as experiencing interpersonal violence. A total of 1,199 Alaska Native mothers responded to these items, with a total of 37 missing values. Approximately 13% (n=159) of Alaska Native mothers reported experiencing interpersonal violence, including physical, psychological, or calls to police, either before, during, or after their pregnancies.

Bivariate Analysis

Each independent variable was tested with the dependent variable of interpersonal violence to assess associations. All measured mental health variables were statistically significantly related with experiencing interpersonal violence. Depression and anxiety were statistically significantly associated with experiencing interpersonal violence ($\beta=0.28$, $SE=0.12$, $p<.05$). Alaska Native mothers who reported visiting a healthcare worker to be checked for depression or anxiety within the 12 months before they got pregnant were 1.75x more likely to report experiencing interpersonal violence (95% CI: 1.08-2.85). Postpartum depression was statistically significantly associated with experiencing interpersonal violence ($\beta=0.5$, $SE=0.10$, $p<.001$). Alaska Native mothers who reported experiencing postpartum depression were 2.7x more likely to experience interpersonal violence (95% CI: 1.8-4.1).

All measures of maternal substance use were statistically significantly associated with experiencing interpersonal violence. Alcohol use during pregnancy was statistically significantly associated with experiencing interpersonal violence ($\beta=0.38$, $SE=0.16$, $p<.05$). Alaska Native

mothers who reported alcohol use during pregnancy were 2.2x more likely to experience interpersonal violence (95% CI: 1.2-3.9). Alcohol use within the previous 2 years was statistically significantly associated with experiencing interpersonal violence ($\beta=0.4$, $SE=0.1$, $p<.001$). Alaska Native mothers who endorsed using alcohol within the previous two years were 2.3x more likely to experience interpersonal violence (95% CI: 1.5-3.4). Marijuana use was statistically significantly associated with experiencing interpersonal violence ($\beta=0.53$, $SE=0.09$, $p<.001$). Alaska Native mothers who reported smoking marijuana were 2.9x more likely to experience interpersonal violence (95% CI: 2.03-4.1). Tobacco use was statistically significantly associated with experiencing interpersonal violence ($\beta=0.32$, $SE=0.1$, $p<.01$). Alaska Native mothers who reported smoking tobacco within the past two years were 1.9x more likely to experience interpersonal violence (95% CI: 1.3-2.8).

In addition to behavioral health variables, measures of stress, prenatal care, and covariates such as SES, demographics, and community level variables were also assessed in their relation to experiencing interpersonal violence. High stress levels were statistically significantly associated with experiencing interpersonal violence ($\beta=0.86$, $SE=0.09$, $p<.001$). Alaska Native mothers who endorsed higher stress levels during the 12 months before their new baby was born were 5.6x more likely to experience interpersonal violence (95% CI: 3.9-7.9).

None of the prenatal care variables were significantly related to the outcome of interest and will not be included in the final regression model. Receiving prenatal care in the first trimester was not statistically significantly associated with experiencing interpersonal violence ($p=0.38$) and not getting prenatal care as early as you wanted was not statistically significantly associated with experiencing interpersonal violence ($p=0.97$). Total number of prenatal care

visits were also not significantly associated with experiencing interpersonal violence: < 9 (p=0.08), 9 – 11 (p=0.28), and 12+ (p=0.11).

Both SES indicator variables were significantly associated with the outcome. Utilizing WIC (the special supplemental nutrition program for women, infants, and children) during pregnancy was statistically significantly associated with experiencing interpersonal violence ($\beta=0.41$, $SE=0.11$, $p<.001$). Alaska Native mothers who were on WIC during their most recent pregnancy were 2.3x more likely to experience interpersonal violence (95% CI: 1.5-3.5). Experiencing poverty was statistically significantly associated with experiencing interpersonal violence ($\beta=0.45$, $SE=0.11$, $p<.001$). Alaska Native mothers experiencing poverty were 2.5x more likely to experience interpersonal violence (95% CI: 1.6-3.9).

Maternal demographics such as marital status, education, and age were assessed as covariates with the outcome of interest. Maternal marital status was statistically significantly associated with experiencing interpersonal violence ($\beta=-0.22$, $SE=0.10$, $p<.05$). Alaska Native mothers who were married were 1.56x less likely to experience interpersonal violence compared to those who were not (95% CI: 0.432-0.943). Maternal education and age were not statistically significantly associated with the outcome and will not be included in the final regression model. Maternal education level was not statistically significantly associated with experiencing interpersonal violence (p=0.66). Maternal age was not statistically significantly associated with experiencing interpersonal violence (p=0.57).

Community level variables will not be included in the final regression model due to lack of association with the outcome of interest. Community violence was not statistically significantly associated with experiencing interpersonal violence (p=0.59 (low vs safe) and p=0.30 (low vs high). Residing in a high poverty community was not statistically significantly

associated with experiencing interpersonal violence ($p=0.53$). Residing in a rural community was not statistically significantly associated with experiencing interpersonal violence ($p=0.52$). Residing in a community with alcohol restrictions was not statistically significantly associated with experiencing interpersonal violence ($p=0.71$ (none vs. total ban) $p=0.94$ (none vs. some restrictions)). Residing in a community with marijuana restrictions was not statistically significantly associated with experiencing interpersonal violence ($p=0.56$). Multicollinearity was assessed with the variance inflation factor (VIF). There was no problematic variance inflation for all included independent variables.

Logistic Regression

The overall model is significant, with the likelihood ratio being ($X^2(10, n=1236) = 13.42$, $p<.001$). The max rescaled $R^2 = 0.2218$. Postpartum depression, alcohol use, marijuana use, high stress, and SES indicators of WIC use and experiencing poverty were all statistically significant predictors of experiencing interpersonal violence, as seen in Table 18 on the following page. Postpartum depression increases the odds of experiencing interpersonal violence ($\beta=0.3$, $p<.05$). Alaska Native mothers who experienced postpartum depression were 80% more likely to experience interpersonal violence (95% CI: 1.1-2.9). Alcohol use statistically increased the odds of experiencing interpersonal violence ($\beta=0.31$, $p<.05$). Alaska Native mothers who reported alcohol use within the past 2 years were 90% more likely to experience interpersonal violence (95% CI: 1.1-3.2). Marijuana use increases the odds of experiencing interpersonal violence ($\beta=0.33$, $p<.01$). Alaska Native mothers who reported marijuana use were 95% more likely to experience interpersonal violence (95% CI: 1.2-3.1). High stress levels increase the odds of experiencing interpersonal violence ($\beta=0.7$, $p<.001$). Alaska Native mothers under high levels of stress were 4.2x more likely to experience interpersonal violence (95% CI: 2.8-6.5). Both

socioeconomic indicators were statistically significant predictors of interpersonal violence. Maternal WIC use increased the odds of experiencing interpersonal violence ($\beta=0.29$, $p<.05$). Alaska Native mothers who utilized WIC were 78% more likely to experience interpersonal violence (95% CI: 1.0-3.0). Finally, mothers experiencing poverty had increased odds of experiencing interpersonal violence ($\beta=0.32$, $p<.05$). Alaska Native mothers living below the poverty line were 90% more likely to experience interpersonal violence (95% CI: 1.1-3.1). The receiver operating statistic is moderately strong, $c=0.774$.

Table 18

Cohort 1 PRAMS Cross-Sectional Regression on Interpersonal Violence

Measure	β	SE	Exp(β)	95% CI
Postpartum Depression	0.3*	0.10	1.80	1.1 - 2.9
Alcohol Use	0.3*	0.16	1.91	1.1 - 3.2
Marijuana Use	0.3**	0.09	1.95	1.2 - 3.1
Stress	0.7***	0.09	4.2	2.8 - 6.5
WIC	0.3*	0.11	1.78	1.0 - 3.0
Poverty	0.3*	0.11	1.90	1.1 - 3.1

Note: $p<.05$ *, $p<.01$ **, $p<.001$ ***; ($X^2(10, n=1236) = 13.42$, $p<.001$); max-rescaled $R^2=0.22$; c-statistic = 0.77.

Aim 1, Figure 2: PRAMS Prevalence Cohort 2

Continuing with Aim 1 investigation of interpersonal violence prevalence among Alaska Native mothers, Figure 2 below investigates IPV within Cohort 2 mothers (2012-2015). This model continues to investigate individual factors at Time 1 in relation to experiences of IPV among Alaska Native mothers.

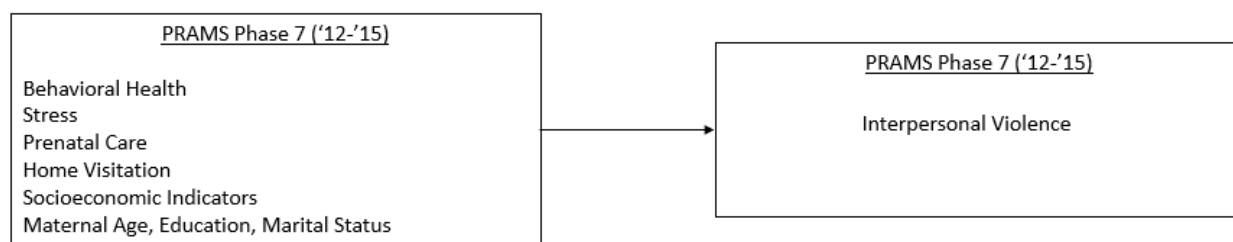


Figure 2. Cohort 2 PRAMS Cross-sectional Interpersonal Violence.

Outcome Variable: Interpersonal Violence

In combining all measures of psychological and physical violence, *Did your husband or partner threaten you, limit your activities against your will, or make you feel unsafe in any other way? During the 12 months before you got pregnant, during my most recent pregnancy, and since my new baby was born (yes/no)* and *Did your husband or partner push, hit, slap, kick, choke, or physically hurt you in any other way? During the 12 months before you got pregnant, during your most recent pregnancy (yes/no)*, Alaska Native mothers who experienced either type of violence at any timepoint were coded as yes. A total of 1,691 Alaska Native mothers responded to the items, with a total of 47 missing values. Approximately 10% of Alaska Native mothers (n=168) reported experiencing interpersonal violence surrounding their pregnancy.

Bivariate Associations

Each independent variable was tested with the dependent variable of interpersonal violence in order to assess bivariate associations. The majority of behavioral health variables were significantly associated with the outcome, with the exception of maternal depression or anxiety ($p=0.07$). Maternal depression was significantly associated with interpersonal violence ($\beta=0.42$, $SE=0.11$, $p<.001$). Alaska Native mothers who were checked for depression or anxiety were 2.3x more likely to experience interpersonal violence (95% CI: 1.5-3.6). Postpartum depression was significantly associated with the outcome ($\beta=0.62$, $SE=0.09$, $p<.001$). Alaska

Native mothers with postpartum depression were 3.5x more likely to experience interpersonal violence (95% CI: 2.5-5.0). Alcohol use was significantly associated with interpersonal violence ($\beta = 0.25$, SE= 0.09, $p < .001$). Alaska Native mothers who reported using alcohol within the previous two years were 1.7x more likely to report experiencing interpersonal violence (95% CI: 1.2-2.4). Finally, both tobacco use ($\beta = 0.37$, SE=0.09, $p < .001$) and marijuana use ($\beta = 0.56$, SE=0.09, $p < .001$) were significantly associated with the outcome. Alaska Native mothers who smoked tobacco within the previous two years were 2.1x more likely to experience IPV (95% CI: 1.5-3.0) while those who smoked marijuana surrounding their pregnancy were 3.1x more likely to experience IPV (95% CI: 2.2-4.3).

High levels of stress were significantly associated with the outcome ($\beta = 1.0$, SE=0.09, $p < .001$). Alaska Native mothers who reported high levels of stress were 7.5x more likely to experience interpersonal violence (95% CI: 5.2-10.9); however, the inflated nature of the confidence intervals indicates an unsteady parameter. Socioeconomic status was significantly associated with experiencing IPV ($\beta = 0.38$, SE=0.08, $p < .001$). Alaska Native mothers with a low SES or high levels of poverty were 2.1x more likely to experience interpersonal violence (95% CI: 1.5-3.0). Prenatal care ($p = 0.69$) and home visitation ($p = 0.43$) were not significantly associated with experiences of interpersonal violence.

Each maternal covariate measure was significantly associated with interpersonal violence, except maternal education level ($p = 0.4$). Marital status was significantly associated with IPV ($\beta = 0.46$, SE=0.10, $p < .001$). Married Alaska Native mothers were 2.5x less likely to experience interpersonal violence (95% CI: 0.27-0.60). Maternal age was associated with the outcome ($\beta = -0.28$, SE=0.07, $p < .001$). Older Alaska Native mothers were 1.3x less likely to

experience interpersonal violence. Multicollinearity was assessed with the variance inflation factor (VIF). There was no problematic variance inflation for all included independent variables.

Logistic Regression

The overall model is statistically significant with the likelihood ratio being ($X^2(15, n=1,533) = 13.32, p<.001$). Postpartum depression, marijuana use, high stress, and high poverty were all statistically significantly related to experiencing interpersonal violence, as seen below in Table 19. Postpartum depression was significantly associated with experiencing IPV ($\beta = 0.39, SE=0.10, p<.001$). Alaska Native mothers with postpartum depression were 2.2x more likely to report IPV (95% CI: 1.5-3.3). Marijuana use was significantly associated with the outcome ($\beta=0.24, SE=0.11, p<.05$). Alaska Native mothers who reported marijuana use were 1.6x more likely to endorse experiences of IPV (95% CI: 1.1-2.5). Stress was a significant association with interpersonal violence ($\beta=0.87, SE=0.11, p<.001$). Highly stressed Alaska Native mothers were 5.7x more likely to report IPV (95% CI: 3.8-8.7). Finally, poverty was a significant relation to the outcome ($\beta=0.29, SE=0.10, p<.01$). Alaska Native mothers experiencing poverty were 1.8x more likely to report experiencing IPV (95% CI: 1.2-2.6). The max rescaled $R^2=0.24$, indicating that postpartum depression, marijuana use, high stress and high poverty account for roughly one fourth of the variance explained in interpersonal violence among Alaska Native mothers. The receiver operating statistic is moderately strong ($c=0.81$) indicating strong model fit.

Table 19

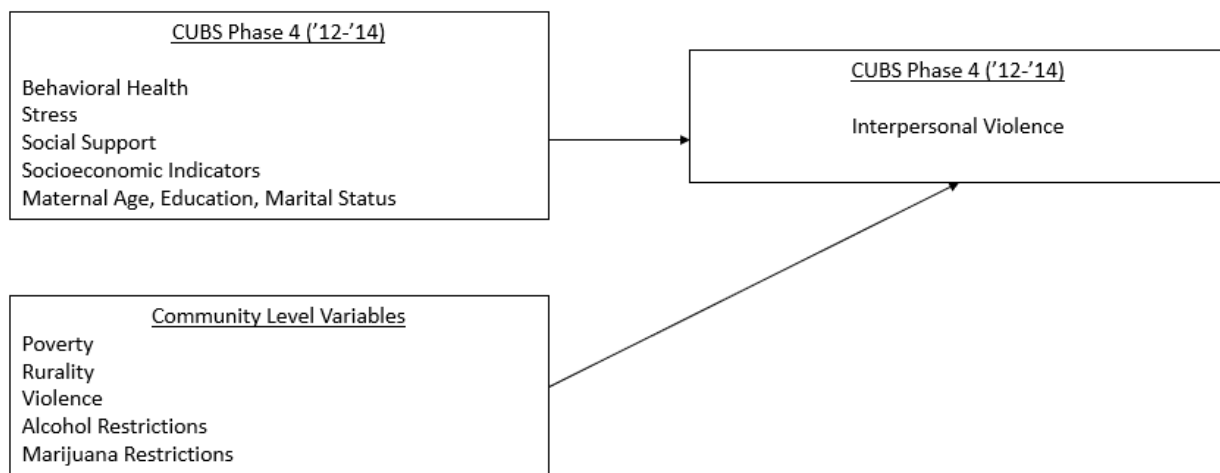
Cohort 2 PRAMS Cross-Sectional Regression on Interpersonal Violence

Measure	β	SE	Exp(β)	95% CI
Postpartum Depression	0.39***	0.10	2.2	1.5 – 3.3
Marijuana Use	0.24*	0.11	1.6	1.1 – 2.5
Stress	0.87***	0.11	5.7	3.8 – 8.7
Poverty	0.29**	0.10	1.8	1.2 – 2.6

Note: $p < .05$ *, $p < .01$ **, $p < .001$ ***; ($X^2(15, n=1533) = 13.32, p < .001$); max-rescaled $R^2 = 0.24$; c-statistic = 0.81.

Aim 1, Figure 3: CUBS Prevalence Cohort 1

Remaining within Aim 1 and the prevalence inquiry, the following model utilizes CUBS data to assess interpersonal violence at Time 2. The CUBS is the 3-year follow-up to the PRAMS instrument (Time 1). Figure 3 below is the first look at Time 2 prevalence of interpersonal violence for Cohort 1 (2012-2014). This model further investigates both individual and community level factors and their relationship to experiences of interpersonal violence among Alaska Native mothers.

*Figure 3. Cohort 1 CUBS Cross-sectional Interpersonal Violence.*

Outcome Variable: Interpersonal Violence

Two items were combined to assess respondents' experiences of interpersonal violence: *During the past 12 months, did your husband or partner push, hit, slap, kick, choke, or physically hurt you in any other way? (yes/no). During the past 12 months, did your husband or partner threaten you, limit your activities against your will or make you feel unsafe in any other way? (Yes/no).* Alaska Native mothers who responded Yes to either item were coded as Yes for experiencing interpersonal violence. A total of 572 Alaska Native mothers responded to these items, with 12 missing values. Approximately 10% (n=58) of Alaska Native mothers reported experiencing interpersonal violence, either physical or psychological, at the hands of their husband or partner within the past 12 months.

Bivariate Associations

Each independent variable was tested with the dependent variable of interpersonal violence to assess associations. The majority of mental health variables were significantly associated with the outcome, except for treatment seeking. Maternal mental health was statistically significantly associated with experiencing interpersonal violence ($\beta=0.43$, $SE=0.16$, $p<.001$). Alaska Native mothers who reported feeling down, depressed, sad, hopeless, or slowed down were 2.4x more likely to report experiencing interpersonal violence (95% CI: 1.3-4.5). Maternal depression was statistically significantly associated with experiencing interpersonal violence ($\beta= 0.67$, $SE=0.18$, $p<.001$). Alaska Native mothers who reported being diagnosed with depression since their 3-year-old baby was born were 3.8x more likely to report experiencing interpersonal violence (95% CI: 1.9-7.8). Having a high stress level was statistically significantly associated with experiencing interpersonal violence ($\beta=0.77$, $SE=0.19$, $p<.001$). Alaska Native mothers who reported experiencing 6 or more stressful life events were 4.7x more likely to report

experiencing interpersonal violence (95% CI: 2.2-10.1). Seeking treatment for depression was not statistically significantly associated with experiencing interpersonal violence ($p=0.08$).

Both substance use variables were significantly associated with interpersonal violence. Tobacco use was statistically significantly associated with experiencing interpersonal violence ($\beta=0.75$, $SE=0.18$, $p<.001$). Alaska Native mothers who reported smoking cigarettes within the past two years were 4.5x more likely to report experiencing interpersonal violence (95% CI: 2.2-9.2). Alcohol use was statistically significantly associated with experiencing interpersonal violence ($\beta=0.2$, $SE=0.07$, $p<.001$). Among Alaska Native mothers who reported using alcohol within the past 30 days, those who drank more frequently were 1.2x more likely to experience interpersonal violence (95% CI: 1.1-1.4).

Several socioeconomic indicator variables were assessed with the outcome of interest. Living below the poverty line ($p=0.1$), participating in the school lunch program ($p=0.82$), and receiving childcare assistance ($p=0.28$) all were not significantly associated with the outcome of interest. WIC usage was associated with experiencing interpersonal violence ($\beta=0.35$, $SE=0.16$, $p<.05$). Alaska Native mothers who reported using WIC within the past 3 months to feed themselves, their 3 yr. old child, or a member of their household were 2x more likely to report experiencing interpersonal violence (95% CI: 1.1-3.8). Both food stamps ($\beta=0.30$, $SE=0.15$, $p<.05$) and food bank ($\beta=0.41$, $SE=0.19$, $p<.05$) use were significantly associated with experiencing interpersonal violence. Alaska Native mothers who reported using food stamps within the past 3 months were 1.8x more likely to report experiencing interpersonal violence (95% CI: 1.0-3.3) while Alaska Native mothers who reported accessing a food bank within the past 3 months were 2.3x more likely to report experiencing IPV (95% CI: 1.1-4.9).

The majority of social support variables were not significantly associated with the outcome. Financial social support was significantly associated with the outcome ($\beta = -0.61$, $SE = 0.15$, $p < .001$). Alaska Native mothers who reported they knew someone who would loan them money for bills if they needed it were 3.3x less likely to report experiencing interpersonal violence (95% CI: 0.17-0.53). Empathetic social support was significantly associated with the outcome of interest ($\beta = -0.6$, $SE = 0.2$, $p < .01$). Alaska Native mothers who reported they knew someone who would listen to them if they needed to talk were 3.3x less likely to report experiencing interpersonal violence (95% CI: 0.13-0.67).

Both maternal marital status and maternal age were associated with the outcome of interest, while maternal education level was not. Marital status was significantly associated with experiencing interpersonal violence ($\beta = -0.95$, $SE = 0.22$, $p < .001$). married Alaska Native mothers were 6.7x less likely to report experiencing interpersonal violence (95% CI: 0.1-0.36). Maternal age was significantly associated with the outcome ($\beta = -0.25$, $SE = 0.12$, $p < .05$). As age increased for Alaska Native mothers, the likelihood of experiencing interpersonal violence decreased by 28% (95% CI: 0.6-0.98). Maternal education level was not significantly associated with the outcome ($p = 0.3$).

Finally, none of the community level variables, rurality ($p = 0.07$), poverty ($p = 0.1$), alcohol restrictions ($p = 0.29$), marijuana restrictions ($p = 0.9$), and violence ($p = 0.8$), were significantly associated with the outcome of interest. Multicollinearity was assessed with the variance inflation factor (VIF). There was no problematic variance inflation for all included independent variables.

Logistic Regression

The overall model is significant, with the likelihood ratio being ($X^2(12, n=525) = 6.27$, $p < .001$). the max rescaled R^2 is 0.278, indicating significant variables account for roughly 28% of the variance explained within interpersonal violence. Both substance use variables, WIC usage, being married, and having financial social support were significantly related to the outcome, as seen in Table 20 on the following page. Smoking cigarettes increases the odds of experiencing interpersonal violence ($\beta = 0.53$, $p < .01$). Alaska Native mothers who smoked cigarettes within the past two years were 2.9x more likely to experience interpersonal violence (95% CI: 1.3-6.4). Alcohol use increases the odds of experiencing interpersonal violence ($\beta = 0.28$, $p < .01$). Alaska Native mothers who used alcohol more frequently were 1.3x more likely to experience interpersonal violence (95% CI: 1.1-1.6). WIC usage increases the odds of experiencing interpersonal violence ($\beta = 0.39$, $p < .05$). Alaska Native mothers who reported using WIC within the past 3 months to feed themselves, their child, or a member of their household were 2.2x more likely to report experiencing interpersonal violence (95% CI: 1.0-4.7). Married Alaska Native mothers were less likely to experience interpersonal violence ($\beta = -0.78$, $p < .01$), decreasing their odds of experiencing IPV by 5x (95% CI: 0.1-0.6). Lastly, those with financial social support were less likely to report experiencing interpersonal violence ($\beta = -0.5$, $p < .01$). Alaska Native mothers who reported they knew someone who would loan them money for bills if they needed it were 2.7x less likely to report experiencing interpersonal violence (95% CI: 0.2-0.7). The receiver operating statistic is strong, $c=0.8$.

Table 20

Cohort 1 CUBS Cross-Sectional Regression on Interpersonal Violence

Measure	β	SE	Exp(β)	95% CI
Tobacco Use	0.53**	0.18	2.9	1.3 – 6.4
Alcohol Use	0.28**	0.07	1.3	1.1 – 1.6
WIC	0.39*	0.16	2.2	1.0 – 4.7
Married	-0.78**	0.22	0.2	0.1 – 0.6
Financial Social Support	-0.5**	0.15	2.7	0.2 – 0.7

Note: p<.05 *, p<.01 **, p<.001 ***; ($X^2(12, n=525) = 6.27, p<.001$); max-rescaled $R^2=0.28$; c-statistic = 0.8.

Aim 1, Figure 4: CUBS Prevalence Cohort 2

Figure 4 below is the first look at CUBS (time 2) prevalence of interpersonal violence for Cohort 2 (2015-2018). This model further investigates individual level factors and their relationship to experiences of interpersonal violence among Alaska Native mothers.

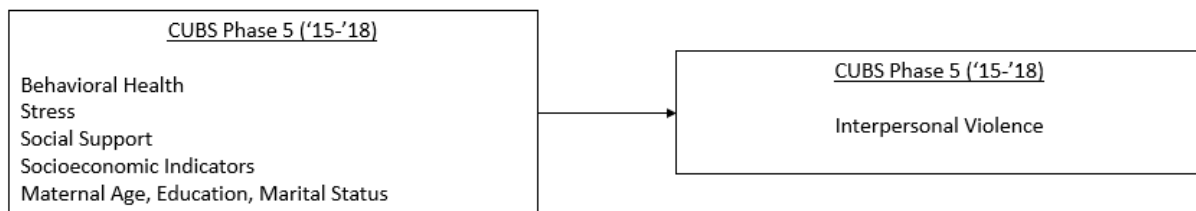


Figure 4. Cohort 2 CUBS Cross-sectional Interpersonal Violence.

Outcome Variable: Interpersonal Violence

In combining both measures of physical and psychological violence, *During the past 12 months, did your husband or partner push, hit, slap, kick, choke, or physically hurt you in any other way? (yes/no)* and *During the past 12 months, did your husband or partner threaten you, limit your activities against your will or make you feel unsafe in any other way? (yes/no)*, with

mothers indicating either form of violence being counted as experiencing interpersonal violence. A total of 819 Alaska Native mothers responded to the items, with 28 missing values. Approximately 5% of Alaska Native mothers (n=43) reported experiencing interpersonal violence within the past year.

Bivariate Associations

Each independent variable was tested with the dependent variable of interpersonal violence in order to assess bivariate associations. All behavioral health variables were significantly associated with the outcome. Maternal mental health was significantly associated with the outcome ($\beta=-0.53$, $SE=0.16$, $p<.001$). Alaska Native mothers who reported feeling down, depressed, or hopeless in the past 3 months were 2.8x less likely to report experiencing IPV (95% CI: 0.2-0.7). Similarly, maternal loss of interest was significantly associated with interpersonal violence ($\beta= -0.42$, $SE=0.16$, $p<.01$). Alaska Native mothers who reported loss of interest or pleasure in things they previously enjoyed were 2.5x less likely to report experiencing IPV. Talking with a healthcare worker about depression was significantly associated with IPV ($\beta= 0.36$, $SE= 0.16$, $p<.05$). Alaska Native mothers who spoke with a healthcare worker about depression were 2.9x more likely to report experiencing interpersonal violence (95% CI:1.1-3.9). Both tobacco ($\beta=0.54$, $SE=0.16$, $p<.05$) and marijuana use ($\beta=0.96$, $SE=0.16$, $p<.001$) were significantly associated with the outcome of interest. Alaska Native mothers who used tobacco were 2.9x more likely to report IPV (95% CI: 1.5-4.9) while those who used marijuana were 6.8x more likely to report IPV (95% CI:3.6-12.9).

Several socioeconomic indicators were significantly associated with the outcome of interest. Poverty level was not significantly associated with the outcome ($p=0.86$). Two measures of food security were associated with the outcome. Only one measure of food security was

significantly associated with the outcome: food stamps ($\beta=0.32$, $SE=0.16$, $p<.05$). Alaska Native mothers who used food stamps were 1.9x more likely to report experiencing IPV (95% CI: 1.0-3.6). Using a food bank or pantry ($p=0.22$), free or reduced school lunch program ($p=0.31$), and WIC usage ($p=0.98$) all were not significantly associated with experiencing IPV.

Stress, social support and certain maternal demographics were not significantly related to the outcome. Stress was not significantly associated with the outcome ($p=0.43$). Similarly, social support was not related with IPV ($p=0.13$). While maternal age ($p=0.85$) and education level ($p=0.72$) were not significantly related to the outcome, marital status was ($\beta= -0.88$, $SE= 0.22$, $p<.001$). Married Alaska Native mothers were 5x less likely to report experiencing IPV (95% CI: 0.1-0.4). Multicollinearity was assessed with the variance inflation factor (VIF). There was no problematic variance inflation for all included independent variables.

Logistic Regression

The overall model is statistically significant with the likelihood ratio being ($X^2(7, n=779) = 7.96$, $p<.001$). Only marijuana use and maternal marital status were statistically significantly related to experiencing interpersonal violence, as seen below in Table 21. Marijuana use was significantly associated with experiencing IPV ($\beta= 0.60$, $SE=0.19$, $p<.01$). Alaska Native mothers who reported marijuana use within the past two years were 3.3x more likely to report experiencing interpersonal violence. Finally, marital status was a protective significant association with interpersonal violence ($\beta= -0.75$, $SE= 0.23$, $p<.01$). Married Alaska Native mothers were 4.3x less likely to report experiencing IPV (95% CI: 0.1-0.6). The max rescaled $R^2 = 0.19$, indicating that marijuana use and marital status account for a little less than one fifth of the variance explained in interpersonal violence among Alaska Native mothers. The receiver operating statistic is moderately strong ($c=0.79$) indicating a moderately strong model fit.

Table 21

Cohort 2 CUBS Cross-Sectional Regression on Interpersonal Violence

Measure	β	SE	Exp(β)	95% CI
Marijuana Use	0.60**	0.19	3.3	3.6 – 12.9
Married	-0.75**	0.23	0.23	0.1 – 0.6

Note: $p < .05$ *, $p < .01$ **, $p < .001$ ***; ($X^2(7, n=779) = 7.96, p < .001$); max-rescaled $R^2 = 0.19$; c-statistic = 0.79.

The 3-year follow up point (CUBS) showed significant deviations in the prevalence of interpersonal violence for Alaska Native mothers in both Cohort 1 in Figure 3 and Cohort 2 in Figure 4. While the prevalence of interpersonal violence remained relatively steady for cohort 1 (10%, $n=58$), it dropped significantly for cohort 2 (5%, $n=43$). These models did not have many similarities in associations with IPV. Cohort 1 had significant associations with both tobacco and alcohol use, WIC use, marital status, and financial social support in relation to experiencing IPV. Cohort 2 only had significant associations with marijuana use and marital status in relation to experiencing IPV. It is possible this reduction in both prevalence and significance can be due to the decreased sample size as Cohort 1 CUBS had an n-size of 584 and Cohort 2 CUBS had an n-size of 847, with Cohort 1 reducing the sample by 47% and Cohort 2 reducing by 49%. Further, this reduction in sample size contributes to the small instance of the outcome variable of interest in both Figures 3 and 4, as both had less than roughly 50 observations in the outcome category, indicating a potential violation of regression assumptions, and ultimately an underpowered model.

The second half of Aim 1 centered on the prevalence of behavioral health issues in relation to mothers who experienced interpersonal violence in comparison to those who did not. In both cohorts, all measures of behavioral health surrounding pregnancy had higher prevalence for Alaska Native mothers who experienced interpersonal violence than those who did not. Over

two-thirds of Alaska Native mothers in cohort 1 indicated postpartum depression and interpersonal violence (77%, n=118) while only 57% of those with no IPV experienced postpartum depression. This is similar for mothers in cohort 2 as 70% of Alaska Native mothers experienced both IPV and postpartum depression (n=117) while only 40% experienced postpartum depression without IPV (n=609). Nearly 16% of Alaska Native mothers in cohort 1 reported experiencing depression or anxiety (n=26) while only 9% reported depression or anxiety without IPV (n=95). Similarly, 23% of Alaska Native mothers in cohort 2 reported depression or anxiety with interpersonal violence (n=38) while only 18% reported depression or anxiety without interpersonal violence (n=277). Further, these patterns repeated for all substance use measures as well; there was a higher proportion of mothers who reported substance use and interpersonal violence than those who reported substance use without IPV. Full breakdown of these patterns can be seen in Table 22 below.

Table 22

PRAMS Behavioral Health and Interpersonal Violence Surrounding Pregnancy by Cohort

	COHORT 1		COHORT 2	
	%	n-size	%	n-size
Postpartum Depression				
with IPV	73%	118	70%	117
without	57%	565	40%	609
Depression or Anxiety				
with IPV	16%	26	23%	38
without	9%	95	18%	277
Alcohol Use				
with IPV	79%	123	74%	123
without	63%	643	61%	921
Marijuana Use				
with IPV	46%	71	50%	81
without	22%	225	21%	311
Tobacco Use				
with IPV	75%	119	71%	119
without	61%	630	53%	807

A similar pattern was detected at the 3-year follow up inquiry with higher prevalence of behavioral health variables among mothers who reported experiences of interpersonal violence compared to those who did not. Roughly 72% of Alaska Native mothers in Cohort 1 reported feeling down, depressed, or sad and experiencing IPV (n=41) while only 50% (n=253) reported feeling down, depressed, or sad without experiencing IPV. Similarly, 23% of Alaska Native mothers in Cohort 1 who reported experiencing interpersonal violence were diagnosed with depression (n=13) while only 8% reported being diagnosed with depression but no interpersonal violence (n=42). In both cohorts, Alaska Native mothers who experienced interpersonal violence had a higher proportion of tobacco use; 81% of Cohort 1 respondents experienced both IPV and tobacco use (n=46) while only 52% reported tobacco use without IPV (n=267). Similarly, 72% of Cohort 2 respondents reported both IPV and tobacco use (n=31) while 47% reported tobacco use without IPV (n=362). Further patterns can be seen in Table 23, however Cohort 1 only has measures of mental health, tobacco use, and alcohol use, while Cohort 2 has measures of mental health, tobacco use, and marijuana use.

Table 23

CUBS Behavioral Health and Interpersonal Violence at Time 2 Patterns by Cohort

	COHORT 1		COHORT 2	
	%	n-size	%	n-size
Mental Health				
with IPV	34%	19	47%	20
without	25%	128	31%	237
Tobacco Use				
with IPV	81%	46	72%	31
without	52%	267	47%	362
Alcohol Use				
with IPV	53%	29		
without	35%	173		
Marijuana Use				
with IPV			49%	21
without			15%	115

Aim 1, Figure 5: Longitudinal Analysis PRAMS to CUBS Cohort 1

The final two models of Aim 1 take a longitudinal perspective in investigating experiences of interpersonal violence across time. Figure 5 on the following page is the first longitudinal analysis of Cohort 1 (2009-2011) from PRAMS (Time 1) to CUBS (Time 2).

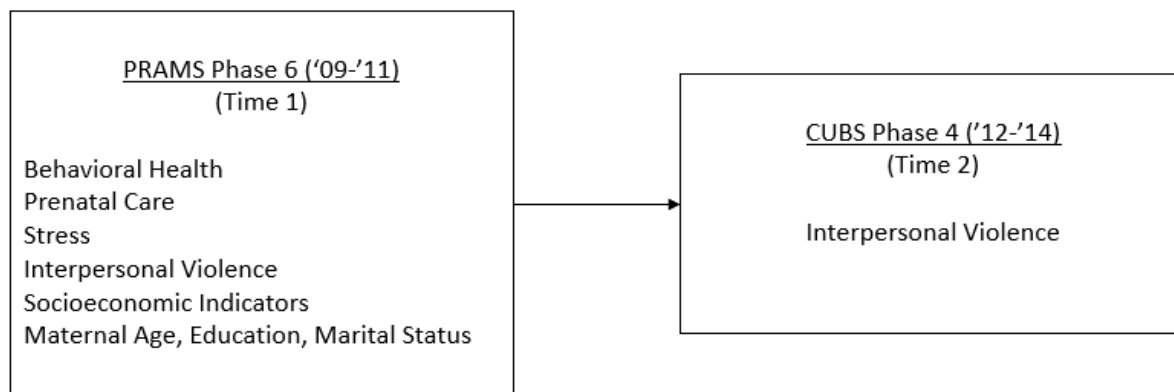


Figure 5. Cohort 1 PRAMS to CUBS Longitudinal Interpersonal Violence.

Outcome Variable: Interpersonal Violence

During the past 12 months, did your husband or partner push, hit, slap, kick, choke, or physically hurt you in any other way? (yes/no). During the past 12 months, did your husband or partner threaten you, limit your activities against your will or make you feel unsafe in any other way? (Yes/no). Yes to either, interpersonal violence = yes. A total of 572 Alaska Native mothers responded to these items, with 12 missing values. Approximately 10% (n=58) of Alaska Native mothers reported experiencing interpersonal violence, either physical or psychological, at the hands of their husband or partner within the past 12 months. The dependent variable is interpersonal violence at Time 2 (CUBS) using PRAMS (Time 1) independent variables. Table 24 on the following page demonstrates descriptive statistics of all included independent variables in the present analysis over time.

Table 24

Cohort 1 PRAMS to CUBS Independent Variable Descriptive Statistics Over Time

	PRAMS (Time 1)		CUBS (Time 2)	
	n=1,256		n=584	
	n-size	%	n-size	%
Postpartum Depression	683	59%	273	63%
Depression or Anxiety	124	10%	46	11%
Tobacco Use	759	63%	268	62%
Marijuana Use	297	25%	110	25%
Alcohol Use				
During Pregnancy	65	5%	19	4%
Past 2 Years	776	65%	294	68%
Prenatal Care				
< 9	656	55%	215	49%
9 – 11	290	24%	114	26%
12 +	245	21%	106	24%
High Stress	251	21%	95	22%
SES Indicators				
Poverty	662	67%	285	66%
(WIC)	856	71%	310	71%
Demographics				
Married	376	30%	149	34%
High School Edu	896	74%	359	83%
Maternal Age (20-29)	759	61%	261	60%
Interpersonal Violence	159	13%	58	14%

SAS %SURVEYGENMOD Macro

The %SURVEYGENMOD macro developed for SAS allows researchers to account for complex survey design in generalized linear models over time. In order to use the macro, data must meet certain requirements, namely inclusion of only numeric variables, creating dummy variables for categorical measures, and the deletion of missing values (Silva, 2017). The process of deleting missing variables and the subsequent sample size is detailed in Table 25 on the following page. Limitations of using the macro are discussed in Chapter 6. Ultimately, the sample was reduced from n=584 to n=428, with roughly 27% of the sample missing.

Table 25

Cohort 1 PRAMS to CUBS Sample Size Reduction to meet %SURVEYGENMOD Requirements

	Original		Meeting Macro Requirements	
	n-size	%	n-size	%
Postpartum Depression	572	98%	551	94%
Depression or Anxiety	551	94%	550	94%
Tobacco Use	550	94%	548	94%
Marijuana Use	548	94%	541	93%
Alcohol Use				
During Pregnancy	541	93%	540	92%
Past 2 Years	540	92%	536	92%
Prenatal Care				
< 9	536	92%	516	88%
9 – 11	516	88%	516	88%
12 +	516	88%	516	88%
High Stress	516	88%	516	88%
SES Indicators				
Poverty	516	88%	440	75%
(WIC)	440	75%	438	75%
Demographics				
Married	438	75%	438	75%
High School Edu	438	75%	435	74%
Maternal Age	435	74%	435	74%
Interpersonal Violence	435	74%	428	73%

Bivariate Associations

The majority of behavioral health variables were not significantly associated with interpersonal violence at Time 2. Postpartum depression ($p=0.06$), depression or anxiety ($p=0.33$), and both measures of alcohol use during pregnancy ($p=0.30$) and within the past 2 years ($p=0.05$) were not significantly associated with IPV over time. Both tobacco use ($\beta=1.1$, $SE=0.46$, $p<.05$) and marijuana use ($\beta=1.1$, $SE=0.37$, $p<.01$) surrounding pregnancy were significantly associated with interpersonal violence over time. Alaska Native mothers who reported using tobacco surrounding their pregnancy were 3x more likely to report experiencing IPV at Time 2 (95% CI: 1.2-7.4). Similarly, Alaska Native mothers who reported marijuana use

surrounding their pregnancy were 3.1x more likely to report experiencing IPV over time (95% CI: 1.5-6.4).

Total prenatal care visits were not significant predictors of interpersonal violence over time: less than 9 total visits ($p=0.27$), between 9 and 11 visits ($p=0.14$), and 12 or more visits ($p=0.77$). Neither measure of socioeconomic status indicators were significant predictors of IPV over time including residing below the federal poverty line ($p=0.62$) and WIC use ($p=0.13$). Finally, all maternal demographics were not significant associations with interpersonal violence: marital status ($p=0.07$), education level ($p=0.34$), and maternal age ($p=0.40$).

High stress was a significant predictor of interpersonal violence at Time 2 ($\beta= 1.4$, $SE= 0.37$, $p<.001$). Alaska Native mothers who reported high levels of stress surrounding their pregnancy were 3.9x more likely to experience IPV over time (95% CI: 1.9-8.1). Finally, experiencing interpersonal violence surrounding pregnancy was a significant predictor of interpersonal violence at Time 2 ($\beta= 1.7$, $SE= 0.39$, $p<.001$). Alaska Native mothers who experienced violence surrounding their pregnancy were 5.6x more likely to experience interpersonal violence over time (95% CI: 2.6-11.9).

Full Model

Tobacco use, marijuana use, interpersonal violence, and stress were regressed on interpersonal violence during Time 2. Both interpersonal violence and stress at Time 1 were significant predictors of interpersonal violence at Time 2 as seen in Table 26 on the following page. Stress surrounding pregnancy (Time 1) was a significant predictor of interpersonal violence at Time 2 ($\beta= 0.91$, $SE= 0.42$, $p<.05$). Alaska Native mothers who reported high levels of stress surrounding their pregnancy were 2.5x more likely to experience interpersonal violence at Time 2 (95% CI: 1.1-5.6). Interpersonal violence surrounding pregnancy was a significant

predictor of interpersonal violence at Time 2 ($\beta = 1.4$, $SE = 0.44$, $p < .01$). Alaska Native mothers who reported IPV at Time 1 were 3.9x more likely to report experiencing interpersonal violence over time (95% CI: 1.6-9.4). Both tobacco use and marijuana use were not significantly associated with interpersonal violence in the multivariate model.

Table 26

Cohort 1 PRAMS to CUBS Regression Over Time on Interpersonal Violence

Measure	β	SE	Exp(β)	95% CI
Stress	0.91*	0.42	2.5	1.1 – 5.6
Interpersonal Violence	1.4**	0.44	3.9	1.6 – 9.4

Note: $p < .05$ *, $p < .01$ **, $p < .001$ ***.

Aim 1, Figure 6: Longitudinal Analysis PRAMS to CUBS Cohort 2

The sixth and final model of Aim 1 again takes a longitudinal perspective in investigating experiences of interpersonal violence across time. Figure 6 below is the longitudinal analysis of Cohort 2 (2012-2015) from PRAMS (Time 1) to CUBS (Time 2).

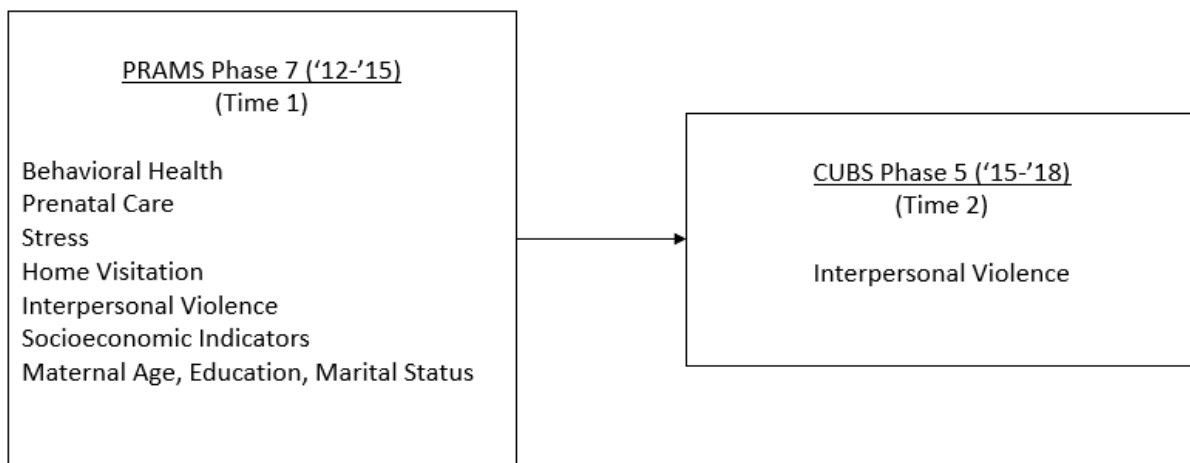


Figure 6. Cohort 2 PRAMS to CUBS Longitudinal Interpersonal Violence.

Outcome Variable: Interpersonal Violence

In combining both measures of physical and psychological violence from the CUBS (time 2), *During the past 12 months, did your husband or partner push, hit, slap, kick, choke, or physically hurt you in any other way? (yes/no)* and *During the past 12 months, did your husband or partner threaten you, limit your activities against your will or make you feel unsafe in any other way? (yes/no)*, with mothers indicating either form of violence being counted as experiencing interpersonal violence. A total of 819 Alaska Native mothers responded to the items, with 28 missing values. Approximately 5% of Alaska Native mothers (n=43) reported experiencing interpersonal violence within the past year. The dependent variable is interpersonal violence at Time 2 (CUBS) using PRAMS (Time 1) independent variables. Table 27 below demonstrates descriptive statistics of all included independent variables in the present analysis over time.

Table 27

Cohort 2 PRAMS to CUBS Independent Variable Descriptive Statistics Over Time

	PRAMS (Time 1) n=1,738		CUBS (Time 2) n=847	
	n-size	%	n-size	%
Depression Diagnosis	161	10%	68	8%
Depression or Anxiety	325	19%	144	17%
Postpartum Depression	729	43%	343	42%
Tobacco Use	938	55%	427	51%
Marijuana Use	392	24%	174	22%
Alcohol Use	1050	62%	521	63%
Prenatal Care				
< 9	707	42%	340	41%
9 – 11	441	26%	211	25%
12 +	543	32%	282	34%
High Stress	608	36%	275	33%
Poverty	761	44%	337	40%
Home Visitation	204	12%	106	13%
Demographics				
Married	611	35%	354	42%
High School Edu	1341	78%	697	83%
Maternal Age (20-29)	1051	61%	480	57%
Interpersonal Violence	168	10%	66	8%

SAS %SURVEYGENMOD Macro

The %SURVEYGENMOD macro developed for SAS allows researchers to account for complex survey design in generalized linear models over time. In order to use the macro, data must meet certain requirements, namely inclusion of only numeric variables, creating dummy variables for categorical measures, and the deletion of missing values (Silva, 2017). The process of deleting missing variables and the subsequent sample size is detailed in Table 28 below.

Limitations of using the macro are discussed in Chapter 6. Ultimately, the sample was reduced from n=847 to n=720, with roughly 15% of the sample missing.

Table 28

Cohort 2 PRAMS to CUBS Sample Size Reduction to meet %SURVEYGENMOD Requirements

	Original		Meeting Macro Requirements	
	n-size	%	n-size	%
Depression Diagnosis	819	97%	797	94%
Depression or Anxiety	797	94%	794	94%
Postpartum Depression	794	94%	776	92%
Tobacco Use	776	92%	773	91%
Marijuana Use	773	91%	753	89%
Alcohol Use	753	89%	751	89%
Prenatal Care				
< 9	751	89%	737	87%
9 – 11	737	87%	737	87%
12 +	737	87%	737	87%
High Stress	737	87%	735	87%
Poverty	735	87%	731	86%
Home Visitation	731	86%	731	86%
Demographics				
Married	731	86%	730	86%
High School Edu	730	86%	720	85%
Maternal Age (20-29)	720	85%	720	85%
Interpersonal Violence	720	85%	720	85%

Bivariate Associations

The majority of behavioral health variables were not significantly associated with experiencing interpersonal violence at Time 2. Maternal depression (p=0.86) and anxiety

($p=0.75$) were not significantly associated with the outcome; however, postpartum depression was ($\beta= 0.87$, $SE= 0.38$, $p<.05$). Alaska Native mothers who reported postpartum depression at Time 1 were 2.4x more likely to report experiencing interpersonal violence at Time 2 (95% CI: 1.1-5.1). Alcohol use was not significantly associated ($p=0.62$) but both tobacco use ($\beta= 0.85$, $SE= 0.40$, $p<.05$) and marijuana use ($\beta= 0.86$, $SE= 0.40$, $p<.05$) at Time 1 were significantly associated with experiencing IPV at Time 2. Alaska Native mothers who used tobacco were 2.3x more likely to experience interpersonal violence (95% CI: 1.1-5.2) while those who used marijuana were 2.4x more likely to experience interpersonal violence (95% CI: 1.1-5.2). Finally, stress was significantly associated with IPV ($\beta= 0.91$, $SE= 0.38$, $p<.05$). Alaska Native mothers who reported high stress at Time 1 were 2.5x more likely to experience interpersonal violence at Time 2 (95% CI: 1.2-5.3).

Several variables from Time 1 were not significant predictors of violence at Time 2. Prenatal care ($p=0.34$) and home visitation ($p=0.48$) were not significantly associated with the outcome. Similarly, experiencing interpersonal violence at Time 1 was not significantly associated with experiencing interpersonal violence at Time 2 ($p=0.18$).

The socioeconomic status indicator measure was not significantly associated with the outcome ($p=0.25$). Finally, maternal age ($p=0.45$) and education level ($p=0.21$) were not significantly associated, but marital status was ($\beta= -1.5$, $SE= 0.47$, $p<.01$). Married Alaska Native mothers 5x less likely to experience interpersonal violence at Time 2 (95% CI: 0.1-0.6).

SAS %SURVEYGENMOD Macro

Postpartum depression, tobacco use, marijuana use, stress, and marital status were regressed on interpersonal violence experiences during Time 2, as seen in Table 29 on the following page. All behavioral health variables, postpartum depression, tobacco use, and

marijuana use, were not significant predictors of interpersonal violence in the overall model. Stress at Time 1 was significantly associated with the outcome ($\beta = 0.99$, $SE = 0.37$, $p < .01$). Alaska Native mothers who reported high levels of stress at Time 1 were 2.7x more likely to report experiencing interpersonal violence at Time 2 (95% CI: 1.3-5.6). Maternal marital status was significantly associated with the outcome ($\beta = -1.4$, $SE = 0.48$, $p < .01$). Married Alaska Native mothers were 3.3x less likely to experience interpersonal violence than unmarried Alaska Native mothers (95% CI: 0.1-0.7).

Table 29

Cohort 2 PRAMS to CUBS Regression Over Time on Interpersonal Violence

Measure	β	SE	Exp(β)	95% CI
Stress	0.99**	0.37	2.7	1.3 – 5.6
Married	-1.4**	0.48	0.3	0.1 – 0.7

Note: $p < .05$ *, $p < .01$ **, $p < .001$ ***.

The present study was able to examine patterns of interpersonal violence across time. A substantial finding from this dissertation demonstrates that pregnancy violence is indeed a time of heightened risk for Alaska Native mothers, see Table 30 on the following page. Roughly 70% of Cohort 1 mothers experienced pregnancy violence but did not report subsequent violence at the 3-year follow up ($n=49$). This pattern is similar for Cohort 2 respondents as well, 87% of Alaska Native mothers reported experiencing violence surrounding their pregnancy only and did not report subsequent violence at time 2 ($n=54$). A lesser portion of Alaska Native mothers reported sustained experiences of violence surround pregnancy (time 1) and at the 3-year follow up (time 2). For Alaska Native mothers in Cohort 1, nearly 30% of respondents who reported experiencing violence surrounding their pregnancy also reported continued experiences of

violence at the 3-year follow up (n=21). This figure was vastly different from Cohort 2 as 13% of respondents indicated experiencing both violence surrounding pregnancy and violence at the 3-year follow-up (n=8). A lesser portion of Alaska Native mothers in both cohorts reported violence only at time 2. For Alaska Native mothers in Cohort 1, roughly 7% of respondents indicated they did not experience violence surrounding pregnancy but did experience IPV at the 3-year follow up (n=34). Similarly, 5% of Alaska Native mothers in Cohort 2 did not experience pregnancy violence but did report IPV at time 2 (n=34).

Table 30

Experiences of Interpersonal Violence Over Time for Alaska Native Mothers by Cohort

	TIME 1 ONLY (PRAMS)		SUSTAINED (TIME 1 + TIME 2)		TIME 2 ONLY (CUBS)	
COHORT 1	70%	n= 49	30%	n= 21	7%	n= 34
COHORT 2	87%	n= 54	13%	n= 8	5%	n= 34

5.2 Aim Two: Role of Stress

Aim 2, Figure 7: PRAMS Prenatal Care Cohort 1

Aim 2 investigates the role of stress surrounding interpersonal violence among Alaska Native mothers with the outcomes of prenatal care and social support. Figure 7 (pictured below) seeks to answer RQ2, addressing how stress and behavioral health are related to prenatal care for Alaska Native mothers in Cohort 1 PRAMS (2009-2011). This figure is split out into three logistic models modelling mothers who had less than 9 total prenatal care visits (7A), between 9-11 total prenatal care visits (7B), and more than 12 total prenatal care visits (7C), model comparison can be seen in Table 21. Separate logistic models were run as the present study is

more interested in predicting probabilities of each category of prenatal care rather than comparing model parameters. Further, a multinomial model of prenatal care in the present study would violate the independence of irrelevant alternatives assumption which could bias findings. While these models are presented in relation to the data points used, they are cross-sectional.

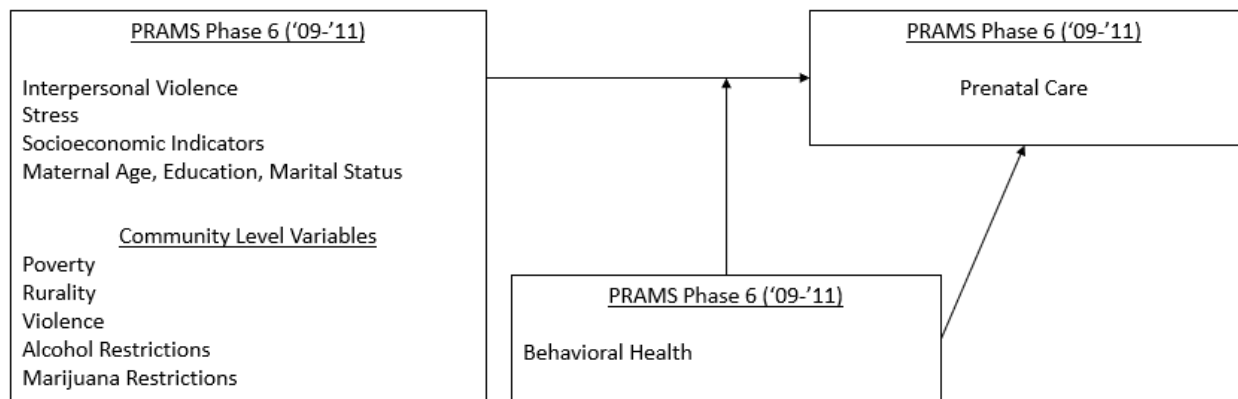


Figure 7. Cohort 1 PRAMS Cross-sectional Prenatal Care.

Figure 7A: Cohort 1 PRAMS Less than 9 Total Prenatal Care Visits

Outcome Variable: Prenatal Care. Prenatal care was provided as a grouped variable from vital records indicating the total number of prenatal care visits. Three categories of the variable were presented: <9, 9-11, and 12+. These were then dichotomized into three separate variables, with those who had less than 9 prenatal care visits coded as 1 and all others coded as 0 being used in the first model. A total of 1,191 Alaska Native mothers responded to the item, with 65 missing values. Approximately 55% (n=656) of Alaska Native mothers had less than 9 total prenatal care visits.

Bivariate Analysis

Each independent variable was tested with the dependent variable of less than 9 total prenatal care visits in order to assess bivariate associations. Interpersonal violence was significantly associated with prenatal care ($\beta = -0.20$, $SE = 0.09$, $p < .05$). Alaska Native mothers

who reported interpersonal violence surrounding their pregnancy were 1.42x less likely to have less than 9 total prenatal care visits (95% CI: 0.5-0.9). High stress levels were also associated with prenatal care ($\beta = -0.22$, SE= 0.07, $p < .01$). Alaska Native mothers who endorsed high stress levels were 1.6x less likely to report less than 9 total prenatal care visits (95% CI: 0.5-0.9).

While WIC use was not a significant association with prenatal care ($p = 0.49$), individual poverty was significantly related to prenatal care ($\beta = 0.46$, SE= 0.07, $p < .001$). Alaska Native mothers residing below the poverty line were 2.5x more likely to have less than 9 total prenatal care visits (95% CI: 1.9-3.3). Maternal age was not significantly associated with the outcome ($p = 0.61$); however, both marital status ($\beta = -0.15$, SE=0.06, $p < .01$) and maternal education level ($\beta = -0.21$, SE= 0.07, $p < .01$) were significantly associated with prenatal care. Married Alaska Native mothers and those with a high school education or equivalent were 1.42x less likely to have less than 9 total prenatal care visits (95% CI: 0.6-0.9; 0.5-0.9).

All community level variables were significantly associated with prenatal care. Residing in a violent community was significantly associated with the outcome ($\beta = 0.51$, SE= 0.11, $p < .001$). Alaska Native mothers residing in a community with a high crime rate were 2.7x more likely to have less than 9 total prenatal care visits (95% CI: 1.7-4.3). Similarly, both community level poverty ($\beta = 0.52$, SE=0.06, $p < .001$) and rurality ($\beta = 0.48$, SE= 0.07, $p < .001$) were significantly associated with prenatal care. Alaska Native mothers residing in communities with high levels of poverty were 2.8x more likely to have less than 9 total prenatal care visits (95% CI: 2.2-3.6) while those residing in rural communities were 2.6x more likely to experience the outcome (95% CI: 2.0-3.4). Residing in a community with alcohol restrictions was significantly associated with prenatal care ($\beta = 1.1$, SE= 0.12, $p < .001$). Those residing in a community with alcohol restrictions were 5.2x more likely to have less than 9 total prenatal care visits than those

who did not (95% CI: 3.9-6.8). Residing in a community with marijuana restrictions was significantly associated with the outcome ($\beta = -0.6$, $SE = 0.06$, $p < .001$). Alaska Native mothers residing in a community with marijuana restrictions were 3.3x less likely to have less than 9 total prenatal care visits (95% CI: 0.2-0.4).

Depression and anxiety and alcohol use were significantly associated with the outcome, while marijuana use ($p = 0.31$), tobacco use ($p = 0.73$), and alcohol use during pregnancy ($p = 0.55$) were not. Depression and anxiety were significantly associated with the outcome ($\beta = -0.23$, $SE = 0.10$, $p < .05$). Alaska Native mothers who reported experiencing depression or anxiety were 1.6x less likely to have less than 9 total prenatal care visits (95% CI: 0.4-0.9). Finally, alcohol use was significantly associated with the outcome ($\beta = -0.33$, $SE = 0.06$, $p < .001$). Alaska Native mothers who used alcohol within the previous 2 years were 2x less likely to have less than 9 total prenatal care visits (95% CI: 0.4-0.7).

Multicollinearity was assessed with the variance inflation factor (VIF). There was no problematic variance inflation for all included independent variables. Community poverty, community rurality, and community alcohol restrictions had VIF scores around 2, which do not rise to the level of concern.

Logistic Regression

All variables with significant bivariate associations were regressed on prenatal care. The overall model was statistically significant with the likelihood ratio being ($X^2 (15, n=681) = 8.49$, $p < .001$). Only individual level poverty ($\beta = 0.3$, $SE = 0.1$, $p < .01$), community rurality ($\beta = 0.27$, $SE = 0.12$, $p < .05$), and community alcohol restrictions ($\beta = 1.1$, $SE = 0.42$, $p < .01$) were significantly associated with prenatal care. Alaska Native mothers residing below the federal poverty line were 1.8x more likely to have less than 9 total prenatal care visits (95% CI: 1.2-2.7).

Alaska Native mothers residing in rural communities were 1.7x more likely to have less than 9 total prenatal care visits (95% CI: 1.1-2.8). Finally, Alaska Native mothers residing in communities with alcohol restrictions were 2.6x more likely to have less than 9 total prenatal care visits (95% CI: 1.4-4.8). The max rescaled R^2 is 0.21, indicating individual poverty, community rurality, and community alcohol restrictions account for 21% of the variance explained in prenatal care. The c-statistic is 0.71, indicating a fair model fit. No behavioral health variables were significantly associated with the outcome, thus no tests for mediators or moderators were run. See Table 31 on page 136 for full model comparison.

Figure 7B: Cohort 1 PRAMS Between 9-11 Total Prenatal Care Visits

Outcome Variable: Prenatal Care. Prenatal care was provided as a grouped variable from vital records indicating the total number of prenatal care visits. Three categories of the variable were presented: <9, 9-11, and 12+. These were then dichotomized into three separate variables, with those who had between 9 to 11 prenatal care visits coded as 1 and all others coded as 0 for the second model. A total of 1,191 Alaska Native mothers responded to the item, with 65 missing values. Approximately 24% (n=290) of Alaska Native mothers had between 9-11 total prenatal care visits.

Bivariate Analysis

Associations with each independent variable were tested with the dependent variable indicating between 9-11 total prenatal care visits compared to less or more in order to assess bivariate associations. The majority of independent variables of interest were not significantly associated with the outcome of interest. Interpersonal violence (p=0.28), WIC use (p=0.22), and individual poverty (p=0.16) were not associated with prenatal care. All maternal demographics were not significantly associated with prenatal care: marital status (p=0.8), education level

($p=0.69$), and maternal age ($p=0.13$). Finally, all behavioral health variables were not significantly associated with prenatal care: depression and anxiety ($p=0.49$), alcohol use during pregnancy ($p=0.42$) and within the past 2 years ($p=0.09$), marijuana use ($p=0.08$) and tobacco use ($p=0.45$).

The majority of community level variables were associated with the outcome except for community violence ($p=0.82$). Community level poverty was significantly associated with prenatal care ($\beta = -0.23$, $SE = 0.07$, $p < .001$). Alaska Native mothers residing in high poverty communities were 1.6x less likely to report having between 9-11 total prenatal care visits (95% CI: 0.5-0.8). Alaska Native mothers residing in rural communities were also 1.6x less likely to report having 9-11 total prenatal care visits ($\beta = -0.22$, $SE = 0.07$, $p < .01$; 95% CI: 0.5-0.9). Residing in a community with alcohol restrictions was significantly associated with prenatal care ($\beta = -0.65$, $SE = 0.13$, $p < .001$). Alaska Native mothers who lived in a community with alcohol restrictions were 2.5x less likely to report having between 9-11 total prenatal care visits (95% CI: 0.3-0.6). Lastly, community marijuana restrictions were associated with the outcome of interest ($\beta = 0.36$, $SE = 0.07$, $p < .001$). Alaska Native mothers residing in a community with marijuana restrictions were 2x more likely to report having between 9-11 total prenatal care visits (95% CI: 1.6-2.7). Multicollinearity was assessed with the variance inflation factor (VIF). There was no problematic variance inflation for all included independent variables. Community poverty, community rurality, and community alcohol restrictions had VIF scores around 2, which do not rise to the level of concern but will be watched in the final model.

Logistic Regression

All significantly associated independent variables based upon bivariate analyses were regressed on prenatal care as defined with a normative range of prenatal care visits. The overall

model was statistically significant with the likelihood ratio being (X^2 (6, $n=988$) = 6.73, $p<.001$). Community level marijuana restrictions was the only significant association with prenatal care ($\beta= 0.21$, $SE= 0.10$, $p<.05$). Alaska Native mothers residing in a community with marijuana restrictions were 1.5x more likely to have between 9-11 total prenatal care visits (95% CI: 1.0-2.3). The max rescaled R^2 is 0.052, indicating community marijuana restrictions account for 5% of the variance explained in 9-11 prenatal care visits. Finally, the c-statistic is 0.59 indicating a rather poor model fit. Again, no behavioral health variables were significantly associated with the outcome, so no tests for mediations and moderations were run. See Table 31 on page 136 for full model comparison.

Figure 7C: Cohort 1 PRAMS More than 12 Total Prenatal Care Visits

Outcome Variable: Prenatal Care. The final model assessed what predicted those who had 12+ prenatal care visits coded as 1 and all others coded as 0. A total of 1,191 Alaska Native mothers responded to the item, with 65 missing values. Approximately 21% ($n=245$) of Alaska Native mothers had more than 12 total prenatal care visits.

Bivariate Analysis

Each independent variable was tested with the dependent variable of 12 or more total prenatal care visits in order to assess bivariate associations. Interpersonal violence ($p=0.11$) and high stress ($p=0.29$) were not significantly associated with the outcome. While WIC use was not related to prenatal care ($p=0.97$), individual poverty was significantly associated with the outcome ($\beta= -0.47$, $SE= 0.08$, $p<.001$). Alaska Native mothers residing below the federal poverty line were 2.6x less likely to have 12 or more total prenatal care visits (95% CI: 0.3-0.5).

All maternal demographics were significantly related to the outcome of interest. Maternal marital status was significantly associated with prenatal care ($\beta= 0.20$, $SE= 0.07$, $p<.01$). Married

Alaska Native mothers were 1.5x more likely to have 12 or more prenatal care visits (95% CI: 1.1-2.0). Maternal education level was significantly associated with the outcome ($\beta=0.29$, SE= 0.09, $p<.001$). Alaska Native mothers with a high school education or equivalent were 1.8x more likely to have 12 or more total prenatal care visits (95% CI: 1.3-2.5). Maternal age was also significantly associated with the outcome ($\beta= 0.12$, SE= 0.05, $p<.05$). Older Alaska Native mothers were 1.1x more likely to have 12 or more total prenatal care visits (95% CI: 1.0-1.3).

The majority of community level variables were significantly associated with the outcome of interest except community violence ($p=0.46$) and community alcohol restrictions ($p=0.21$). Residing in a high poverty community ($\beta= -0.49$, SE= 0.08, $p<.001$) and a rural community ($\beta= -0.4$, SE=0.07, $p<.001$) were both significantly associated with prenatal care. Alaska Native mothers residing in high poverty communities (95% CI: 0.3-0.5) and those residing in rural communities (95% CI: 0.3-0.6) were both 2.5x less likely to have 12 or more total prenatal care visits. Conversely, those residing in a community with marijuana restrictions were 2.5x more likely to have 12 or more total prenatal care visits ($\beta= 0.46$, SE=0.07, $p<.001$; 95% CI: 1.9-3.4).

Most behavioral health variables were not significantly associated with prenatal care except depression and anxiety ($\beta= 0.36$, SE= 0.11, $p<.001$) and alcohol use ($\beta= 0.37$, SE=0.08, $p<.001$). Alaska Native mothers with depression and anxiety (95% CI: 1.4-3.1) and those who reported alcohol use (95% CI: 1.5-2.9) were both 2.1x more likely to have 12 or more total prenatal care visits. Alcohol use during pregnancy ($p=0.89$), marijuana use ($p=0.51$), and tobacco use ($p=0.23$) were not significantly associated with prenatal care.

Multicollinearity was assessed with the variance inflation factor (VIF). There was no problematic variance inflation for all included independent variables. Community poverty and

community rurality had VIF scores around 2, which do not rise to the level of concern but will be watched in the final model.

Logistic Regression

All significantly associated independent variables based upon bivariate analyses were regressed on prenatal care. The overall model was statistically significant with the likelihood ratio being (X^2 (9, n=801) = 9.08, $p < .001$). Only individual level poverty ($\beta = -0.31$, $SE = 0.09$, $p < .001$) and alcohol use ($\beta = 0.25$, $SE = 0.10$, $p < .05$) were significantly associated with prenatal care. Alaska Native mothers residing below the federal poverty line were 2x less likely to report having 12 or more total prenatal care visits (95% CI: 0.4-0.8). Alaska Native mothers who reported alcohol use within the previous two years were 1.7x more likely to report having 12 or more total prenatal care visits (95% CI: 1.1-2.5). The max rescaled $R^2 = 0.13$, indicating that individual level poverty and alcohol use account for roughly 13% of the variance explained in prenatal care. The c-statistic is 0.69, indicating a rather poor model fit. See Table 31 below for full model comparison.

Table 31

Cohort 1 PRAMS Cross-Sectional Regression on Prenatal Care

	Figure 7A < 9			Figure 7B 9 – 11			Figure 7C 12 +		
Measure	β	SE	OR	β	SE	OR	β	SE	OR
Individual									
Poverty	0.3**	0.1	1.8				-0.3***	0.1	0.5
Alcohol Use							0.3*	0.1	1.7
Community									
Rurality	0.3*	0.1	1.7						
Alcohol Restrictions	1.1**	0.4	2.6						
Marijuana Restrictions				0.2*	0.1	1.5			

Note: * $< .05$, ** $< .01$, *** $< .001$

Aim 2, Figure 8: PRAMS Prenatal Care Cohort 2

Aim 2 investigates the role of stress surrounding interpersonal violence among Alaska Native mothers with the outcomes of prenatal care and social support using the Cohort two which was sampled approximately 5 years later. Figure 8 (pictured below) seeks to answer RQ2, addressing how stress and behavioral health are related to prenatal care for Alaska Native mothers in Cohort 2 PRAMS (2012-2015). This figure is split out into three logistic models modelling mothers who had less than 9 total prenatal care visits (8A), between 9-11 total prenatal care visits (8B), and more than 12 total prenatal care visits (8C), model comparison below in Table 22. While these models are cross-sectional, they provide valuable insight into the experiences of Alaska Native mothers directly surrounding their pregnancies.

Figure 8. Cohort 2: Cross-sectional PRAMS Prenatal Care for Aim 2

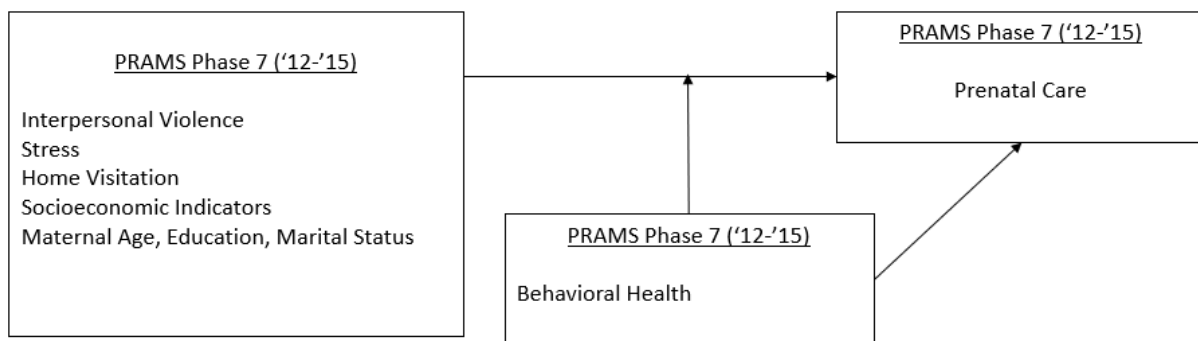


Figure 8. Cohort 2 PRAMS Cross-sectional Prenatal Care.

Figure 8A: Cohort 2 PRAMS Less than 9 Total Prenatal Care Visits

Outcome Variable: Prenatal Care. Prenatal care is provided from vital records as a grouped variable (<9, 9-11, 12+) totaling the number of prenatal care visits. These were then dichotomized into three separate variables, with those who had less than 9 prenatal care visits coded as 1 and all others coded as 0. A total of 1,691 Alaska Native mothers were included in the

item, with 47 missing values. Approximately 42% (n=707) of Alaska Native mothers had less than 9 total prenatal care visits.

Bivariate Analysis

Each independent variable was tested with the dependent variable of less than 9 total prenatal care visits in order to assess bivariate associations. Stress was significantly associated with the outcome ($\beta = -0.1$, $SE = 0.05$, $p < .05$). Alaska Native mothers with high levels of stress were 1.25x less likely to have less than 9 total prenatal care visits (95% CI: 0.7-0.9).

Interpersonal violence was not significantly associated with prenatal care ($p = 0.59$). Poverty was significantly associated with the outcome ($\beta = 0.4$, $SE = 0.05$, $p < .001$). Alaska Native mothers experiencing poverty were 2.1x more likely to report having less than 9 total prenatal care visits (95% CI: 1.7-2.5). Home visitation was not significantly associated with having less than 9 total prenatal care visits ($p = 0.3$).

Each maternal covariate was significantly associated with the outcome of interest. Married Alaska Native mothers ($\beta = -0.3$, $SE = 0.05$, $p < .001$; 95% CI: 0.4-0.6) and those with a high school education or equivalent ($\beta = -0.4$, $SE = 0.06$, $p < .001$; 95% CI: 0.4-0.6) were both 2x less likely to have less than 9 total prenatal care visits. Similarly, maternal age was significantly associated with prenatal care ($\beta = -0.2$, $SE = 0.04$, $p < .001$). Older Alaska Native mothers were 1.25x less likely to have less than 9 total prenatal care visits (95% CI: 0.7-0.9).

The majority of behavioral health variables were not significantly associated with the outcome except depression and anxiety ($\beta = -0.14$, $SE = 0.07$, $p < .05$) and alcohol use ($\beta = -0.3$, $SE = 0.05$, $p < .001$). Alaska Native mothers with depression or anxiety were 1.4x less likely to have less than 9 total prenatal care visits. Similarly, Alaska Native mothers who used alcohol were 2x less likely to have less than 9 total prenatal care visits (95% CI: 0.4-0.6). Maternal

depression ($p=0.42$), tobacco use ($p=0.49$), and marijuana use ($p=0.16$) were not significantly associated with prenatal care. Multicollinearity was assessed with the variance inflation factor (VIF). There was no problematic variance inflation for all included independent variables.

Logistic Regression

All significantly associated independent variables based upon bivariate analyses were regressed on prenatal care. The overall model was statistically significant with the likelihood ratio being ($X^2 (7, n=1,543) = 16.9, p<.001$). Poverty, marital status, depression and anxiety, and alcohol use were all significantly associated with having less than 9 total prenatal care visits. Poverty was significantly associated with prenatal care ($\beta = 0.2, SE = 0.06, p<.001$). Alaska Native mothers experiencing poverty were 1.6x more likely to report having less than 9 total prenatal care visits (95% CI: 1.3-2.0). Married Alaska Native mothers were 1.42x less likely to have less than 9 total prenatal care visits ($\beta = -0.2, SE = 0.06, p<.01$; 95% CI: 0.5-0.9). Depression and anxiety were significantly associated with prenatal care ($\beta = -0.2, SE = 0.08, p<.01$). Alaska Native mothers with depression or anxiety were also 1.42x less likely to have less than 9 total prenatal care visits (95% CI: 0.5-0.9). Finally, alcohol use was significantly associated with prenatal care ($\beta = -0.2, SE = 0.06, p<.001$). Alaska Native mothers who reported alcohol use within the previous 2 years were 1.6x less likely to report having less than 9 total prenatal care visits (95% CI: 0.5-0.8). The max-rescaled $R^2 = 0.09$, indicating that poverty, marital status, depression and anxiety, and alcohol use account for roughly 9% of the variance explained in having less than 9 total prenatal care visits. The c-statistic is 0.64 indicating a rather poor model fit. See Table 32 on page 143 for full model comparison.

Figure 8B: Cohort 2 PRAMS Between 9-11 Total Prenatal Care Visits

Outcome Variable: Prenatal Care. Prenatal care is provided from vital records as a grouped variable (<9, 9-11, 12+) totaling the number of prenatal care visits. A total of 1,691 Alaska Native mothers responded to the item, with 47 missing values. Approximately 26% (n=441) of Alaska Native mothers had between 9-11 total prenatal care visits.

Bivariate Analysis

Each independent variable was tested with the dependent variable of between 9-11 total prenatal care visits in order to assess bivariate associations. None of the examined variables were associated with having between 9-11 total prenatal care visits. Home visitation was not significantly associated with having 9-11 total prenatal care visits ($p=0.16$). High stress ($p=0.47$), poverty ($p=0.64$) and interpersonal violence ($p=0.74$) were not significantly associated with prenatal care. Similarly, all maternal covariates were not associated with the outcome: marital status ($p=0.10$), maternal age ($p=0.06$), and maternal education level ($p=0.94$). Finally, all behavioral health variables were not significantly related with prenatal care: depression ($p=0.15$), anxiety ($p=0.80$), alcohol use ($p=0.09$), tobacco use ($p=0.46$), and marijuana use ($p=0.61$). Given the lack of bivariate associations no further analyses were run with 9-11 total prenatal care visits as the outcome. See Table 32 on page 143 for full model comparison.

Figure 8C: Cohort 2 PRAMS More than 12 Total Prenatal Care Visits

Outcome Variable: Prenatal Care. Prenatal care is provided from vital records as a grouped variable (<9, 9-11, 12+) totaling the number of prenatal care visits. A total of 1,691 Alaska Native mothers responded to the item, with 47 missing values. Approximately 32% (n=543) of Alaska Native mothers had more than 12 total prenatal care visits.

Bivariate Analysis

Each independent variable was tested with the dependent variable of 12 or more total prenatal care visits in order to assess bivariate associations. High stress ($p=0.16$) and interpersonal violence ($p=0.38$) were not significantly related to prenatal care. Poverty was significantly associated with prenatal care ($\beta = -0.4$, $SE = 0.05$, $p < .001$). Alaska Native mothers experiencing poverty were 2x less likely to have more than 12 total prenatal care visits (95% CI: 0.4-0.6). Home visitation was significantly associated with prenatal care ($\beta = 0.19$, $SE = 0.08$, $p < .05$). Alaska Native mothers who had a home visitor come to their home to help them learn how to take care of themselves or their new baby were 1.5x more likely to have more than 12 total prenatal care visits (95% CI: 1.1-2.0).

Each maternal demographic covariate was significantly associated with the outcome of interest. Marital status was related to prenatal care ($\beta = 0.2$, $SE = 0.05$, $p < .001$). Married Alaska Native mothers were 1.6x more likely to have more than 12 total prenatal care visits (95% CI: 1.3-2.0). Similarly, maternal age was significantly related to prenatal care ($\beta = 0.2$, $SE = 0.04$, $p < .001$). Older Alaska Native mothers were 1.2x more likely to have more than 12 total prenatal care visits (95% CI: 1.1-1.3). Finally, maternal education was significantly related to prenatal care ($\beta = 0.5$, $SE = 0.07$, $p < .001$). Alaska Native mothers with a high school education or equivalent were 2.6x more likely to have 12 or more total prenatal care visits (95% CI: 1.9-3.5).

The majority of behavioral health variables were significantly associated with the outcome except tobacco use ($p=0.19$) and marijuana use ($p=0.33$). Maternal depression was significantly associated with prenatal care ($\beta = 0.2$, $SE = 0.09$, $p < .05$). Alaska Native mothers who reported feeling depressed were 1.5x more likely to have more than 12 total prenatal care visits (95% CI: 1.0-2.1). Similarly, depression or anxiety were significantly related to prenatal care ($\beta =$

0.1, SE= 0.07, $p < .05$). Alaska Native mothers who endorsed feelings of depression or anxiety were 1.3x more likely to report having more than 12 total prenatal care visits (95% CI: 1.0-1.7). Finally, alcohol use was significantly related to the outcome ($\beta = 0.3$, SE= 0.06, $p < .001$). Alaska Native mothers who reported alcohol use within the previous 2 years were 1.7x more likely to report having more than 12 total prenatal care visits (95% CI: 1.4-2.1). Multicollinearity was assessed with the variance inflation factor (VIF). There was no problematic variance inflation for all included independent variables.

Logistic Regression

All significantly associated independent variables based upon bivariate analyses were regressed on prenatal care. The overall model was statistically significant with the likelihood ratio being (X^2 (8, $n=1,549$) = 13.64, $p < .001$). Home visitation, poverty, marital status, education level, and alcohol use were all significantly associated with prenatal care. Home visitation was significantly associated with prenatal care ($\beta = 0.19$, SE= 0.09, $p < .05$). Alaska Native mothers who had a home visitor come to their home to help them learn how to take care of themselves or their new baby were 1.5x more likely to have more than 12 total prenatal care visits (95% CI: 1.1-2.1). Alaska Native mothers experiencing poverty were 1.6x less likely to report having more than 12 total prenatal care visits ($\beta = -0.2$, SE= 0.06, $p < .001$; 95% CI: 0.5-0.8). Maternal marital status ($\beta = 0.2$, SE= 0.06, $p < .01$) and alcohol use ($\beta = 0.2$, SE= 0.06, $p < .01$) were significantly related to prenatal care; both married Alaska Native mothers (95% CI: 1.1-1.7) and those who reported alcohol use within the previous 2 years (95% CI: 1.1-1.8) were 1.4x more likely to report having more than 12 total prenatal care visits. Finally, maternal education level was significantly associated with prenatal care ($\beta = 0.3$, SE= 0.08, $p < .001$). Alaska Native mothers with a high school education or equivalent were 1.8x more likely to have more than 12 total

prenatal care visits (95% CI: 1.3-2.6). The max-rescaled $R^2 = 0.08$, indicating that home visitation, poverty, marital status, education level, and alcohol use account for roughly 8% of the variance explained within prenatal care. The c-statistic is 0.64 indicating a rather poor model fit. See Table 32 below for full model comparison.

Table 32

Cohort 2 PRAMS Cross-Sectional Regression on Prenatal Care

Measure	Figure 8A <9			Figure 8B 9-11			Figure 8C 12+		
	β	SE	OR	β	SE	OR	β	SE	OR
Poverty	0.2***	0.1	1.6				-0.2***	0.1	0.6
Married	-0.2**	0.1	0.7				0.2**	0.1	1.4
Depression or Anxiety	-0.2**	0.1	0.7						
Alcohol Use	-0.2**	0.1	0.6				0.2**	0.1	1.4
HS Education							0.3***	0.1	1.8
Home Visitation							0.2*	0.09	1.5

Note: * $<.05$, ** $<.01$, *** $<.001$

Aim 2, Figure 9: CUBS Social Support Cohort 1

Aim 2 investigates the role of stress surrounding interpersonal violence among Alaska Native mothers with the outcomes of prenatal care and social support. Figure 9 (pictured on the following page) seeks to answer RQ3, addressing how stress and behavioral health are related to social support for Alaska Native mothers in Cohort 1 CUBS (2012-2014). While these models are cross-sectional, they provide valuable insight into the experiences of Alaska Native mothers at Time 2 CUBS.

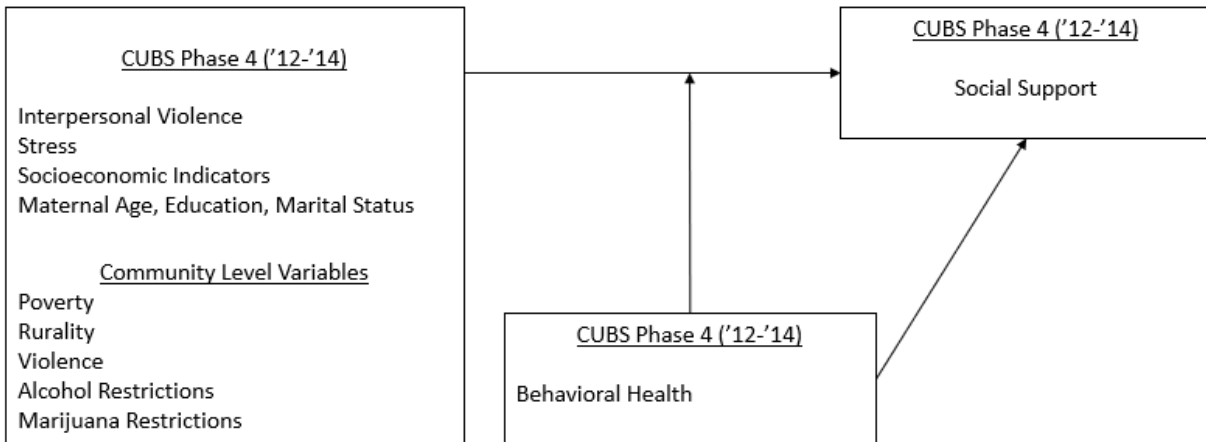


Figure 9. Cohort 1 CUBS Cross-sectional Social Support.

Outcome Variable: Social Support

Four main items assess maternal social support within Cohort 1 of CUBS, including items such as *loaning money, help when sick, getting a ride to the doctors' office, and having someone to listen if they need to talk*. For those who indicated yes to all four items, social support was coded as high (yes). Those with less than 4 items were coded as low social support (no). a total of 585 Alaska Native mothers responded to these items, with no missing values.

Approximately 63% (n=369) reported high levels of social support.

Bivariate Associations

Each independent variable was tested with the dependent variable of social support to assess associations. Interpersonal violence was significantly associated with social support ($\beta = -0.55$, $SE = 0.15$, $p < .001$). Alaska Native mothers who reported experiencing physical or psychological violence within the past 12 months were 2.9x less likely to report having high levels of social support (95% CI: 0.19-0.60). Having a high stress level was not significantly associated with social support ($p = 0.93$).

The majority of socioeconomic status indicator variables were significantly related to social support, except utilizing the school lunch program ($p = 0.71$) and receiving childcare

assistance ($p=0.99$). Living below the poverty line was significantly associated with social support ($\beta = -0.7$, $SE = 0.11$, $p < .001$). Alaska Native mothers who live below the poverty line were 4x less likely to report having high levels of social support (95% CI: 0.16-0.38). WIC usage was significantly associated with social support ($\beta = -0.38$, $SE = 0.09$, $p < .001$). Alaska Native mothers who utilize WIC were 2x less likely to report having high levels of social support (95% CI: 0.32-0.68). Both food stamps ($\beta = -0.39$, $SE = 0.09$, $p < .001$) and food bank ($\beta = -0.35$, $SE = 0.15$, $p < .05$) use were significantly associated with social support. Alaska Native mothers who reported using food stamps within the past 3 months were 2.2x less likely to report high levels of social support (95% CI: 0.32-0.66) while Alaska Native mothers who reported accessing a food bank within the past 3 months were 2x less likely to report high levels of social support (95% CI: 0.28-0.88).

Both maternal marital status and maternal education level were related to the outcome of interest, while maternal age was not ($p=0.07$). Marital status was significantly associated with social support ($\beta = 0.27$, $SE = 0.1$, $p < .01$). Married Alaska Native mothers were 1.7x more likely to report having high levels of social support (95% CI: 1.2-2.5). Maternal education level was significantly associated with social support ($\beta = 0.46$, $SE = 0.12$, $p < .001$). Alaska Native mothers with a high school equivalent or higher were 2.5x more likely to report having a high level of social support (95% CI: 1.6-4.1).

All community level variables were significantly associated with social support. Residing in a rural area was significantly associated with social support ($\beta = -0.4$, $SE = 0.1$, $p < .001$). Alaska Native mothers residing in rural areas were 2.2x less likely to report having high levels of social support (95% CI: 0.31-0.66). Residing in a high poverty area was significantly associated with social support ($\beta = -0.38$, $SE = 0.09$, $p < .001$). Alaska Native mothers residing in high poverty

communities were 2.1x less likely to report having a high level of social support (95% CI: 0.33-0.67). Residing in a community with alcohol restrictions was significantly associated with social support ($\beta = -0.65$, $SE = 0.17$, $p < .001$). Alaska Native mothers residing in dry counties were 2.5x less likely to report having a high level of social support (95% CI: 0.3-0.6). Similarly, residing in a community with marijuana restrictions was also significantly associated with social support ($\beta = 0.23$, $SE = 0.09$, $p < .05$). Alaska Native mothers residing in communities with marijuana restrictions were 1.6x more likely to report high levels of social support (95% CI: 1.1-2.3).

Finally, the majority of behavioral health variables were not significantly associated with the outcome of interest. Tobacco use ($p = 0.34$), maternal mental health ($p = 0.07$), and seeking treatment for depression ($p = 0.94$) all were not significantly associated with social support among Alaska Native mothers. Maternal depression was significantly associated with social support ($\beta = -0.38$, $SE = 0.15$, $p < .01$). Alaska Native mothers who reported being diagnosed with depression since their 3-year-old baby was born were 2x less likely to report having a high level of social support (95% CI: 0.27-0.84). Alcohol use was significantly associated with social support ($\beta = 0.22$, $SE = 0.07$, $p < .01$). Among Alaska Native mothers who reported using alcohol within the past 30 days, those who drank more frequently were 1.2x more likely to report having high levels of social support (95% CI: 1.1-1.4). All significant variables were assessed for multicollinearity. There was no problematic multicollinearity, however rurality, poverty, and alcohol restrictions all had VIF scores around 2.5. These do not rise to the level of concern but will be monitored within the full regression model.

Logistic Regression

All significant bivariate association variables were regressed on social support, as seen in Table 33 on the following page. The overall model was statistically significant, with the

likelihood ratio being ($X^2(14, n=477) = 5.82, p < .001$), with approximately 107 missing values. Individual poverty was significantly associated with social support ($\beta = -0.6, p < .001$). Alaska Native mothers with households below the poverty line were 3.3x less likely to report having a high level of social support (95% CI: 0.17-0.54). Residing in a rural area was significantly associated with social support ($\beta = -0.38, p < .05$). Alaska Native mothers residing in rural communities were 2x less likely to report having a high level of social support (95% CI: 0.23-0.98). Community level alcohol restrictions were associated with social support ($\beta = -0.56, p < .05$). Alaska Native mothers who resided in dry counties, or boroughs with total alcohol restrictions/bans, were 1.6x less likely to report having a high level of social support (95% CI: 0.24-1.3). Finally, depression was significantly associated with social support ($\beta = -0.42, p < .05$). Alaska Native mothers who were diagnosed with depression since their 3-year-old baby was born were 2.5x less likely to report having a high level of social support (95% CI: 0.22-0.87). The max rescaled R^2 is 0.2073, indicating individual poverty, community rurality and alcohol restrictions, and maternal depression diagnosis account for approximately 21% of the variance explained in social support. The c-statistic is 0.723, indicating a moderately acceptable fit.

Table 33

Cohort 1 CUBS Cross-Sectional Regression on High Levels of Social Support

Measure	β	SE	Exp(β)	95% CI
<u>Individual</u>				
Poverty	-0.6***	0.11	0.3	0.17 – 0.54
Depression	-0.42*	0.15	0.4	0.22 – 0.87
<u>Community</u>				
Rural	-0.38*	0.10	0.5	0.23 – 0.98
Alcohol Restrictions	-0.56*	0.17	0.6	0.24 – 1.3

Note: $p < .05$ *, $p < .01$ **, $p < .001$ ***. ($X^2(14, n=477) = 5.82, p < .001$), $R^2 = 0.21$, c-statistic = 0.72.

Testing for Mediations and Moderations

When the interaction of depression diagnosis and interpersonal violence was added to the model, the only significant association remained with individual poverty. The overall model was statistically significant ($X^2(15, n=477) = 5.64, p < .001$), with approximately 107 missing values. Individual poverty was significantly associated with social support ($\beta = -1.19, SE = 0.29, p < .001$). Alaska Native mothers with households below the poverty line were 3.3x less likely to report having a high level of social support (95% CI: 0.17-0.54). Finally, a mediation effect was tested for the relationship between interpersonal violence and social support. Depression diagnosis was tested as the mediator for this relationship but was not statistically significant.

Aim 2, Figure 10: CUBS Social Support Cohort 2

Aim 2 investigates the role of stress surrounding interpersonal violence among Alaska Native mothers with the outcomes of prenatal care and social support. Figure 10 (pictured below) seeks to answer RQ3, addressing how stress and behavioral health are related to social support for Alaska Native mothers in Cohort 2CUBS (2015-2018). While these models are cross-sectional, they provide valuable insight into the experiences of Alaska Native mothers at Time 2 CUBS.

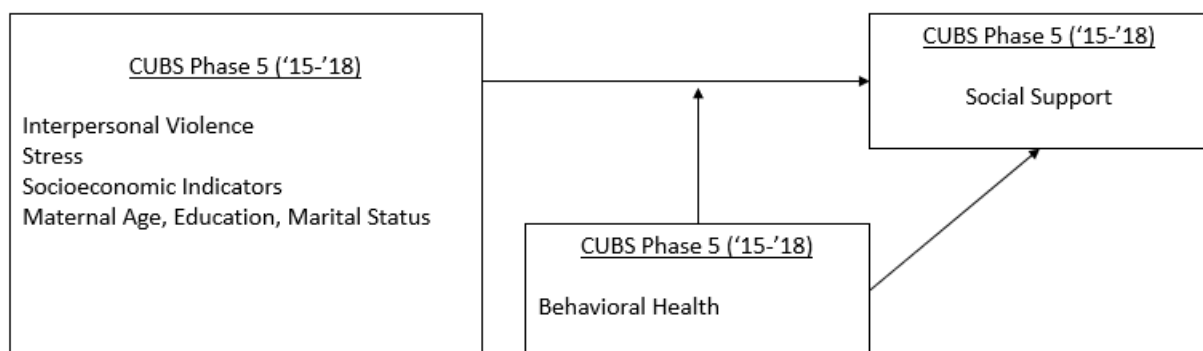


Figure 10. Cohort 2 CUBS Cross-sectional Social Support.

Outcome Variable: Social Support

Four items assess maternal social support through the following statements: *I know someone who would... 1) listen to me if I needed to talk; 2) loan me money for bills if I needed it; 3) take me to the clinic or doctor's office if I needed a ride; 4) help me if I was sick and needed to be in bed. (yes/no)*. These four questions were totaled and dichotomized into high vs low levels of social support. Respondents who responded affirmatively to all four measures were coded as high social support, while those with 0-3 affirmative responses were coded as low social support. A total of 821 Alaska Native mothers responded to these items, with 26 missing values. The majority of Alaska Native mothers indicated high levels of social support (64%, n=529).

Bivariate Associations

Each independent variable was tested with the dependent variable of social support to assess associations. Interpersonal violence ($p=0.13$) and high levels of stress ($p=0.51$) were not significantly associated with social support. Several socioeconomic status indicator variables were significantly associated with the outcome of interest except for free or reduced school lunch ($p=0.87$). Poverty was significantly associated with level of social support ($\beta = -0.51$, $SE = 0.09$, $p < .001$). Alaska Native mothers experiencing poverty were 2.7x less likely to have high levels of social support (95% CI: 0.3-0.5). Accessing a food bank or pantry ($\beta = -0.36$, $SE = 0.12$, $p < .01$) and using food stamps ($\beta = -0.46$, $SE = 0.08$, $p < .001$) were both significantly associated with social support. Alaska Native mothers who have accessed a food bank or pantry were 2x less likely to have high levels of social support (95% CI: 0.3-0.8) while those who used food stamps were 2.5x less likely to have high levels of social support (95% CI: 0.3-0.5). Similarly, WIC use was significantly associated with the outcome ($\beta = -0.4$, $SE = 0.08$, $p < .001$). Alaska Native

mothers who reported using WIC were 2.3x less likely to report having a high level of social support (95% CI:0.3-0.6).

Each maternal covariate was significantly associated with the outcome. Marital status was significantly associated with social support ($\beta = 0.26$, $SE = 0.08$, $p < .001$). Married Alaska Native mothers were 1.7x more likely to report having high levels of social support (95% CI:1.2-2.3). Maternal age was significantly associated with the outcome of interest ($\beta = 0.15$, $SE = 0.06$, $p < .05$). Older Alaska Native mothers were 1.2x more likely to report high levels of social support than younger mothers (95% CI:1.0-1.3). Finally, maternal education was significantly associated with social support ($\beta = 0.31$, $SE = 0.12$, $p < .01$). Alaska Native mothers with a high school education or equivalent were 1.9x more likely to report having a high level of social support than mothers who did not (95% CI:1.2-2.9).

The majority of behavioral health variables were not significantly associated with social support. Visiting a healthcare worker to talk about depression ($p = 0.77$), tobacco use ($p = 0.30$), and marijuana use ($p = 0.06$) were not significantly associated with the outcome of interest. Feeling down, depressed, or sad were significantly associated with social support ($\beta = 0.17$, $SE = 0.08$, $p < .05$). Alaska Native mothers who reported feeling down, depressed, or sad were 1.4x more likely to report high levels of social support (95% CI: 1.0-1.9). Similarly, loss of interest or pleasure was significantly associated with social support ($\beta = 0.30$, $SE = 0.08$, $p < .001$). Alaska Native mothers who reported feeling loss of interest or pleasure in things they once enjoyed were 1.8x more likely to report high levels of social support (95% CI:1.3-2.6). Multicollinearity was assessed with the variance inflation factor (VIF). There was no problematic variance inflation for all included independent variables.

Logistic Regression

Socioeconomic status indicator variables, maternal covariates, and mental health measures were regressed on social support. The overall model was statistically significant with the likelihood ratio being ($X^2(9, n=701) = 8.81, p<.001$). WIC use and loss of interest were both significantly related to high levels of social support, as seen in Table 34 below. Alaska Native mothers who utilized WIC were 1.6x less likely to report high levels of social support ($\beta = -0.2$, $SE = 0.1$, $p<.05$; 95% CI: 0.4-0.9). Loss of interest was significantly associated with social support ($\beta = 0.29$, $SE = 0.11$, $p<.01$). Alaska Native mothers who reported loss of interest or pleasure in doing things they once enjoyed were 1.8x more likely to report high levels of social support (95% CI: 1.2-2.7). The max rescaled $R^2 = 0.14$, indicating that WIC use and loss of interest account for 14% of the variance explained in social support among Alaska Native mothers. The receiver operating statistic is fairly weak ($c=0.69$) indicating poor model fit.

Table 34

Cohort 2 CUBS Cross-Sectional Regression on High Levels of Social Support

Measure	β	SE	Exp(β)	95% CI
WIC	-0.2*	0.10	0.6	0.14 – 0.90
Loss Interest or Pleasure	0.29**	0.11	1.8	1.20 – 2.70

Note: $p<.05$ *, $p<.01$ **, $p<.001$ ***. ($X^2(9, n=701) = 8.81, p<.001$), $R^2 = 0.14$, c-statistic = 0.69.

Testing for Mediations and Moderations

Several interaction terms were tested as possible moderations; however, none achieved statistical significance. Similarly, the main mediating relationship between interpersonal violence and social support was not significant despite several attempts with behavioral health variables according to the proposed conceptual model.

5.3 Aim Three: Intergenerational Impacts of Trauma

Aim 3, Figure 11: PRAMS Neonatal Outcomes Cohort 1

Aim 3 examines several indicators of intergenerational trauma among children of Alaska Native mothers. Figure 11 (pictured below) seeks to answer RQ4, examining neonatal outcomes among children of Alaska Native mothers in Cohort 1 (2009-2011). While this model is cross-sectional, it provides insight into birth outcomes at Time 1 and their potential relation to various maternal level indicators.

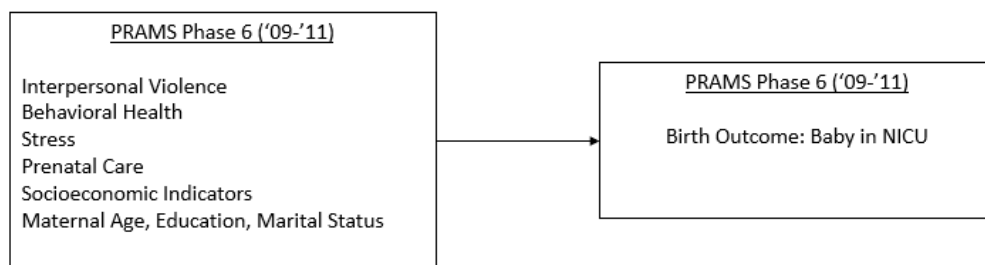


Figure 11. Cohort 1 PRAMS Cross-sectional Child Neonatal Outcomes.

Outcome Variable: Baby in Neonatal Intensive Care Unit (NICU)

Child neonatal outcomes are assessed by the question, *After your baby was born was he or she put in an intensive care unit? (yes/no)*. A total of 1,167 Alaska Native mothers responded to the question, with 69 missing values. Roughly 20% (n=234) of Alaska Native mothers indicated that their baby was put in an ICU when they were born.

Bivariate Associations

Each independent variable was tested with the dependent variable of having a baby in the neonatal intensive care unit (NICU). Experiencing interpersonal violence before pregnancy was not significantly related to having a baby in the NICU ($p=0.43$). Experiencing interpersonal violence during pregnancy was significantly associated with having a baby in the NICU ($\beta=0.46$, $SE=0.13$, $p<.001$). Alaska Native mothers who reported experiencing interpersonal violence

during their pregnancy were 2.5x more likely to have their baby in the NICU upon birth (95% CI: 1.5-4.2).

The majority of behavioral health variables were not significantly associated with having a baby in the NICU. Depression and anxiety ($p=0.80$), postpartum depression ($p=0.13$), alcohol use ($p=0.16$) and marijuana use ($p=0.18$) all were not associated with the outcome of having a baby in the NICU. Tobacco use was significantly related to having a baby in the NICU ($\beta=0.25$, $SE=0.09$, $p<.01$). Alaska Native mothers who reported using tobacco were 1.65x more likely to have their baby in the NICU upon birth (95% CI: 1.2-2.4).

Having high stress levels, both measures of prenatal care, and both socioeconomic status variables were all not significantly related with having a baby in the NICU. Having a high stress level was not statistically significantly associated with the outcome of having a baby in the NICU ($p=0.28$). Neither measure of prenatal care was significantly associated with the outcome of having a baby in the NICU. Time of first prenatal care visit ($p=0.66$) and getting prenatal care as early as desired ($p=0.89$) were not associated with having a baby in the NICU. Neither socioeconomic status indicator variable was associated with the outcome of having a baby in the NICU. Utilizing WIC services ($p=0.44$) and residing below the poverty line ($p=0.70$) were not associated with the outcome of interest.

Maternal covariate demographic variables of marital status and education level were associated with the outcome of interest, while maternal age was not. Maternal marital status was significantly associated with having a baby in the NICU ($\beta= -0.31$, $SE=0.10$, $p<.001$). Married Alaska Native mothers were 1.89x less likely to have a baby in the NICU upon birth (95% CI: 0.4-0.8). Maternal education level was significantly associated with having a bay in the NICU ($\beta= -0.34$, $SE=0.10$, $p<.001$). Alaska Native mothers with a high school education or higher were

1.96x less likely to have a baby in the NICU upon birth (95% CI: 0.4-0.7). Maternal age was not significantly associated with having a baby in the NICU ($p=0.09$).

Several community level variables were assessed in their relationship to the outcome of interest. Community violence ($p=0.79$) and communities with alcohol restrictions ($p=0.19$) were not significantly associated with having a baby in the NICU. Residing in a community below the federal poverty line was significantly associated with having a baby in the NICU ($\beta=0.31$, $SE=0.10$, $p<.001$). Alaska Native mothers residing in communities below the poverty line were 1.85x more likely to have a baby in the NICU upon birth (95% CI: 1.3-2.6). Residing in a rural community was significantly associated with having a baby in the NICU ($\beta= 0.22$, $SE= 0.10$, $p<.05$). Alaska Native mothers residing in rural communities were 1.6x more likely to have a baby in the NICU upon birth (95% CI: 1.1-2.3). Residing in a community with marijuana restrictions was significantly associated with having a baby in the NICU ($\beta= 0.22$, $SE=0.1$, $p<.05$). Alaska Native mothers who reside in communities with marijuana restrictions were 1.67x less likely to have a baby in the NICU upon birth (95% CI: 0.5-0.9).

Multicollinearity was assessed with the variance inflation factor (VIF). Measures of poverty and rurality had VIF scores of 2 but were not high enough to cause concern. Overall, there was no problematic variance inflation for all included independent variables.

Logistic Regression

Pregnancy violence, tobacco use, maternal marital status, maternal education level, community poverty, community rurality, and community marijuana restrictions were regressed on the outcome variable of having a baby in the NICU. The overall model was statistically significant, as seen in Table 35 on the following page, with the likelihood ratio being ($X^2(7, n=973) = 4.7$, $p<.001$). Pregnancy violence was significantly associated with having a baby in

the NICU ($\beta = 0.37$, $p < .05$). Alaska Native mothers who experienced violence during their pregnancy were 2.1x more likely to have a baby in the NICU upon birth (95% CI: 1.1-3.9). Tobacco use was significantly associated with having a baby in the NICU ($\beta = 0.29$, $p < .01$). Alaska Native mothers who reported using tobacco were 1.8x more likely to have a baby in the NICU upon birth (95% CI: 1.2-2.7). Maternal education level was significantly associated with having a baby in the NICU ($\beta = -0.27$, $p < .01$). Alaska Native mothers with a high school education or higher were 1.7x less likely to have a baby in the NICU (95% CI: 0.4-0.9). Finally, community poverty was significantly associated with having a baby in the NICU ($\beta = 0.34$, $p < .05$). Alaska Native mothers who resided in a community below the federal poverty line were 1.98x more likely to have a baby in the NICU upon birth (95% CI: 1.1-3.6). The max rescaled R^2 is 0.06, indicating that pregnancy violence, tobacco use, maternal education level, and community poverty status account for approximately 6% of the variance explained in having a baby in the NICU. The c-statistic is 0.615, indicating a weak model fit.

Table 35

Cohort 1 PRAMS Cross-Sectional Regression on Baby in the NICU at Birth

Measure	β	SE	Exp(β)	95% CI
<u>Individual</u>				
Pregnancy Violence	0.37*	0.13	2.1	1.1 – 3.9
Tobacco Use	0.29**	0.09	1.8	1.2 – 2.7
HS Education	-0.27**	0.10	0.6	0.4 – 0.9
<u>Community</u>				
Poverty	0.34*	0.10	1.9	1.1 – 3.6

Note: $p < .05$ *, $p < .01$ **, $p < .001$ ***. ($X^2(7, n=973) = 4.7$, $p < .001$), $R^2 = 0.06$, c-statistic = 0.62.

Aim 3, Figure 12: PRAMS Neonatal Outcomes Cohort 2

Aim 3 examines several indicators of intergenerational trauma among children of Alaska Native mothers. Figure 12 (pictured below) seeks to answer RQ4, examining neonatal outcomes among children of Alaska Native mothers in Cohort 2 (2012-2015). While this model is cross-sectional, it provides insight into birth outcomes at Time 1 and their potential relation to various maternal level indicators.

Figure 12. Cohort 2: Cross-sectional PRAMS Birth Outcomes for Aim 3

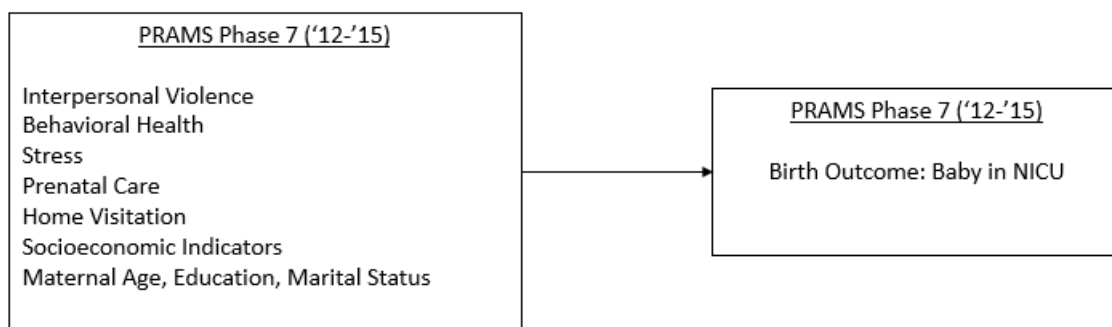


Figure 12. Cohort 2 PRAMS Cross-sectional Child Neonatal Outcomes.

Outcome Variable: Baby in NICU

Having a baby in the NICU is a key birth outcome measured within the PRAMS by the question, *After your baby was delivered, was he or she put in an intensive care unit? (NICU).* (yes/no). A total of 1,669 Alaska Native mothers indicated if their baby was placed in a NICU upon birth, with 69 missing values. Roughly 21% of Alaska Native mothers (n=344) reported their newborns were placed in a NICU upon birth.

Bivariate Associations

Each independent variable was tested with the dependent variable of having a baby in the neonatal intensive care unit (NICU). The majority of behavioral health variables were not significantly associated with the outcome except for maternal depression ($\beta = 0.34$, $SE = 0.10$, $p < .001$). Alaska Native mothers who were diagnosed with depression were 2x more likely to

report having their baby placed in the NICU upon birth (95% CI: 1.3-2.9). Maternal depression or anxiety was not significantly related to the outcome ($p=0.33$). Similarly, all substance use measures were not associated with the NICU birth outcome: alcohol use ($p=0.44$), tobacco use ($p=0.37$), and marijuana use ($p=0.44$).

Interpersonal violence was statistically significantly associated with having a baby in the NICU ($\beta = 0.30$, $SE = 0.10$, $p < .01$). Alaska Native mothers who reported experiencing interpersonal violence were 1.8x more likely to report having a baby in the NICU upon birth (95% CI: 1.2-2.7). High levels of stress were also significantly associated with the outcome ($\beta = 0.18$, $SE = 0.07$, $p < .01$). Alaska Native mothers under high amounts of stress were 1.4x more likely to report having a baby in the NICU upon birth (95% CI: 1.1-1.9).

Prenatal care ($p=0.82$) and poverty status ($p=0.06$) were not significantly associated with having a baby in the NICU among Alaska Native mothers. Home visitation was related with the outcome of interest ($\beta = 0.29$, $SE = 0.09$, $p < .01$). Alaska Native mothers who were seen by a home visitor either during or following their pregnancy were 1.8x more likely to have their baby in the NICU upon birth (95% CI: 1.3-2.5).

Most maternal covariates were not significantly associated with the outcome: maternal education level ($p=0.33$) and maternal age ($p=0.80$). However, maternal marital status was a significant association with the outcome variable ($\beta = -0.18$, $SE=0.07$, $p < .01$). Married Alaska Native mothers were 1.4x less likely to report having their baby in the NICU upon birth compared to non-married mothers (95% CI: 0.5-0.9). Multicollinearity was assessed with the variance inflation factor (VIF). There was no problematic variance inflation for all included independent variables.

Logistic Regression

The overall model is statistically significant with the likelihood ratio being ($X^2(5, n=1,615) = 6.21, p<.001$). Interpersonal violence, depression, home visitation, and maternal marital status were all statistically significantly related to having a baby in the NICU upon birth, as seen below in Table 36. Interpersonal violence was significantly related to the outcome ($\beta = 0.23, SE = 0.11, p<.05$). Alaska Native mothers who experienced interpersonal violence surrounding their pregnancy were 1.6x more likely to report having their baby in the NICU upon birth (95% CI: 1.0-2.4). Similarly, Alaska Native mothers who were diagnosed with depression were 1.7x more likely to report having their baby in the NICU upon birth ($\beta = 0.26, SE = 0.10, p<.05; 95\% \text{ CI: } 1.1\text{-}2.6$). Home visitation was significantly associated with the outcome ($\beta = 0.25, SE = 0.09, p<.01$). Alaska Native mothers who were seen by a home visitor surrounding their pregnancy were 1.6x more likely to have their baby in the NICU (95% CI: 1.1-2.4). Finally, maternal marital status was marginally significantly associated with the NICU birth outcome ($\beta = -0.15, SE = 0.07, p<.05$). Married Alaska Native mothers were 1.3x less likely to have their baby in the NICU upon birth (95% CI: 0.6-0.99). The max rescaled R^2 is 0.03, indicating that interpersonal violence, depression, home visitation, and maternal marital status account for approximately 3% of the variance explained in the NICU birth outcome. The receiver operating statistic is quite weak ($c=0.59$) indicating poor model fit.

Table 36

Cohort 2 PRAMS Cross-Sectional Regression on Baby in the NICU at Birth

Measure	β	SE	Exp(β)	95% CI
Interpersonal Violence	0.23*	0.11	1.6	1.0 – 2.4
Depression Diagnosis	0.26*	0.10	1.7	1.1 – 2.6
Home Visitation	0.25**	0.09	1.6	1.1 – 2.4
Married	-0.15*	0.07	0.7	0.6 – 0.9

Note: $p<.05$ *, $p<.01$ **, $p<.001$ ***. ($X^2(5, n=1,615) = 6.21, p<.001$), $R^2 = 0.03$, c-statistic = 0.59.

Aim 3, Figure 13: CUBS Developmental Indicators Cohort 1

Aim 3 examines several indicators of intergenerational trauma among children of Alaska Native mothers. Figure 13 (pictured below) examines child behavioral concerns among children of Alaska Native mothers in Cohort 1 at the three year follow up. While this model is cross-sectional, it provides insight into developmental outcomes at Time 2 and their potential relation to various maternal level indicators.

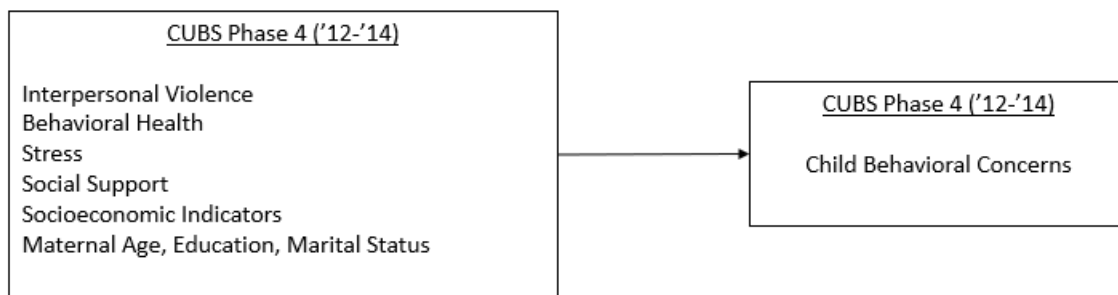


Figure 13. Cohort 1 CUBS Cross-sectional Child Developmental Indicators.

Outcome Variable: Child Behavioral Concerns

Developmental indicators are assessed by the question: *During the past 12 months, have you had any concerns about how your child acts, gets along with others, or shows feelings?* (yes/no). A total of 546 Alaska Native mothers responded to the question, with 16 missing values. Approximately 11% (n=62) indicated they have had concerns about how their child acts, gets along with others, or shows feelings.

Bivariate Associations

Each independent variable was tested with the dependent variable of child behavioral concern to assess bivariate associations. Interpersonal violence was significantly associated with child behavioral concerns ($\beta = 0.55$, $SE = 0.19$, $p < .01$). Alaska Native mothers who reported experiencing physical or psychological violence within the past 12 months were 2.98x more likely to report having concerns about how their child acts, gets along with others, or shows

feelings (95% CI: 1.4-6.3). High levels of stress were significantly associated with child behavioral concerns ($\beta = 0.54$, $SE = 0.17$, $p < .001$). Alaska Native mothers who endorsed high stress levels were 2.9x more likely to report having concerns for how their child acts, gets along with others, or shows feelings (95% CI: 1.5-5.7).

None of the socioeconomic status indicator variables were significantly related to child behavioral concerns, including individual poverty ($p = 0.44$), use of WIC ($p = 0.97$), use of food stamps ($p = 0.09$), use of food bank ($p = 0.79$), use of school lunch program ($p = 0.57$), and receiving childcare assistance ($p = 0.2$). Similarly, none of the maternal covariates were significantly associated with child behavioral concerns, including marital status ($p = 0.47$), maternal age ($p = 0.23$), and maternal education level ($p = 0.78$). Finally, social support was not significantly associated with the outcome ($p = 0.33$).

The majority of behavioral health variables were significantly associated with the outcome; however, maternal alcohol use was not ($p = 0.87$). Maternal mental health was significantly associated with child behavioral concerns ($\beta = 0.31$, $SE = 0.15$, $p < .05$). Alaska Native mothers who reported feeling down, depressed, sad, hopeless, or slowed down were 1.9x more likely to report having concerns for how their child acts, gets along with others, or shows feelings (95% CI: 1.0-3.3). Seeking treatment for mental health concerns was significantly associated with child behavioral concerns ($\beta = 0.36$, $SE = 0.15$, $p < .05$). Alaska Native mothers who spoke to a health care professional about how they're feeling emotionally within the past 12 months were 2x more likely to report having concerns about their child's behavior (95% CI: 1.1-3.6). Maternal depression was significantly associated with child behavioral concerns ($\beta = 0.55$, $SE = 0.19$, $p < .01$). Alaska Native mothers who reported being diagnosed with depression in the three years since their new baby was born were 3x more likely to report behavioral concerns for

their child (95% CI: 1.4-6.2). Maternal tobacco use was significantly associated with child behavioral concerns ($\beta = 0.46$, $SE = 0.15$, $p < .01$). Alaska Native mothers who reported smoking cigarettes within the past two years were 2.5x more likely to report child behavioral concerns (95% CI: 1.4-4.6). All significant variables were assessed for multicollinearity. There was no problematic multicollinearity.

Logistic Regression

Interpersonal violence, stress, and behavioral health variables were regressed on child behavioral concern. The overall model was statistically significant ($X^2(7, n=525) = 4.75$, $p < .001$) with 60 missing values. Maternal tobacco use was the only significantly associated independent variable with outcome of child behavioral concerns ($\beta = 0.71$, $SE = 0.34$, $p < .05$), as seen in Table 37 below. Alaska Native mothers who reported smoking cigarettes within the past two years were 2x more likely to report child behavioral concerns (95% CI: 1.0-3.9). Stress and the remaining behavioral health variables were not significantly related to the outcome of interest. Interpersonal violence was trending towards significance ($p = 0.07$) but this may be related to the cell size for IPV and behavioral concerns women.

Table 37

Cohort 1 CUBS Cross-sectional Regression on Child Behavioral Concerns.

Measure	β	SE	Exp(β)	95% CI
Tobacco Use	0.71*	0.34	2.0	1.0 – 3.9

Note: $p < .05$ *, $p < .01$ **, $p < .001$ ***. ($X^2(7, n=525) = 4.75$, $p < .001$)

Testing for Mediations and Moderations

When an interaction term of interpersonal violence and maternal mental health was added to the model, interpersonal violence became significant ($\beta = 1.65$, $SE = 0.7$, $p < .05$). Alaska Native

mothers who reported experiencing interpersonal violence but did not report feeling down, depressed, or sad were 5.2x more likely to report child behavioral concerns (95% CI: 1.3-21.1); however, the enormous size of the confidence interval indicates instability likely related to low cell size. The max-rescaled R^2 is 0.11, indicating maternal cigarette smoking and interpersonal violence account for approximately 11% of the variance explained in child behavioral concerns. The c-statistic is 0.71, indicating a moderately acceptable fit.

Further mediation and moderation effects were tested but were largely non-significant. A mediation effect was tested for the relationship between interpersonal violence and child behavioral concern. Maternal mental health was tested as the mediator for this relationship and was not statistically significant ($p=0.07$). Maternal help-seeking and depression diagnosis were also tested for mediating relationships but were not significant. Maternal help-seeking and depression diagnosis were also tested (separately) as interaction terms with interpersonal violence but were non-significant $p=0.47$ and $p=0.37$ respectively. Finally, all mental health variables were tested as interactions with high stress levels, but maternal mental health ($p=0.31$), maternal help-seeking ($p=0.29$), and maternal depression diagnosis ($p=0.77$) were all non-significant.

Aim 3, Figure 14: CUBS Developmental Indicators Cohort 2

Aim 3 examines several indicators of intergenerational trauma among children of Alaska Native mothers. Figure 14 (pictured on the following page) examines parental report of child's experience of interpersonal violence (14A) and child stress (14B) among children of Alaska Native mothers in Cohort 2 at the three year follow up. While these models are cross-sectional, they provide insight into developmental outcomes at Time 2 and their potential relation to various maternal level indicators.

Figure 14A: Cohort 2 CUBS Parental Report of Child's Experience of Interpersonal Violence



Figure 14A. Cohort 2 CUBS Cross-sectional Child Interpersonal Violence.

Outcome Variable: Parental Report of Child's Experience of Interpersonal

Violence. The developmental indicator of child experiences of interpersonal violence are assessed through the question, *Did an adult ever push, hit, slap, kick, choke, or physically hurt your 3-year-old child in any other way? (Do not include spanking that did not leave a bruise).* (yes/no). Children witnessing violence is assessed through the question, *Has your child ever witnessed violence or physical abuse between household members?* (yes/no). These items were combined due to sample size to create a measure of the child's total exposure to violence in their lifetime (aged 3 years) as reported by the caregiver. If respondents indicated yes to either measure, they were coded as having experienced child IPV. A total of 796 Alaska Native mothers responded to these items with 51 missing values. Approximately 8% (n=60) of Alaska Native mothers indicated their children had experienced or witnessed interpersonal violence within the child's lifetime.

Bivariate Associations

Each independent variable was tested with the dependent variable of parental report of child's experiences of interpersonal violence in order to assess bivariate associations. Maternal experiences of interpersonal violence were significantly related to parental report of child witnessing and experiencing interpersonal violence ($\beta = 1.8$, $SE = 0.21$, $p < .001$). Alaska Native

mothers who experienced IPV were 38.6x more likely to report their child's experience of IPV (95% CI:16.9-87.9). Similarly, stress was significantly associated with parental report of child IPV experiences ($\beta = 1.3$, SE= 0.23, $p < .001$). Alaska Native mothers with high levels of stress were 13.4x more likely to report their children experiencing interpersonal violence (95% CI:5.4-33.2). Finally, social support was significantly related to the outcome ($\beta = -0.41$, SE= 0.14, $p < .01$). Alaska Native mothers with high levels of social support were 2.3x less likely to report that their children experienced interpersonal violence (95% CI:0.3-0.8).

The majority of mental health and substance use variables were significantly associated with parental report of child IPV experiences. Feeling down, depressed, or sad ($\beta = -0.53$, SE= 0.14, $p < .001$) and mothers who reported loss of interest or pleasure ($\beta = -0.64$, SE= 0.14, $p < .001$) were significantly associated with the outcome. Mothers who reported feeling down, depressed, or sad were 2.5x less likely (95% CI:0.2-0.6) while mothers who reported loss of interest or pleasure in things they once enjoyed were 3.3x less likely to report that their children had experienced IPV (95% CI: 0.2-0.5). Speaking with a healthcare worker about depression was not significantly associated with parental report of child IPV experiences ($p = 0.54$). Both tobacco use ($\beta = 0.36$, SE= 0.15, $p < .01$) and marijuana use ($\beta = 0.85$, SE=0.15, $p < .001$) were significantly related to the outcome. Alaska Native mothers who used tobacco were 2.1x more likely (95% CI:1.2-3.6) while mothers who used marijuana were 5.5x more likely to report that their children had experienced IPV (95% CI: 3.1-9.7).

Most socioeconomic indicator variables were not significantly associated with the outcome. Experiencing poverty ($p = 0.15$), accessing a food bank or pantry ($p = 0.06$), using WIC ($p = 0.12$) and qualifying for free or reduced school lunch program ($p = 0.82$) were not significantly related to parental report of child experiences of IPV. However, food stamp use was significantly

associated ($\beta = 0.38$, $SE = 0.14$, $p < .01$). Alaska Native mothers who utilized food stamps were 2.1x more likely to report that their children had experienced interpersonal violence (95% CI: 1.2-3.8).

While maternal age ($p = 0.06$) and education level ($p = 0.77$) were not significantly related to child IPV, maternal marital status was significantly associated with the outcome ($\beta = -0.67$, $SE = 0.18$, $p < .001$). Married Alaska Native mothers were 3.3x less likely to report their children experienced interpersonal violence (95% CI: 0.1-0.5). Multicollinearity was assessed with the variance inflation factor (VIF). There was no problematic variance inflation for included independent variables.

Logistic Regression

The overall model is statistically significant with the likelihood ratio being (X^2 (9, $n = 742$) = 17.14, $p < .001$). Maternal interpersonal violence, high stress levels, and marital status were significantly associated with parental report of child experiences of interpersonal violence. Maternal interpersonal violence was significantly associated with child experiences of IPV ($\beta = 1.5$, $SE = 0.27$, $p < .001$). Alaska Native mothers who experienced interpersonal violence were 20x more likely to have their children also experience interpersonal violence (95% CI: 6.8-58.3). Stress was significantly associated with the outcome ($\beta = 1.2$, $SE = 0.26$, $p < .001$). Alaska Native mothers with high levels of stress were 11.5x more likely to report their children have experienced interpersonal violence (95% CI: 4.2-31.4). However, the inflated odds ratios and subsequent confidence intervals for both interpersonal violence and stress level indicate unstable parameters and should be cautiously interpreted. Finally, marital status was significantly associated with parental report of child experiences of IPV ($\beta = -0.5$, $SE = 0.20$, $p < .05$). Married Alaska Native mothers were 2.5x less likely to report that their children had experienced

interpersonal violence (95% CI: 0.2-0.9) as seen below in Table 38. The max rescaled R^2 was 0.42, indicating that maternal interpersonal violence, high stress levels, and marital status account for roughly 42% of the variance explained in child experiences of interpersonal violence. The receiver operating statistic is substantially strong ($c=0.91$) indicating good model fit.

Table 38

Cohort 2 CUBS Cross-Sectional Regression on Parental Report of Child IPV

Measure	β	SE	Exp(β)	95% CI
Interpersonal Violence	1.5***	0.27	20	6.8 – 58.3
Stress	1.2***	0.27	11.5	4.2 – 31.4
Married	-0.5*	0.20	0.4	0.2 – 0.9

Note: $p < .05$ *, $p < .01$ **, $p < .001$ ***. Model 14A: ($X^2(9, n=742) = 17.14, p < .001$), $R^2 = 0.42$, c-statistic = 0.91.

Figure 14B: Cohort 2 CUBS Child Stress

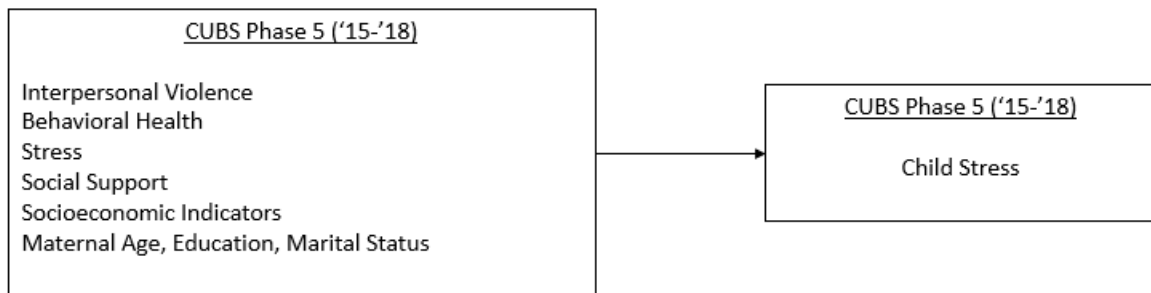


Figure 14B. Cohort 2 CUBS Cross-sectional Child Stress.

Outcome Variable: Child Stress. The second developmental indicator examined within Cohort 2 CUBS is child stress. Children’s stressful life events are assessed through several items children may have experienced since birth: *alcoholism or mental health disorder among household members; death of a household member; overnight stay in a hospital; witnessed violence or physical abuse between household members (yes/no)*. These four questions were totaled and dichotomized into high vs. low child stress. Respondents who experienced no

stressful life events were coded as low stress, while those with one or more stressful life event were coded as high stress. A total of 796 Alaska Native mothers responded to the items, with 51 missing values. Approximately 38% (n=301) of children with Alaska Native mothers had high levels of stress.

Bivariate Associations

Each independent variable was tested with the dependent variable of child stress in order to assess bivariate associations. Maternal interpersonal violence was significantly associated with child stress ($\beta = 1.6$, $SE = 0.30$, $p < .001$). Alaska Native mothers who reported experiencing IPV were 25x more likely to report high levels of child stress (95% CI: 7.6-82). Social support was also significantly associated with child stress level ($\beta = -0.22$, $SE = 0.08$, $p < .01$). Alaska Native mothers with high levels of social support were 1.7x less likely to have children report high levels of stress (95% CI: 0.5-0.9).

All measures of maternal behavioral health were significantly associated with child stress. Feeling down, depressed, or sad ($\beta = -0.37$, $SE = 0.08$, $p < .001$) and loss of interest or pleasure ($\beta = -0.34$, $SE = 0.09$, $p < .001$) were significantly related to child stress. Alaska Native mothers who reported feeling down, depressed, or sad (95% CI: 0.3-0.7) and mothers who reported loss of interest of pleasure (95% CI: 0.4-0.7) were both 2x less likely to have children with high levels of stress. Talking with a healthcare provider about depression was significantly associated with the outcome ($\beta = 0.18$, $SE = 0.08$, $p < .05$). Alaska Native mothers who spoke with a healthcare provider about depression were 1.4x more likely to have high stress children (95% CI: 1.2-2.0). Finally, both tobacco use ($\beta = 0.7$, $SE = 0.08$, $p < .05$) and marijuana use ($\beta = 0.50$, $SE = 0.11$, $p < .001$) were significantly associated with child stress levels. Alaska Native mothers who

used tobacco were 1.4x more likely (95% CI:1.0-1.9) while those who used marijuana were 2.7x more likely to have children report high stress levels (95% CI: 1.8-4.1).

Several socioeconomic status indicator variables were significantly related to child stress levels except poverty ($p=0.06$), food bank or pantry use ($p=0.06$), and WIC use ($p=0.64$). Food stamp use was significantly associated with child stress ($\beta=0.20$, $SE=0.08$, $p<.05$). Alaska Native mothers who used food stamps were 1.5x more likely to have children report high stress levels (95% CI: 1.1-2.0). Similarly, qualifying for free or reduced school lunch programs was significantly associated with child stress ($\beta=0.2$, $SE=0.09$, $p<.05$). Alaska Native mothers who reported their children qualify for free or reduced school lunches were 1.5x more likely to have children report high levels of stress (95% CI:1.1-2.1).

Maternal covariates such as education level ($p=0.98$) and maternal age ($p=0.59$) were not significantly associated with the outcome; however maternal marital status was significantly associated to child stress levels ($\beta=-0.18$, $SE=0.08$, $p<.05$). Alaska Native mothers were 1.4x less likely to report having a child with high stress levels (95% CI: 0.5-0.9). Multicollinearity was assessed with the variance inflation factor (VIF). There was no problematic variance inflation for all included independent variables.

Logistic Regression

The overall model is statistically significant with the likelihood ratio being ($X^2(10, n=720) = 8.8$, $p<.001$). Maternal experiences of interpersonal violence, marijuana use, and qualifying for free or reduced school lunch programs all were significantly associated with child stress levels. Maternal interpersonal violence was significantly related to child stress level ($\beta=1.5$, $SE=0.30$, $p<.001$). Alaska Native mothers who experienced interpersonal violence were 18.2x more likely to have children with high stress levels (95% CI:5.5-60.3). The inflated nature

of the odds ratio and subsequent confidence intervals indicate maternal interpersonal violence may be an unstable parameter. Marijuana use was significantly associated with child stress ($\beta = 0.32$, $SE = 0.12$, $p < .01$). Alaska Native mothers who reported marijuana use were 1.9x more likely to have children report high levels of stress (95% CI: 1.2-3.1). Finally, qualifying for free or reduced school lunch programs was significantly related to child stress level ($\beta = 0.22$, $SE = 0.10$, $p < .05$). Children of Alaska Native mothers who qualified for free or reduced school lunch programs were 1.5x more likely to report high levels of stress (95% CI: 1.1-2.3) as seen below in Table 39. The max rescaled $R^2 = 0.15$, indicating that maternal interpersonal violence, marijuana use, and qualifying for free or reduced school lunch programs account for 15% of the variance explained in child stress levels. The receiver operating statistic ($c = 0.67$) is fairly weak, indicating poor model fit.

Table 39

Cohort 2 CUBS Cross-Sectional Regression on Child Stress

Measure	β	SE	Exp(β)	95% CI
Interpersonal Violence	1.5***	0.30	18.2	5.5 – 60.3
Marijuana Use	0.32**	0.12	1.9	1.2 – 3.1
Free or Reduced School Lunch	0.22*	0.10	1.5	1.1 – 2.3

Note: $p < .05$ *, $p < .01$ **, $p < .001$ ***. Model 14B: ($X^2(10, n=720) = 8.8$, $p < .001$), $R^2 = 0.15$, c-statistic = 0.67.

Aim 3, Figure 15: PRAMS, CUBS, and ALCANLink Intergenerational Trauma Cohort 1

Aim 3 examines several indicators of intergenerational trauma among children of Alaska Native mothers. Figure 15 addresses RQ5 in the examination of report for child maltreatment (15A), while the remaining models further examine intergenerational trauma through outcomes such as child welfare report substantiation (15B), removal from home (15C), and child developmental concerns (15D) among children of Alaska Native mothers in Cohort 1. These models take a longitudinal perspective in examining maternal level indicators in relation to these child outcomes.

Figure 15A: Cohort 1 PRAMS to ALCANLink Report for Child Maltreatment

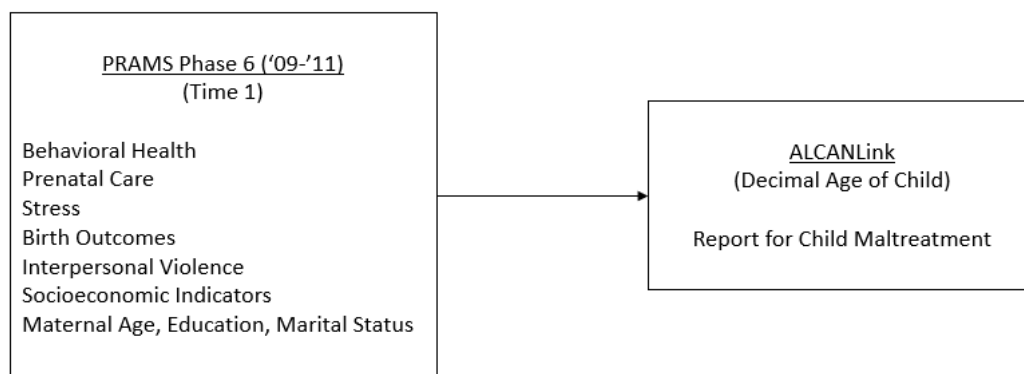


Figure 15A. Cohort 1 PRAMS to ALCANLink Longitudinal Report for Child Maltreatment.

Outcome variable: Report for Child Maltreatment. *Decimal age of first report, death, OOS emigration, or end of current follow-up * reported for maltreatment. 0= no; 1=yes.* A total of 1,237 Alaska Native mothers responded to the item, with no missing values.

Behavioral health, prenatal care, stress, socioeconomic indicators, maternal covariates, birth outcomes, and interpersonal violence were placed into a survival analysis model with the outcome of report for child maltreatment. The overall model was statistically significant ($X^2(20, n= 839) = 160, p<.001$), with 397 missing values. See model comparison Table 35 on page 166.

A total of 44% of the sample was censored, indicating roughly 56% of Alaska Native mothers were reported for child maltreatment during the study period. Each independent variable was evaluated in order to meet the proportional hazards assumption. No measures varied by time and therefor met the proportional hazards assumption. Two behavioral health measures were related to the outcome: tobacco use ($p<.001$) and high levels of stress ($p<.05$). Alaska Native mothers who reported using tobacco within the past two years had a 1.5x greater risk for being reported for child maltreatment (95% CI: 1.2-1.9) while Alaska Native mothers who indicated a high level of stress had a 1.3x greater risk for being reported for child maltreatment (95% CI: 1.0-1.7). Two socioeconomic indicator measures were significant predictors of child maltreatment reports: WIC use ($p<.001$) and residing below the poverty line ($p<.05$). Alaska Native mothers who utilized WIC services surrounding their pregnancies face a 1.8x greater risk to be reported for child maltreatment (95% CI: 1.4-2.3) while Alaska Native mothers who resided below the federal poverty line were 1.4x greater risk for being reported for child maltreatment (95% CI: 1.1-1.8). Two maternal covariates were significant predictors of child maltreatment reports: maternal marital status ($p<.01$) and education level ($p<.001$). Married Alaska Native mothers had a 1.43 decreased risk for being reported for child maltreatment (95% CI: 0.6-0.9). Similarly, Alaska Native mothers with a high school education or equivalent had a 1.67 decreased risk for being reported for child maltreatment (95% CI: 0.5-0.8). Interpersonal violence was a significant predictor for child maltreatment reports ($p<.01$). Alaska Native mothers who experienced interpersonal violence surrounding their pregnancy had a 1.5x greater risk of being reported for child maltreatment (95% CI: 1.1-2.1). Finally, the birth outcome of having a baby in the NICU was significantly associated with the outcome ($p<.001$). Alaska Native mothers who indicated

their baby was placed in the NICU upon birth had a 1.6x greater risk of being reported for child maltreatment (95% CI: 1.3-2.1). See model comparison Table 40 on page 175.

Figure 15B: Cohort 1 PRAMS to ALCANLink Report Substantiation

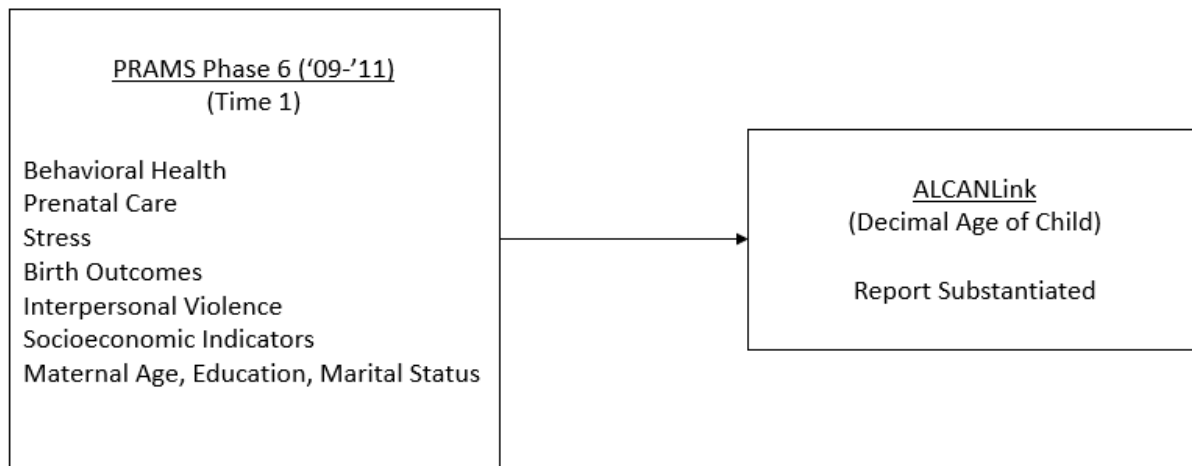


Figure 15B. Cohort 1 PRAMS to ALCANLink Longitudinal Report Substantiation.

Outcome variable: Report Substantiated. *Decimal age of first substantiated report, death, OOS emigration, or end of current follow-up * report substantiated. 0 = no, 1 = yes.* A total of 1,237 Alaska Native mothers responded to the item, with no missing values.

Behavioral health, prenatal care, stress, socioeconomic indicators, maternal covariates, birth outcomes, and interpersonal violence were placed into a survival analysis model with the outcome of report substantiation. The overall model was statistically significant ($X^2(19, n=839) = 85.7, p<.001$), with 397 missing values, see model comparison Table 40 on page 175. A total of 78% of the sample was censored, indicating 22% of Alaska Native mothers had a child welfare report substantiated. Each independent variable was evaluated in order to meet the proportional hazards assumption. No measures varied by time and therefor met the proportional hazards assumption. Both marijuana use ($p<.05$) and tobacco use ($p<.01$) were significantly associated with the outcome. Alaska Native mothers who used marijuana surrounding their

pregnancies had a 1.6x greater risk to have a child welfare report substantiated (95% CI: 1.1-2.3) while those who used tobacco within the past two years had a 1.7x greater risk of report substantiation (95% CI: 1.1-2.5). Prenatal care was significantly associated with the outcome, $p < .05$. Alaska Native mothers who had their first prenatal care visit during their first trimester had a 1.67x decreased risk of having a child welfare report substantiated (95% CI: 0.4-0.9). Two socioeconomic indicators were significantly associated with the outcome: WIC use ($p < .05$) and residing below the federal poverty line ($p < .05$). Alaska Native mothers who used WIC services had a 1.6x greater risk for having a report substantiated (95% CI: 1.0-2.4) and those who resided below the federal poverty line also had a 1.6x greater risk for having a report substantiated (95% CI: 1.0-2.5). Finally, two maternal covariates were associated with the outcome: marital status ($p < .05$) and education level ($p < .05$). Married Alaska Native mothers had a 1.54x decreased risk of having a report substantiated (95% CI: 0.43-0.96) while mothers with a high school education or equivalent similarly had a 1.56x decreased risk of having a child welfare substantiated (95% CI: 0.44-0.94).

Figure 15C: Cohort 1 PRAMS to ALCANLink Removed from Home

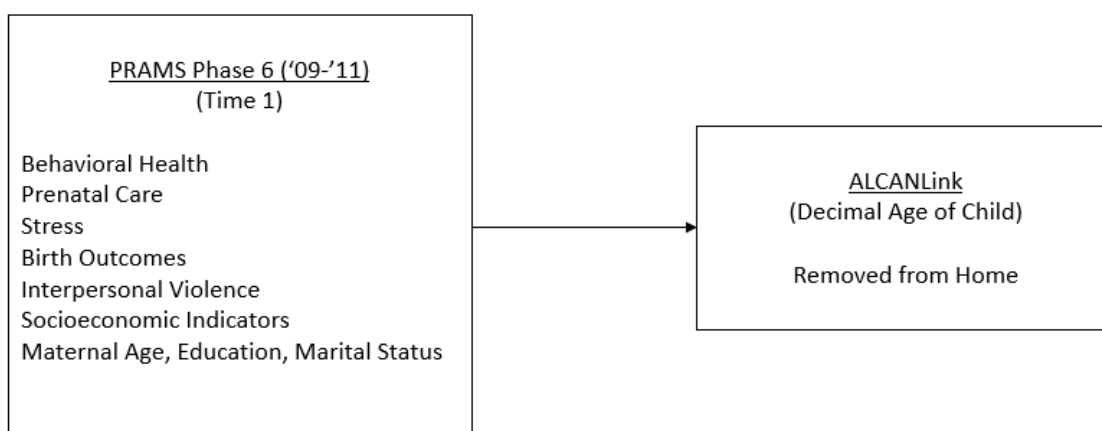


Figure 15C. Cohort 1 PRAMS to ALCANLink Longitudinal Removed from Home.

Outcome variable: Removed from Home. *Decimal age of first removal, death, OOS emigration, or end of current follow-up * removal from home. 0 = no, 1 = yes.* A total of 839 Alaska Native mothers responded to the item, with 398 missing values.

Behavioral health, prenatal care, stress, socioeconomic indicators, maternal covariates, birth outcomes, and interpersonal violence were placed into a survival analysis model with the outcome of removal from the home. The overall model was statistically significant ($X^2(22, n=839) = 41, p<.001$), with 397 missing values. A total of 90% of the sample was censored, indicating that 10% of Alaska Native mothers had their child removed from the home. Each independent variable was evaluated in order to meet the proportional hazards assumption. All but one variable did not vary by time and therefore met the proportional hazards assumption.

Alcohol use in the past two years did not meet the proportional hazards assumption. In order to meet the assumption, an interaction term of alcohol use and time was entered into the model. The interaction was statistically significantly associated with the outcome of removal from the home ($p<.001$). Two measures of alcohol use were significantly predictors of having the child removed from the home. Alaska Native mothers who reported any alcohol use within the previous two years had a 2x greater risk for child removal, $p<.05$ (95% CI: 1.0-3.9), while Alaska Native mothers who reported alcohol use during their pregnancy had a 2.5x greater risk for having their child removed from the home, $p<.05$ (95% CI: 1.1-5.5). Maternal education appeared as a protective factor again as those with a high school education or equivalent had a 2x decreased risk of having their child removed from the home, $p<.05$ (95% CI: 0.3-0.9). The present model investigated three outcomes of involvement with the child welfare system including report for child maltreatment (15A), report substantiation (15B), and removal from the home (15C). Full model comparison can be seen in Table 40 on the following page.

Table 40

Cohort 1 PRAMS to ALCANLink Longitudinal Survival Analysis of Alaska Native Children and Involvement with the Child Welfare System Model Comparison

Measure	15A: Report for Child Maltreatment		15B: Report Substantiated		15C: Removed from Home	
	HR	95% CI	HR	95% CI	HR	95% CI
Poverty	1.4*	1.1-1.8	1.6*	1.0-2.5		
HS Education	0.6***	0.5-0.8	0.7*	0.4-0.9	0.5*	0.3-0.9
Tobacco Use	1.5***	1.2-1.9	1.7**	1.1-2.5		
WIC	1.8***	1.4-2.3	1.6*	1.0-2.4		
Married	0.7**	0.6-0.9	0.7*	0.4-0.9		
NICU upon Birth	1.6***	1.3-2.1				
Interpersonal Violence	1.5**	1.1-2.1				
Stress	1.3*	1.0-1.7				
Marijuana Use			1.6*	1.1-2.3		
Prenatal Care			0.6*	0.4-0.9		
Alcohol Use						
Past 2 Years					2.0*	1.0-3.9
During Pregnancy					2.5*	1.1-5.5

Note: * $<.05$, ** $<.01$, *** $<.001$. Model 15A: ($X^2(20, n=839) = 160, p<.001$).

Model 15B: ($X^2(19, n=839) = 85.7, p<.001$). Model 15C: ($X^2(21, n=839) = 33.4, p<.001$).

Figure 15D: Cohort 1 PRAMS to CUBS Concern for Child

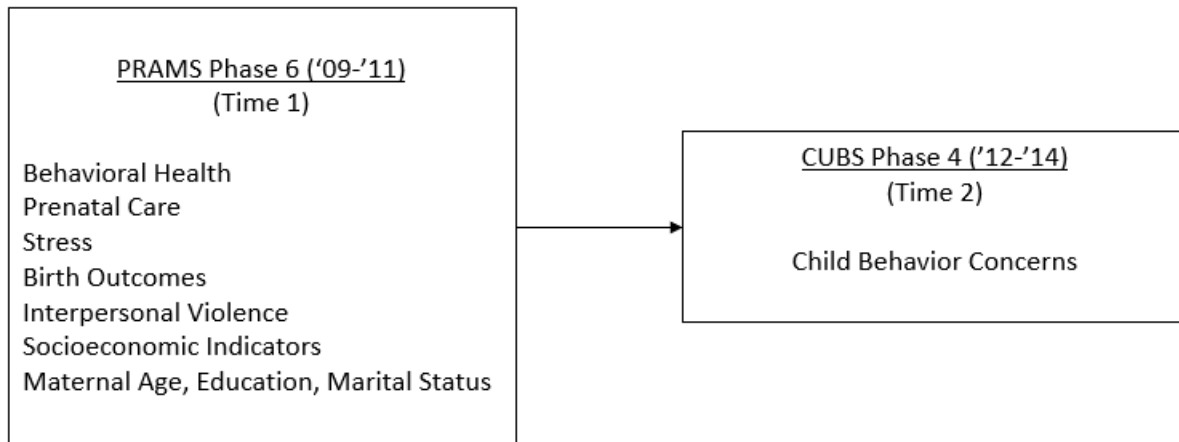


Figure 15D. Cohort 1 PRAMS to CUBS Longitudinal Child Behavior Concerns.

Outcome Variable: Concern for Child. *During the past 12 months, have you had any concerns about how your child acts, gets along with others, or shows feelings? (yes/no).* A total of 546 Alaska Native mothers responded to the question, with 16 missing values. Approximately 11% (n=62) indicated they have had concerns about how their child acts, gets along with others, or shows feelings. The dependent variable is child behavioral concern at Time 2 (CUBS) using PRAMS (Time 1) independent variables. Table 41 on the following page demonstrates descriptive statistics of all included independent variables in the present analysis over time.

Table 41

Cohort 1 PRAMS to CUBS Independent Variable Descriptive Statistics Over Time

	PRAMS (Time 1)		CUBS (Time 2)	
	n=1,256		n=584	
	n-size	%	n-size	%
Postpartum Depression	683	59%	273	63%
Depression or Anxiety	124	10%	46	11%
Tobacco Use	759	63%	268	62%
Marijuana Use	297	25%	110	25%
Alcohol Use				
During Pregnancy	65	5%	19	4%
Past 2 Years	776	65%	294	68%
Prenatal Care				
< 9	656	55%	215	49%
9 – 11	290	24%	114	26%
12 +	245	21%	106	24%
High Stress	251	21%	95	22%
SES Indicators				
Poverty	662	67%	285	66%
(WIC)	856	71%	310	71%
Demographics				
Married	376	30%	149	34%
High School Edu	896	74%	359	83%
Maternal Age (20-29)	759	61%	261	60%
Interpersonal Violence	159	13%	58	14%
Baby in NICU	234	20%	105	18%

SAS %SURVEYGENMOD Macro

The %SURVEYGENMOD macro developed for SAS allows researchers to account for complex survey design in generalized linear models over time. In order to use the macro, data must meet certain requirements, namely inclusion of only numeric variables, creating dummy variables for categorical measures, and the deletion of missing values (Silva, 2017). The process of deleting missing variables and the subsequent sample size is detailed in Table 42 on the following page. Limitations of using the macro are discussed in Chapter 6. Ultimately, the sample was reduced from n=584 to n=403, with roughly 31% of the sample missing.

Table 42

Cohort 1 PRAMS to CUBS Sample Size Reduction to meet %SURVEYGENMOD Requirements

	Original		Meeting Macro Requirements	
	n-size	%	n-size	%
Postpartum Depression	572	98%	551	94%
Depression or Anxiety	551	94%	550	94%
Tobacco Use	550	94%	548	94%
Marijuana Use	548	94%	541	93%
Alcohol Use				
During Pregnancy	541	93%	540	92%
Past 2 Years	540	92%	536	92%
Prenatal Care				
< 9	536	92%	516	88%
9 – 11	516	88%	516	88%
12 +	516	88%	516	88%
High Stress	516	88%	516	88%
SES Indicators				
Poverty	516	88%	440	75%
WIC	440	75%	438	75%
Demographics				
Married	438	75%	438	75%
High School Edu	438	75%	435	74%
Maternal Age	435	74%	435	74%
Interpersonal Violence	435	74%	428	73%
Baby in NICU	428	73%	423	72%
Child Behavior Concern	423	72%	403	69%

Bivariate Associations

Postpartum depression, depression and anxiety, and tobacco use were the only significantly associated measures with child behavioral concerns at Time 2. Postpartum depression at Time 1 was a significant predictor of child behavior concerns at Time 2 ($\beta = 1.3$, $SE = 0.5$, $p < .01$). Alaska Native mothers who experienced symptoms of postpartum depression

were 3.9x more likely to report having concerns over their child's behavior over time (95% CI: 1.6-9.5). Similarly, maternal depression and anxiety was significantly associated with the outcome ($\beta = 1.4$, SE= 0.4, $p < .001$). Alaska Native mothers who visited a healthcare worker to be checked or treated for depression or anxiety in the 12 months before they became pregnant were 4x more likely to report child behavior concerns at Time 2 (95% CI: 1.7 – 9.1). Finally, tobacco use was significantly associated with child behavior concerns ($\beta = 0.8$, SE= 0.4, $p < .05$). Alaska Native mothers who reported tobacco use surrounding their pregnancy were 2.2x more likely to report having child behavior concerns over time (95% CI: 1.0 – 4.6).

The remaining independent variables were not significantly associated with the outcome. The remaining behavioral health variables such as marijuana use ($p = 0.13$), alcohol use during pregnancy ($p = 0.45$), and alcohol use within the past 2 years ($p = 0.09$) were not significantly associated with child behavior concerns. All levels of total prenatal care visits were not significantly associated with the outcome: less than 9 ($p = 0.18$), between 9 and 11 ($p = 0.91$), and 12 or more ($p = 0.10$). Both socioeconomic status indicators were not significantly related to the outcome over time, including poverty ($p = 0.10$) and WIC use ($p = 0.76$). High stress ($p = 0.08$), interpersonal violence ($p = 0.93$), and having a baby in the NICU upon birth ($p = 0.53$) were not related to child behavioral concerns. Finally, none of the maternal demographics were significant predictors of child behavioral concerns: marital status ($p = 0.96$), education level ($p = 0.30$), and maternal age ($p = 0.53$).

Full Model

Postpartum depression, depression and anxiety, and tobacco use were regressed on child behavior concerns during Time 2. Both postpartum depression and depression and anxiety were significant predictors of child behavior concerns at Time 2 as seen in Table 43 on the following

page. Postpartum depression was significantly associated with the outcome ($\beta = 1.1$, $SE = 0.5$, $p < .01$). Alaska Native mothers who endorsed symptoms of postpartum depression were 3x more likely to report having concerns about their child's development over time (95% CI: 1.3 – 7.9). Similarly, depression and anxiety significantly predicted child development concerns ($\beta = 1.1$, $SE = 0.4$, $p < .01$). Alaska Native mothers who visited a healthcare worker to be checked or treated for depression or anxiety in the 12 months before they became pregnant were 3x more likely to report child behavior concerns at Time 2 (95% CI: 1.2 – 7.2). Tobacco use was not significantly associated with child behavior concerns in the multivariate model.

Table 43

Cohort 1 PRAMS to CUBS Regression Over Time on Child Behavior Concerns

Measure	β	SE	Exp(β)	95% CI
Postpartum Depression	1.1**	0.5	3.1	1.3 – 7.9
Depression and Anxiety	1.1**	0.4	3.0	1.2 – 7.2

Note: $p < .05$ *, $p < .01$ **, $p < .001$ ***.

Aim 3, Figure 16: Longitudinal Analysis PRAMS to CUBS Cohort 2

Aim 3 examines several indicators of intergenerational trauma among children of Alaska Native mothers. Figure 16 (pictured below) examines child interpersonal violence (16A) and child stress (16B) among children of Alaska Native mothers in Cohort 2 at the three year follow up. These models take a longitudinal perspective in examining maternal level indicators in relation to these child outcomes.

Figure 16A: Cohort 2 PRAMS to CUBS Parental Report of Child IPV

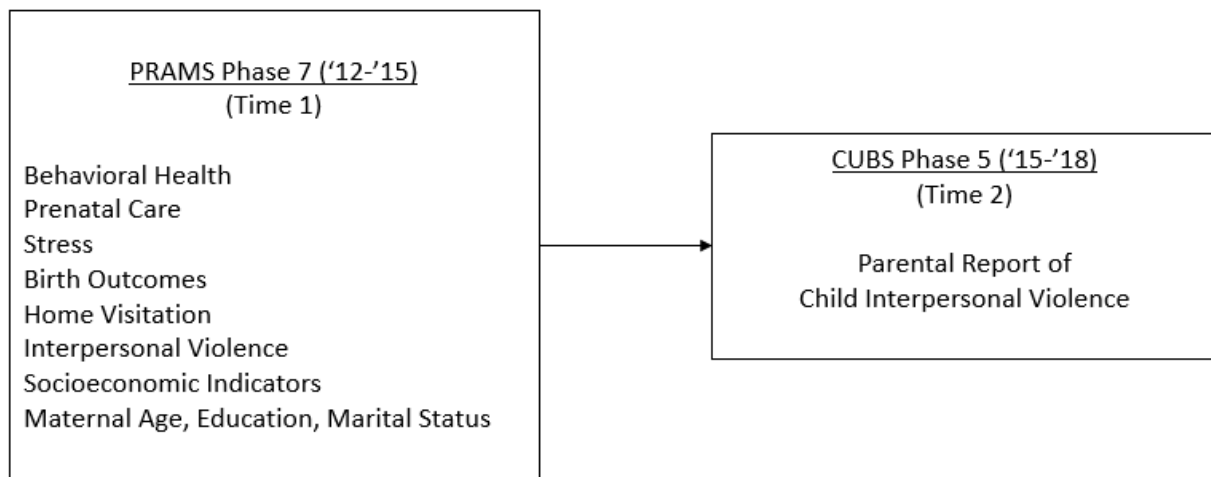


Figure 16A: Cohort 2 PRAMS to CUBS Longitudinal Parental Report of Child IPV.

Outcome Variable: Child Interpersonal Violence. Child experiences of interpersonal violence are assessed through the question, *Did an adult ever push, hit, slap, kick, choke, or physically hurt your 3-year-old child in any other way? (Do not include spanking that did not leave a bruise). (yes/no)*. Children witnessing violence is assessed through the question, *Has your child ever witnessed violence or physical abuse between household members? (yes/no)*. These items were combined to create a measure to represent child's experiences of interpersonal violence through physical or witnessing. If respondents indicated yes to either measure, they were coded as having experienced child IPV. A total of 796 Alaska Native mothers responded to

these items with 51 missing values. Approximately 8% (n=60) of Alaska Native mothers indicated their children had experienced or witnessed interpersonal violence. Table 44 below demonstrates descriptive statistics of all included independent variables in the present analysis over time.

Table 44

Cohort 2 PRAMS to CUBS Independent Variable Descriptive Statistics Over Time

	PRAMS (Time 1) n=1,738		CUBS (Time 2) n=847	
	n-size	%	n-size	%
Depression Diagnosis	161	10%	68	8%
Depression or Anxiety	325	19%	144	17%
Postpartum Depression	729	43%	343	42%
Tobacco Use	938	55%	427	51%
Marijuana Use	392	24%	174	22%
Alcohol Use	1050	62%	521	63%
Prenatal Care				
< 9	707	42%	340	41%
9 – 11	441	26%	211	25%
12 +	543	32%	282	34%
High Stress	608	36%	275	33%
Poverty	761	44%	337	40%
Home Visitation	204	12%	106	13%
Demographics				
Married	611	35%	354	42%
High School Edu	1341	78%	697	83%
Maternal Age (20-29)	1051	61%	480	57%
Interpersonal Violence	168	10%	66	8%
Baby in NICU	344	21%	157	19%

SAS %SURVEYGENMOD Macro

The %SURVEYGENMOD macro developed for SAS allows researchers to account for complex survey design in generalized linear models over time. In order to use the macro, data must meet certain requirements, namely inclusion of only numeric variables, creating dummy variables for categorical measures, and the deletion of missing values (Silva, 2017). The process

of deleting missing variables and the subsequent sample size is detailed in Table 45 below.

Limitations of using the macro are discussed in Chapter 6. Ultimately, the sample was reduced from n=847 to n=683, with roughly 19% of the sample missing.

Table 45

Cohort 2 PRAMS to CUBS Sample Size Reduction to meet %SURVEYGENMOD Requirements

	Original		Meeting Macro Requirements	
	n-size	%	n-size	%
Depression Diagnosis	819	97%	797	94%
Depression or Anxiety	797	94%	794	94%
Postpartum Depression	794	94%	776	92%
Tobacco Use	776	92%	773	91%
Marijuana Use	773	91%	753	89%
Alcohol Use	753	89%	751	89%
Prenatal Care				
< 9	751	89%	737	87%
9 – 11	737	87%	737	87%
12 +	737	87%	737	87%
High Stress	737	87%	735	87%
Poverty	735	87%	731	86%
Home Visitation	731	86%	731	86%
Demographics				
Married	731	86%	730	86%
High School Edu	730	86%	720	85%
Maternal Age (20-29)	720	85%	720	85%
Interpersonal Violence	720	85%	720	85%
Baby in NICU	720	85%	712	84%
Parent Report of Child IPV	712	84%	683	81%

Bivariate Associations

Each independent variable was tested with the dependent variable of parental report of child interpersonal violence in order to assess bivariate associations. While depression diagnosis (p=0.3) and being checked for depression or anxiety (p=0.1) were not significantly associated with the outcome, postpartum depression was ($\beta = 0.7$, SE= 0.3, $p < .05$). Alaska Native mothers who endorsed symptoms of postpartum depression were 2.1x more likely to report that their children had experienced interpersonal violence over time (95% CI: 1.1 – 3.9). Alcohol use

($p=0.2$) and tobacco use ($p=0.1$) were not significantly associated with the outcome; however, marijuana use was a significant predictor of parental report of child IPV ($\beta=1.5$, $SE=0.3$, $p<.001$). Alaska Native mothers who reported using marijuana surrounding pregnancy were 4.3x more likely to report their child had experienced IPV over time (95% CI: 2.3 – 8.2).

Neither prenatal care or home visitation measures were significant predictors of parental report of child IPV. All levels of total prenatal care were not significantly associated with the outcome: less than 9 visits ($p=0.5$), between 9 and 11 visits ($p=0.9$), and 12 or more visits ($p=0.5$). Similarly, home visitation surrounding pregnancy was not a significant predictor of parental report of child IPV ($p=0.3$).

High levels of stress and maternal experiences of interpersonal violence surrounding pregnancy were both significant predictors of parental report of child IPV over time. Alaska Native mothers with high levels of stress were 3.9x more likely to report that their child had experienced interpersonal violence in their lifetime ($\beta=1.4$, $SE=0.3$, $p<.001$; 95% CI: 2.0 – 7.5). Similarly, mothers who reported experiencing interpersonal violence surrounding their pregnancy were more 1.9x more likely to report that their child had also experienced interpersonal violence over time ($\beta=1.9$, $SE=0.4$, $p<.001$; 95% CI: 3.1 – 15.1).

Poverty and marital status were significant predictors of parental report of child IPV while the remaining maternal demographics and birth outcomes were not. Poverty surrounding pregnancy was significantly associated with the outcome ($\beta=0.6$, $SE=0.3$, $p<.05$). Alaska Native mothers who resided below the federal poverty line were 1.9x more likely to report their child had experienced interpersonal violence over time (95% CI: 1.0 – 3.6). Maternal marital status emerged as a protective factor in relation to the outcome ($\beta=-0.96$, $SE=0.4$, $p<.01$). Alaska Native mothers who were married at Time 1 were 2.5x less likely to report their child had

experienced interpersonal violence at Time 2 (95% CI: 0.2 – 0.8). Maternal age ($p=0.07$), high school education ($p=0.10$), and having a baby in the NICU upon birth ($p=0.5$) all were not significant predictors of the outcome.

Full Model

Postpartum depression, marijuana use, stress, poverty, maternal interpersonal violence, and marital status all surrounding pregnancy (Time 1) were regressed on parental report of child experiences of IPV at Time 2. Marijuana use, stress, and interpersonal violence were significant predictors of parental report of child IPV at Time 2 as seen in Table 46 below. Marijuana use was a significant predictor of parental report of child IPV over time ($\beta = 0.99$, $SE = 0.3$, $p < .01$). Alaska Native mothers who reported using marijuana surrounding pregnancy were 2.7x more likely to report their child had experienced interpersonal violence over time (95% CI: 1.4 – 5.2). High stress was significantly associated with the outcome ($\beta = 0.85$, $SE = 0.4$, $p < .05$). Alaska Native mothers who reported high levels of stress surrounding their pregnancy were 2.3x more likely to report their child had experienced interpersonal violence at Time 2 (95% CI: 1.2 – 4.7). Finally, maternal experiences of interpersonal violence surrounding pregnancy was a significant predictor of parental report of child IPV at Time 2 ($\beta = 1.1$, $SE = 0.5$, $p < .05$). Alaska Native mothers who reported experiencing interpersonal violence surrounding their pregnancy were 3.1x more likely to report their child had also experienced interpersonal violence in their lifetime (95% CI: 1.2 – 8.1).

Table 46

Cohort 2 PRAMS to CUBS Regression Over Time on Parental Report of Child IPV

	β	SE	Exp(β)	95% CI
Marijuana Use	0.99**	0.3	2.7	1.4 – 5.2
Stress	0.85*	0.4	2.3	1.2 – 4.7
Interpersonal Violence	1.1*	0.5	3.1	1.2 – 8.1

Note: $p < .05$ *, $p < .01$ **, $p < .001$ ***.

Figure 16B: Cohort 2 PRAMS to CUBS Child Stress

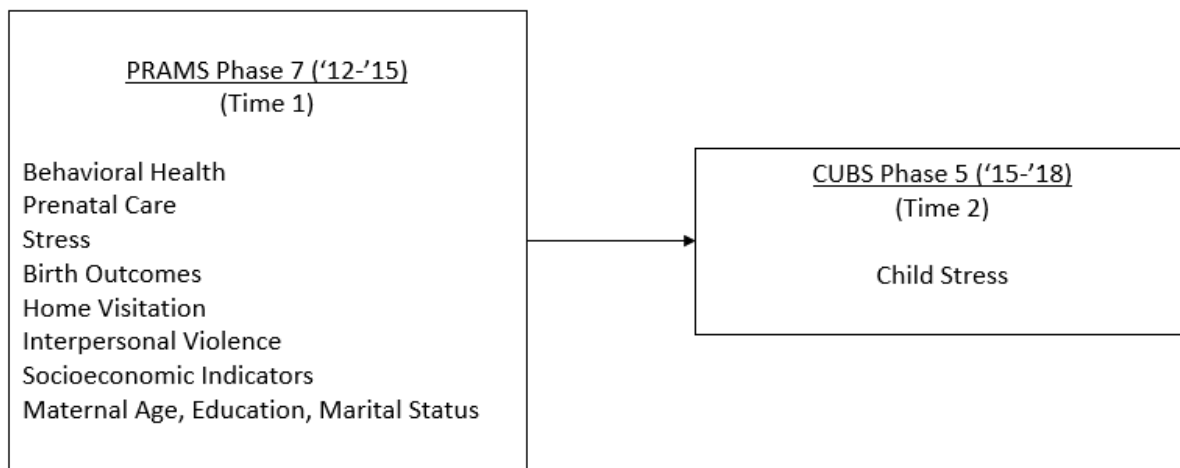


Figure 16B: Cohort 2 PRAMS to CUBS Longitudinal Child Stress.

Outcome Variable: Child Stress. Children’s stressful life events are assessed through several items children may have experienced since birth: *alcoholism or mental health disorder among household members; death of a household member; overnight stay in a hospital; witnessed violence or physical abuse between household members (yes/no)*. These four questions were totaled and dichotomized into high vs. low child stress. Respondents who experienced no stressful life events were coded as low stress, while those with one or more stressful life event were coded as high stress. Ultimately, the sample was reduced from n=847 to n=683, with roughly 19% of the sample missing, which is identical to the previous model in Figure 16A, see Table 39 on page 172 for reference. A total of 683 Alaska Native mothers responded to the items, with no missing values. Approximately 37% of Alaska Native mothers (n=250) indicated their child had high levels of stress.

Bivariate Associations

Each independent variable was tested with the dependent variable of child stress in order to assess bivariate associations. While maternal depression diagnosis was not significantly

associated with the outcome ($p=0.08$), visiting a healthcare worker to be checked for depression or anxiety ($\beta= 0.6$, $SE= 0.2$, $p<.01$) and postpartum depression ($\beta= 0.5$, $SE= 0.2$, $p<.01$) were both significant predictors of child stress over time. Alaska Native mothers with depression or anxiety surrounding their pregnancy were 1.9x more likely to report their children having high levels of stress at Time 2 (95% CI: 1.2 – 2.9). Similarly, Alaska Native mothers with symptoms of postpartum depression were 1.7x more likely to report their child having a high level of stress at Time 2 (95% CI: 1.2 – 2.4). Alcohol use ($p=0.5$) and tobacco use ($p=0.05$) were not significantly associated with the outcome. Marijuana use surrounding pregnancy was significantly associated with child stress at Time 2 ($\beta= 0.4$, $SE= 0.2$, $p<.01$). Alaska Native mothers who reported marijuana use surrounding pregnancy were 1.9x more likely to report high levels of stress among their children at Time 2 (95% CI: 1.3 – 2.9).

Total prenatal care visits and home visitation were not significantly associated with the outcome but having a baby in the NICU upon birth was a significant predictor of child stress ($\beta= 1.1$, $SE= 0.2$, $p<.001$). Alaska Native mothers who had a baby in the NICU upon birth were 3.2x more likely to have children with high stress over time (95% CI: 1.9 – 5.1). All levels of total prenatal care were not significantly associated with the outcome: less than 9 visits ($p=0.2$), between 9 and 11 visits ($p= 0.9$), and 12 or more visits ($p=0.2$). Similarly, home visitation surrounding pregnancy was not a significant predictor of child stress ($p=0.4$).

Stress and interpersonal violence were significant predictors of the outcome; however, poverty was not ($p=0.07$). Stress was significantly associated with child stress ($\beta= 0.5$, $SE= 0.2$, $p<.01$). Alaska Native mothers who reported high levels of stress surrounding pregnancy were 1.6x more likely to report their child experiencing high levels of stress at Time 2 (95% CI: 1.1 – 2.4). Maternal interpersonal violence at Time 1 significantly predicted child stress at Time 2 ($\beta=$

1.0, SE= 0.3, $p<.01$). Alaska Native mothers who reported experiencing interpersonal violence surrounding pregnancy were 2.6x more likely to report their children having high levels of stress over time (95% CI: 1.3 – 5.1). None of the maternal demographics were significantly associated with the outcome: marital status ($p=0.20$), maternal age ($p=0.44$), and high school education ($p=0.71$).

Full Model

Postpartum depression, depression and anxiety, marijuana use, stress, interpersonal violence, and having a baby in the NICU surrounding pregnancy (Time 1) were all regressed on child stress at Time 2. Depression and anxiety, postpartum depression, and having a baby in the NICU were all significant predictors of child stress over time, as seen in Table 47 below. Alaska Native mothers who visited a healthcare worker to be checked for depression or anxiety surrounding pregnancy were 1.8x more likely to report high stress levels in their children over time ($\beta= 0.6$, SE= 0.2, $p<.01$; 95% CI: 1.2 – 2.9). Postpartum depression was a significant predictor of child stress over time ($\beta= 0.4$, SE= 0.2, $p<.05$). Alaska Native mothers who endorsed symptoms of postpartum depression were 1.5x more likely to report high stress levels in their children over time (95% CI: 1.0 – 2.1). Finally, Alaska Native mothers who reported having a baby in the NICU upon birth were 3.3x more likely to report high levels of stress among their children over time ($\beta= 1.2$, SE= 0.2, $p<.001$; 95% CI: 2.0 – 5.3).

Table 47

Cohort 2 PRAMS to CUBS Regression Over Time on Child Stress

Measure	β	SE	Exp(β)	95% CI
Depression or Anxiety	0.6**	0.2	1.8	1.2 – 2.9
Postpartum Depression	0.4*	0.2	1.5	1.0 – 2.1
NICU upon Birth	1.2***	0.2	3.3	2.0 – 5.3

Note: $p<.05$ *, $p<.01$ **, $p<.001$ ***.

Chapter 6: Discussion + Conclusion

6.1 Discussion

Aim One

The central focus of Aim 1 was to better understand the prevalence of interpersonal violence among Alaska Native mothers. Key research questions centered on what individual factors discriminate between Alaska Native mothers who reported experiencing interpersonal violence in comparison to those who did not. Models 1-6 revealed several illuminating patterns surrounding the Indigenous women who reported experiences of violence both surrounding pregnancy and during the 3 years follow up.

The overall prevalence of interpersonal violence surrounding pregnancy for Alaska Native mothers in cohort 1 PRAMS was 13% (n=159) and 10% (n=168) in cohort 2 PRAMS. These demonstrate similar self-report rates of IPV immediately surrounding pregnancy for Alaska Native mothers. Overall, while lower than studies of lifetime intimate partner violence prevalence (1 in 2; Breiding, 2014), Aim 1 prevalence findings fit with the few existing studies surrounding pregnancy violence among American Indian and Alaska Native mothers (Kemberling & Avellaneda-Cruz, 2013; Mylant & Mann, 2008; Malcoe et al., 2004). The present study found 13% of Cohort 1 and 10% of Cohort 2 Alaska Native mothers experienced violence surrounding pregnancy, which fits with existing literature that posits roughly 1 in 10 Native Alaskan women who recently gave birth experiencing violence (Kemberling & Avellaneda-Cruz, 2013) and Malcoe et al.'s study that found 9% of Native women experiencing IPV during their pregnancies (2004). A 2011 Alaskan report on Native women, indicated that the self-report of IPV in Alaska among pregnant women declined significantly across 2000 to 2008 (Young et al, 2011). A later data book was published in 2018 and suggested the decline might have leveled but

the question reported was limited to physical abuse during pregnancy (Perham-Hester & Young, 2018), but these data were collected after the present Cohort 2 and the combination of questions used here are somewhat different. It is therefore difficult to understand whether the reduced prevalence reflects a population level decline or simply a change in questions asked. Results of the present study demonstrate a slightly higher prevalence among Alaska Native mothers and their pregnancies.

While some literature has suggested that pregnancy could be a time of reduced risk for IPV (Kita et al., 2020), based on the results of the present study, this study is consistent with others that find pregnancy is a time of increased risk (Taillieu & Brownridge, 2010). Within cross-sectional models in both cohorts there was a trend toward a reduced number of mothers reporting IPV in the CUBS data three years following pregnancy (Figures 1-4). The majority (over 70% across cohorts) of Indigenous women who reported IPV in the present study did so at the baseline pregnancy survey with a reduced rate reporting later violence when their children were aged three. It is not clear if such findings reflect the way in which questions were asked or are specific to the population of women willing to respond to PRAMS surveys. In the longitudinal models (Fig. 5 and 6), maternal stress surrounding pregnancy was a significant predictor of interpersonal violence over time for both cohorts; however, it was only within cohort 1 that interpersonal violence surrounding pregnancy significantly predicted experiencing interpersonal violence over time. Future work should continue to longitudinally examine patterns of violence both surrounding and beyond pregnancy among American Indian and Alaska Native mothers.

Similarly, both statistical models of IPV surrounding pregnancy (Fig. 1 and 2) showed significant associations with postpartum depression, marijuana use, high levels of stress, and poverty. These findings demonstrate the salience of both behavioral health measures of

postpartum depression and marijuana use, the impact of stress, and socioeconomic status in experiences of interpersonal violence. While substance abuse has been named as a cause and consequence of IPV (Duran et al., 2009; Taillieu & Brownridge, 2010), much of the work regarding mental health and stress has focused on them as consequences of IPV. While substance use has been named a significant issue among Alaskan Natives much of the attention has focused on alcohol (Montag et al., 2019). The present study instead found only marijuana use to be significant in relation to IPV; however, the relationship between IPV and substance abuse has not been well-studied among Native peoples. The association between poverty and IPV among pregnant and postpartum women is consistent with prior literature (Kothari et al., 2016; Masho et al., 2019). Finally, while the relationship of stress as a risk for IPV is less clear, there is some literature finding that crises can and do precipitate increases (Moreira & Costa, 2020). In the present study it is not possible to ascertain causal ordering of IPV given that earlier instances of IPV might not be reflected that might predate the behavioral or stress measures.

Aim Two

The central focus of Aim 2 was to investigate the potential relationship between stress and behavioral health with the outcomes of prenatal care and social support, and to see if these relationships differ by Alaska Native mothers who experience interpersonal violence and those who do not. Overall, stress, most of the behavioral health measures, and interpersonal violence were not significantly associated with prenatal care among Alaska Native mothers in the present study in either cohort. The lack of association between IPV and less prenatal care was somewhat surprising given literature indicating that IPV is a significant barrier to prenatal care (Taillieu & Brownridge, 2010). Alaska Native mothers experiencing poverty were both more likely to have less total visits. These findings fit with existing literature on the relationship between poverty

and prenatal care among Alaska Native and American Indian women (Heck et al., 2021; Sarche & Spicer, 2008) and demonstrate the salience of poverty as a key entry point for improving access to prenatal care. In the later cohort, married mothers and mothers with a high school education or equivalent were more likely to have a greater amount of prenatal care visits. These findings fit with existing literature that marital status and higher levels of education are protective factors for prenatal care access (Austin et al., 2018; Van Horne et al., 2015; Parrish et al., 2011; Putnam-Hornstein, 2011). It is not clear why these variables lacked significance in the earlier cohort.

While the majority of behavioral health variables in the models were not associated with amount of prenatal care visits, there was a significant association with self-reported alcohol use and depression or anxiety. In both cohorts, alcohol use was significantly associated with an increased likelihood of having a greater amount of total prenatal care visits. These results are consistent with existing PRAMS analyses that have found mothers with a greater amount of prenatal care visits were more likely to report alcohol use during pregnancy (Hebert & Sarche, 2021). It is not possible to know at what point in the pregnancy a mother disclosed nor is it possible to know if medical providers encouraged a greater number of visits because of health concerns for the pregnancy. Screening for perinatal depression is gaining ground as a best practice in many practice settings with pregnant women (Milgram & Gemmill, 2014). Alaska Native mothers who were checked by a healthcare worker for depression or anxiety before they became pregnant were less likely to have less than 9 total prenatal care visits. Recent research indicates that Indigenous women and women experiencing IPV have higher rates of perinatal depression and Alaska has higher rates of providers asking about depressive symptoms in pregnancy compared to the rest of the US (90% v 70%) (Bauman et al, 2020). The association in

the present study seems positive and might indicate more service that also increases prenatal care visits. Future work should investigate timing of mental health issues in conjunction with prenatal care as well as the type of treatment received for those found to have significant behavioral health needs during pregnancy.

Certain community level variables also predicted prenatal care. Residing below the federal poverty line emerged as a prominent association with amount of prenatal care visits across both cohorts (refer back to Fig. 7 and 8). There were some differences by cohort, however. In the earlier cohort women living in both rural communities and those with alcohol restrictions were more likely to have less total prenatal care visits. These findings are consistent with previous research demonstrating that rural American Indian and Alaska Native mothers are more likely to have inadequate prenatal care (Danielson et al., 2018; Johnson et al., 2010) as they face a greater likelihood of longer distances to access health services and limited availability of transportation systems in rural areas (Baldwin et al., 2009; Baldwin et al., 2002). It is less clear why residing in areas with alcohol restrictions increased access to care, but some research in Australia indicates that the imposition of alcohol restrictions in Aboriginal communities holds promise for reduced prenatal alcohol consumption (Symons et al, 2020).

The original focus of Aim 2 was to investigate both timing and access of prenatal care among Alaska Native mothers; however, both variables did not provide sufficient distribution in order to examine differences. When asked how far along mother were in their pregnancy when they had their first prenatal care visit, a total of 1,125 Alaska Native mothers indicated the beginning of their prenatal care, with 87 missing. The vast majority (92%) of mothers indicated they had their first prenatal care visit during their first trimester. When asked if they received prenatal care as early as they wanted in their pregnancy, a total of 1,180 Alaska Native mothers

responded, with 56 missing. Nearly 80% reported they did get prenatal care as early as they wanted. Consistent with other findings, it appears that Alaska Native mothers have excellent prenatal care access (Johnson, 2020). Many rural communities in Alaska receive healthcare from an Alaska Native Regional Health Corporation hospital or clinic (Blabey & Gessner, 2009). These agencies target services toward Alaska Native communities and provide services regardless of ability to pay (Blabey & Gessner, 2009). As such, healthcare access and socioeconomic indicators may contribute less to health disparities for Alaska Natives in comparison to American Indian groups elsewhere (Blabey & Gessner, 2009) and could explain the lack of variance in these measures of prenatal care.

The second half of Aim 2 continues the investigation of stress and behavioral health but takes a closer look at social support. In both cohorts, stress and interpersonal violence were not significantly associated with social support. While the lack of association with IPV was unexpected, there was a very small number of Native women reporting IPV in the CUBS data when the index child was about three years old (only 7% in Cohort 1 and 5% in Cohort 2). The relationships of social support with behavioral health was inconsistent. For Cohort 1, depression was associated with a decreased likelihood of having social support; however, in Cohort 2 women reported that “loss of interest” (a symptom of depression) was associated with an increased likelihood of having social support.

Socioeconomic and community indicators had stronger associations with social support. While different measures of lower income rose to significance in the two cohorts, both cohorts indicated that lower income women had less social support. Research has demonstrated that Native mothers are more likely to qualify for low-income health insurance and family nutrition programs; a recent study found that approximately 47% of Native mothers used WIC while only

22% of white mothers did (James et al., 2021). It is not clear if these formal supports are used in lieu of informal supports or if the lack of informal supports have led to encouraged use of formal supports. Additionally, cohort 1 but not the more contemporary cohort had significant associations with rurality and alcohol restrictions with decreased social support. This suggests the salience of community rurality and alcohol restrictions and fits with previous literature on the role of rurality and community alcohol restrictions for Alaska Native mothers (Austin et al., 2018). It is not clear why such community characteristics did not hold for the more contemporary cohort.

Aim Three

The central focus of Aim 3 is to examine several potential indicators of intergenerational trauma impacting children of Alaska Native mothers.

Neonatal Outcomes – Time 1

In models of cohort 1 and 2, interpersonal violence was significantly associated with an increased likelihood of having a baby in the NICU upon birth. Prior research has documented the role of maternal interpersonal violence in low birth weight and higher rates of pre-term birth, both of which are well-established leading causes of neonatal outcomes like morbidity and mortality (Alhusen et al., 2015; Bailey, 2010; Shah & Shah, 2010; El Kady et al., 2005; Murphy et al., 2001). While research regarding the relationship between maternal violence during pregnancy and having a baby in the NICU is lacking, previous studies have found associations between lifetime physical or sexual abuse linked to pre-term birth rates among AI/AN mothers (Raglan et al., 2016; Shah & Shah, 2010; Bohn, 2002). Further, behavioral health measures in both models increased likelihood of having a baby in the NICU. Maternal tobacco use during pregnancy has a strong relationship in the literature with poor birth outcomes for Native children

(Danielson et al., 2018; Dorfman et al., 2015; LaVallie et al., 2003). Finally, consistent with prior studies, maternal covariates such as high school education and married marital status were significant protective factors that decreased the likelihood of having a baby in the NICU (Austin et al., 2018; Van Horne et al., 2015; Parrish et al., 2011; Putnam-Hornstein, 2011).

Unique associations emerged in each cohort neonatal model as one allowed for community level linkages and the second had a measure of home visitation. Among Cohort 1, Alaska Native mothers who resided in a borough below the federal poverty line were more likely to have their baby in the NICU upon birth. Again, the association between socioeconomic status and poor birth outcomes is well-established in the literature (Danielson et al., 2018; Dorfman et al., 2015). Among Cohort 2, Alaska Native mothers who received home visitation services were more likely to have a baby in the NICU upon birth. This relationship may be related to greater likelihood of high risk pregnancies being referred to home visiting. It is also possible that mothers with babies in the NICU were encouraged to access social services and home visitation to improve outcomes once discharged from the NICU.

Alaska Native mothers who experienced interpersonal violence were more likely to have their children experience the neonatal outcome of having their baby placed in the NICU upon birth than those who did not experience interpersonal violence. This was true across cohorts. Previous research has demonstrated the relationship between neonatal outcomes such as low birth weight and pre-term birth and IPV (Alhusen et al., 2015); however, Native women are often missing or omitted from these analyses. The findings in the present study contribute to earlier findings that physical or sexual abuse are related to pre-term birth rates (Raglan et al., 2016; Shah & Shah, 2010; Bohn, 2002). This study adds to the literature by demonstrating a direct relationship between interpersonal violence surrounding pregnancy and the neonatal outcome of

having a baby in the NICU upon birth among Alaska Native mothers. To the best of the authors knowledge, this is the first study to examine IPV surrounding pregnancy and neonatal outcomes among American Indian and Alaska Native mothers.

Developmental Outcomes – Time 2

Cohort 1 analyses found an association between maternal tobacco use and child developmental concerns. These findings are consistent with previous literature on the significance of tobacco in relation to child outcomes, as maternal tobacco use is a known predictor of poor outcomes for Native children (Danielson et al., 2018; Dorfman et al., 2015; LaVallie et al., 2003). Maternal experiences of interpersonal violence were significantly associated with both child experiences of interpersonal violence and child stress. Maternal stress was also associated with an increased likelihood for the child to experience IPV. Children with married mothers were less likely to experience IPV which is consistent with prior literature (Austin et al., 2018; Van Horne et al., 2015; Parrish et al., 2011; Putnam-Hornstein, 2011). Finally, maternal experiences of IPV and maternal marijuana use were associated with child stress levels. Previous work has found that women experiencing IPV were more likely to use marijuana than those who did not experience violence (Alhusen et al., 2013); however, the relationship between maternal marijuana use and child outcomes on the child are inconclusive. Some studies find adverse child level effects related to maternal marijuana use (Hayatbakhsh et al., 2012), including low birth weight (Alhusen et al., 2013). Earlier studies, however, did not find adverse child outcomes associated with use (Fergusson et al., 2002). Confounding our understanding of this relationship is the change in potency of marijuana over the past 20 years (ElShohly et al, 2016). Lastly, qualifying for free or reduced school lunch program was associated with an increased level of child stress; however, this measure is likely a proxy for

poverty or having multiple children in the household. In other words, as this measure of assistance is typically restricted to school-aged children it is not clear if this is an indicator of mothers with young children who also have older children who qualify for this program.

Longitudinal Child Outcomes

Child Welfare System Involvement. Continuing with investigations of intergenerational impacts of trauma, analyses for Cohort 1 were able to include involvement in child welfare through the ALCANLink data project. The ALCANLink data time range covers the sample through 10-11 years old. Most reports of child maltreatment occur earlier in childhood (US Department of Health and Human Services, 2022). Although some children are only reported in later years, the present analyses cover the majority of first reports to child protection. Analyses examined initial report then whether or not those reported were substantiated and subsequently entered foster care (a relatively rare outcome $n=99$). The prevalence of maltreatment reports among Alaska Native mothers in the present sample was 56%. This is unfortunately not an anomaly as previous research has found that disproportionate interaction of American Indian and Alaska Native families with the child welfare system. Throughout Alaska, the child maltreatment allegation rate is higher than the national average, with roughly 86 in Alaska reported compared to 55 per 1,000 children in 2016) (Austin et al., 2019). Children of mothers from minority racial or ethnic backgrounds have disproportionate contact with CPS (Austin et al., 2018; Putnam-Hornstein et al., 2013; Parrish et al., 2011). American Indian and Alaska Native children are disproportionately represented in the child welfare system, including both overrepresentation in out of home care, and underrepresented in preventative and restorative services in comparison to the general population (Cross, 2021). Roughly 1 in 2 Alaska Natives and American Indians have

had contact with the Child Protective Services (CPS) while only 1 in 4 non-Natives have had CPS contact (Austin et al., 2018; Parrish et al., 2011).

Several scholars have differing theories regarding the main contributor of racial disproportionality in the child welfare system (Feely & Bosk, 2021; Dettlaff & Boyd, 2020; Austin et al., 2018; Putnam-Hornstein et al., 2013; Drake et al., 2011; Dettlaff et al., 2011; Drake et al., 2009). Higher CPS involvement among American Indian and Alaska Native communities may be explained through difficult to measure or invisibilized factors such as institutional bias, detection bias, differing distribution of risk factors such as poverty and substance use, and the subsequent intergenerational and collective trauma that inform these disproportionate risks (Austin et al., 2019; Newby-Kew et al., 2014). Native communities have experienced extensive trauma and historical oppression through forced assimilation, family separation, higher instances of foster care and land and resource seizures (Austin et al., 2020). Several generations of Native communities were robbed of traditional parental role models and interrupted the integrational transmission of health child-rearing practices (Johnson, 2020; Warne & Lajimodiere, 2015).

In the present study, poverty was associated with initial report of maltreatment which is consistent with a number of prior studies (Austin et al., 2019; Austin et al., 2018; Kim et al., 2017). For both child maltreatment and report substantiation models, tobacco use was a significant predictor of increased likelihood. Maternal tobacco use is a known predictor of CPS contact (Austin et al., 2018; Thompson et al., 2013; Parrish et al., 2011). In a recent examination, roughly half of Alaska Native mothers who smoked during pregnancy had later CPS involvement compared to 1 in 4 odds among those who did not smoke (Austin et al., 2018). It may be that smoking is a proxy in available data for other issues that could serve as a useful indicator for preventive intervention.

For the report for child maltreatment model, having a baby in the NICU upon birth was a significant predictor for increased involvement. Maternal marital status and education level were protective predictors in all three CW system models except removal from home model.

Approximately 2 out of 3 of those with less than a high school education will interact with the child welfare system while only 1 in 4 of those with a high school education or equivalent (Austin et al., 2018). These findings fit with a multitude of existing literature that being married and having a high school education are protective factors for interactions with the child welfare system (Austin et al., 2018; Van Horne et al., 2015; Parrish et al., 2013; Putnam-Hornstein et al., 2013; Thompson et al., 2013; Putnam-Hornstein & Needell, 2011; Parrish et al., 2011). Notably education and marital status are also associated with socioeconomic status (Marten et al., 2014; Choi & Marks, 2011).

Alaska Native mothers who reported high levels of stress were more likely to be reported for child maltreatment. Similarly, Alaska Native mothers who experienced interpersonal violence surrounding their pregnancies were more likely to be reported for child maltreatment. These findings fit with existing literature as both maternal stress and interpersonal violence are known significant predictors of involvement with the child welfare system for Alaska Native and American Indian mothers (Austin et al., 2018; Parrish et al., 2015; Coohey et al., 2013; Parrish et al., 2011). This again demonstrates the intergenerational impact of trauma as mothers who experienced violence also had children who experienced some form of harm, thus leading to them being reported for child maltreatment.

A report of maltreatment is a precursor to substantiation which is a disposition for a report (US Department of Health and Human Services, 2022). Those who reported marijuana use were more likely to have a report substantiated. Maternal substance use has received increasing

attention as a factor for child welfare system involvement (Austin et al., 2019; Rebbe et al., 2019; Prindle et al., 2018). It may be that poverty and other circumstances are predictive of or concurrent with additional risks like maternal substance abuse. Qualitative work with Native mothers from the Pacific Northwest has found that having children taken by CPS was both a cause for them to use substances and a motivator to seek treatment for their substance use (Schultz et al., 2018). Early prenatal care emerged as the only protective factor among the report substantiation model. Those who had their first prenatal care visit as early as they wanted were less likely to have a report substantiated. These findings fit with existing research that has found early prenatal care is a protective factor for involvement with the child welfare system (Austin et al., 2018; Eastman et al., 2016; Putnam-Hornstein, 2011).

Finally, the present work found significant associations between maternal alcohol use and having their child removed from the home. Native children in Alaska have high rate of child removal from their families and placement in out of home care, demonstrating a legacy of harm against Indigenous mothers and their children (Austin et al., 2019). Native mothers are twice as likely to be investigated once reported, twice as likely to have their reports substantiated upon investigation, and three times more likely to have their children placed in out of home care (Cross, 2021). In 2014, Native children represented 0.9% of the US population but accounted for 2.4% of total children in foster care (Cross, 2021). Specific to the state of Alaska from 2006 – 2013, Alaska Native children made up nearly 20% of all children in the state but accounted for 60% of all children in foster care, a rate 7 times higher than white children (Vadapalli et al., 2014). In the present study, approximately 10% of Alaska Native mothers had their children removed from the home.

Ultimately, this dissertation takes the approach of examining the overall contact with the child welfare system as the outcome in and of itself – regardless of report screen in or substantiation. Early, chronic, or continuous contact with CPS are all associated with worsened outcomes (Austin et al., 2019); however, the present work only censors upon first event. Previous research has found that child welfare system involvement regardless of screening or substantiation determination can serve as a proxy measure for both potential or real harm to the child; as such, the variable of any CPS contact is treated as an independent marker of child risk and vulnerability (Austin et al., 2018). Additionally, research has shown that outcomes and future contact with the child welfare system is the same, regardless of screening or substantiation decision (Austin et al., 2019). Further, including only reports that are screened in assumes that exclusions are made based upon sufficient information to make an informed decision (Austin et al., 2019; Drake et al., 2003; Hussey et al., 2005). Lastly, measures of CPS involvement may serve more as indicators of surveillance than actualized interaction, particularly among those with greater exposure to and access to professionals who make the initial report such as mandated reporters (Austin et al., 2018). Ultimately, CPS contact may represent a larger unmet need for family or social services, environmental stress, or overall household dysfunction (Austin et al., 2018).

Concern for Child. The CUBS survey asked mothers if they had concern for their child's development related to how their child acts, gets along with others, or shows feelings. In a longitudinal examination, both postpartum depression and depression or anxiety surrounding pregnancy were significant predictors of child behavior concerns over time; however, the overall prevalence of Alaska Native mothers expressing these concerns was quite low (11%). It is possible this question was interpreted differently by Alaska Native mothers, particularly in

consideration of communal caretaking models that are common among Indigenous communities. Future work should investigate varying forms of measurement of child developmental concerns among Native communities and whether this changes across developmental stages.

Child IPV and Stress. The final models explored parental report of child experiences of IPV and child stress. Maternal marijuana use surrounding pregnancy was a significant predictor of parental report of child experiences of interpersonal violence at Time 2 in Cohort 2. As previously mentioned, women who experience IPV are more likely to use marijuana (Alhusen et al., 2013) and research has shown that children are the ‘silent victims’ of interpersonal violence in the household (Meyer et al., 2021). It is possible that the relationship between maternal marijuana use and parental report of child interpersonal violence could be more representative of the association between maternal and child IPV rather than marijuana use itself. Future work should continue to evaluate maternal experiences of IPV, marijuana use, and the impact upon children (Alhusen et al., 2013). Maternal stress surrounding pregnancy significantly predicted parental report of child experiences of IPV over time, which is a substantial addition to the literature as very little research exists that examines the effects of stress upon Native parents (Saunders, 2016). Perhaps unsurprisingly, maternal experiences of interpersonal violence surrounding pregnancy were significant predictors of parental report of child experiences of IPV at Time 2, as consistent with prior literature (Meyer et al., 2021; Gartland et al., 2019; Lourenco et al., 2013; Kitzmann et al., 2003).

When examining child stress as an outcome, maternal depression and anxiety surrounding pregnancy, postpartum depression, and having a baby in the NICU were predictive of high child stress levels at Time 2. These associations may be due to the construction of the child stress variable by combining multiple questions that assess stressful life events the child

may have been exposed to, including if an individual in the household had a problem with alcohol or mental health disorder or if the child has had an overnight stay in the hospital. As such, it is likely that maternal depression and anxiety and postpartum depression and the childhood stressful event of having someone in the household with a mental health issue are collinear. Similarly, it is likely that having a child in the NICU upon birth is answering the same question as if the child has experienced an overnight stay in the hospital. This makes it difficult to disentangle the Time 2 condition from prior events.

A primary goal of Aim 3 of the present dissertation was to understand how current experiences of IPV among Native women were associated with various child outcomes. Overall, maternal experiences of interpersonal violence were associated with having a child in the NICU, parental report of child experiences of interpersonal violence, child stress, and being reported for child maltreatment. These findings demonstrate the multiple manners that interpersonal violence can impact the child. These findings are unique in examining a solely Indigenous sample of mothers and investigating multiple child outcomes across birth, development, and structural manifestations such as interactions with the child welfare system. Situated within the context of historical oppression and structural violence, future work should investigate the impact of interpersonal violence upon Native families across generations. Future work should also examine the mechanisms for how interpersonal violence and subsequent trauma are transmitted generationally among American Indian and Alaska Native communities. This work could inform the development of prevention and intervention work that continues to center Indigenous strength, resilience, and survivance.

6.2 Limitations

There are several limitations to note within the present work. Both key datasets PRAMS and CUBS are based on maternal self-report and are vulnerable to social desirability bias, recall bias, and non-response bias (Austin et al., 2018). Cohort 1 had a response rate of 71% while Cohort 2 had a response rate of 66%. It is possible that this sample of Alaska Native mothers represent a model of willing participants and thus not representative of the entirety of Alaska Native mothers. Further, women in severe interpersonal violence situations may not have been able to complete the survey instruments depending on the level of power and control in the household; thus, these instruments may be biased against women experiencing severe IPV. Further, the PRAMS samples mothers who recently had a live birth. As a result, mothers who had a pregnancy resulting in abortion, miscarriage, or stillbirth were not sampled. Further, PRAMS data is also not representative of mothers who became pregnant within the specified timeframe of the cohorts, only mothers who delivered their children during the time.

Many measures throughout this work required collapsed categories or combined questions in order to attain a sufficient sample size for statistical analyses. Items such as maternal stress and child stress combined several binary measures of stressful life events. Interpersonal violence combined multiple measures of both physical and psychological violence before, during, and after pregnancy. Further, many measures had non-descriptive timeframes especially among substance use variables. Several questions in PRAMS (Time 1) assessed maternal substance use within the previous two years, indicating a time period that would include pregnancy; however, it remains unclear if these measures are specific to pregnancy or in general across the previous two years from the time of survey. It is possible that results may have varied if more precise measures of substance use in relation to pregnancy were available (Austin et al., 2018).

There are key limitations in how interpersonal violence was assessed. Although questions ask about experiences of IPV in the 12 months before pregnancy, during pregnancy, and in the time since pregnancy to the point of survey, there is no accounting for lifetime violence, chronicity of violence, or any indication of severity. Similarly in the CUBS (Time 2), interpersonal violence is assessed within the previous 12 months before the survey follow-up. Again, there is no indication of lifetime violence, chronicity, or severity. Further IPV is not inclusive of other measures of controlling behavior such as economic controls or threats (Montesanti & Thurston, 2015). Future work should assess for prior lifetime experiences of violence beyond the specified study period time, evaluate chronicity through revictimization, and ultimately account for severity of violence to better inform the experiences of survivors. Further, in the evaluation of violence, most questions center on the demographics and related consequences of the survivor; however, next to none of the items evaluate anything about the perpetrator of said violence. Future work must assess perpetrators in order to inform prevention work and intervene at the source of the violence.

Throughout the field of gender-based violence, a multitude of various definitions exist to describe similar or overlapping phenomena. There is a general lack of consensus on differing terms, with interpersonal violence, domestic violence, and intimate partner violence often used interchangeably to the detriment of the field (Jamieson, 2020). This study examines measures of interpersonal violence including family violence (child maltreatment), partner violence (including intimate partner violence and domestic violence), and community violence (including structural violence). However, the questions asked in the PRAMS and CUBS surveys are limited to certain forms of violence and community violence is limited to merged crime data as compared to individual report. The PRAMS only assesses physical violence and elements of

psychological abuse including the controlling partner questions but does not explicitly inquire about emotional or sexual abuse (Masho et al., 2019). Further, the PRAMS and corresponding CUBS leaves out other types of violence such as stalking, reproductive coercion, and human trafficking (Kemberling & Avellaneda-Cruz, 2013). Ideally a future study will be able to capture the full maternal experience in relation to interpersonal violence, childhood violent experiences, and community violence and then relate to later child outcomes.

While survivors of interpersonal violence are at a higher risk for revictimization, the present study was only able to assess for repeated IPV between baseline and PRAMS not lifetime prior victimizations. One of the greatest risks survivors of sexual violence face is an increased risk for revictimization (Simmel et al., 2012; Stockdale et al., 2014; Classen et al., 2005).

Revictimization is the incident of a survivor being assaulted or attacked again. Within the general population, approximately 2 of every 3 survivors of sexual violence will be revictimized (Classen et al., 2005). In the present study, the apparent revictimization rate was quite low but this may reflect the forms of questions asked as well as limitations in who responded to the survey. This is a significant limitation as it is unclear how many instances of violence a mother may have experienced over time, thus potentially compounding her risk for worsened outcomes.

Underreporting remains a consistent limitation within interpersonal violence research, and the present study is not exempt. Regardless of a study's rigor or design, underreporting remains a consistent problem as there are a variety of reasons to not report (Bachman et al., 2010). Survivors may be fearful to disclose information related to the assault, seek help in the aftermath of the assault, and fear reactions from the criminal justice system (Vidal & Petrak, 2007). Very little is known about the relationship between reporting and disclosure of Native survivors with the collective colonial experience (Braithwaite, 2018). Similarly, parents may not

report if their child has witnessed or experienced interpersonal violence due to social desirability bias or fear of child welfare or criminal justice system involvement. Ultimately, culture may also shape the context of disclosure or reporting within American Indian populations as survivors may fear their abuser may go to jail, lose the income or companionship of the abuser, particularly impactful in rural communities, and may distrust agents or process of social control (Braithwaite, 2018).

The utilization of the SAS %SURVEYGENMOD macro led to limitations in order to meet appropriate use requirements (Silva, 2017). Namely deleting missing observations severely limited an already strained sample size and thus the ability to find significant and generalizable results. Further, it is complicated to account for complex survey design and time variations within SAS as PROC GENMOD cannot be used to run GEE models as there is no accounting for survey weights. Ultimately the %SURVEYGENMOD macro provided a pathway to conduct the analysis.

Secondary data analysis is also subject to limitations inherent within the datasets, with the administrative community linkages also holding certain limitations. Reporting crime to the UCR is not mandatory, and as such the UCR data rely on crime reporting from individual police agencies (Booty et al., 2019). Further, the FBI UCR only includes crimes reported to the police that are subsequently reported to the FBI. This may introduce bias in comparisons across jurisdictions as well as variations in willingness of victims to report crimes, law enforcement response, and the overall underrepresentation of crimes (Booty et al., 2019). Census data were centered on the corresponding cohort collection timeframe and as such represent a general estimate of the study timeframe. Both community datasets on alcohol and marijuana restrictions were not listed by year. The only indication of time within these datasets was a measure of when

the restriction was last updated; as such, no prior data on previous restrictions was available. It is unclear if these community level restrictions were in place when the PRAMS data were collected. Community level linkages were only available with cohort 1 data, thus limiting cohort comparison in macro level measures. Overall, community level data were matched by borough or corresponding census tract name, Alaska Native villages or tribal areas were not indicated within the present study. Therefore, it is possible that some community level variables and associations are more of an indication of tribal villages and structural issues resulting from historical oppression. Future work should examine structural issues stratified according to Native village land and jurisdiction compared to the state.

There is an overall lack of cultural specificity within research among American Indian and Alaska Native communities, often leading to an ethnic gloss. While previous studies have utilized AI/AN to encompass all tribal nations within the United States, generalizability is significantly limited as a result. There are 574 federally recognized tribal nations across the US, with 229 federally recognized Alaska Native villages, each with unique cultures and traditions. The present study utilizes pan-Indigenous terms such as Native, Indigenous, AI/AN to describe all Indigenous women in Alaska, American Indian or Alaska Native, thus lacking village or tribal nation affiliation, specification, or designation. The best practices within the movement for decolonizing data include collection of tribal affiliation. Future work with administrative data and national assessments of health should account for tribal affiliation and policies guiding these assessments should mandate the collection of such data.

Finally, although the second cohort includes some notation of home visitation receipt, frequency, quality, and availability of other formal services records are missing. Prenatal care variables demonstrated high access and timing; however, no measures were available to assess

quality of services or other community services, particularly traditional Native birthing practices or programs. Similarly, it is unclear if mothers experiencing stress or depression or IPV sought services in the community. Culturally grounded treatment and traditional healing methods may be a vital part of recovering from interpersonal violence or substance use. This is an important missing factor to understand if existing services could moderate outcomes or if there are issues in access and availability that hamper use. Future studies should include both linkages to other systems as well as mixed methods approaches that can assess maternal willingness to access both formal and informal supports, including cultural methods, to better inform prevention and intervention. This work should also include attention to culturally specific practices that may exist in specific tribal communities.

6.3 Implications

Interpersonal Violence

Results of this work can inform interpersonal violence intervention and prevention efforts across micro, mezzo, and macro levels. This work investigated predictors of interpersonal violence among Alaska Native mothers, with significant findings across behavioral health measures such as postpartum depression, alcohol use, and marijuana use and socioeconomic indicators such as residing below the federal poverty level and WIC use. Interpersonal violence should be screened at all mental health and substance use service appointments as well as interactions with social service systems like WIC and SNAP programs. Of course, screening must be combined with linkage to services to address IPV (Alhusen et al., 2015; Chamberlain & Perham-Hester, 2000).

Within the present study, Alaska Native mothers in both cohorts reported greater amounts of interpersonal violence surrounding their pregnancies than at the 3-year follow-up. These

findings suggest that Alaska Native mothers are at greater risk of experiencing violence surrounding their pregnancy rather than it being a time of respite or reprieve. This has significant implications for screening for IPV at prenatal care visits in order to protect both mom and baby. Medical personnel as well as home visitation program staff that encounter pregnant women need to be trained in both screening and effective referral protocols (Scrafford et al., 2020; Sharps et al., 2016)

Accounting for structural factors beyond the individual risk and protective factors allows for a greater depth of analysis in assessing interpersonal violence among American Indian and Alaska Native communities. This work was informed by Oetzel & Duran's ecological framework (2004) that accounted for both historic and contemporary stressors among Native communities. Other integrated frameworks like the AI/AN community-informed framework for ending violence (Violence Disruptor Model) offer hope for addressing violence in Indigenous communities while accounting for both historical and contemporary oppression, structural issues, and accounting for cultural strengths and resilience (Giacci et al., 2022). Given the greater understanding of structural issues facing Indigenous communities and the growth in research moving from individual interventions toward macro level changes, the time is now to advocate for system level changes to achieve health equity for American Indian and Alaska Native communities. Examples of these system level changes would be to reauthorize the Violence Against Women Act with further protections and jurisdictional power for Native communities, recognize the strength and legitimacy of tribal courts, and provide further funding for community driven, culturally grounded maternal and child healthcare services.

Prenatal Care

Results of this study can have implications for prenatal care utilization access and barriers for Native mothers. The goal of prenatal care is to prevent and identify complications associated with pregnancy, birth, and the newborn's health (Johnson, 2020). Prenatal care is an ideal time for both intervention and prevention efforts as it is a time of frequent interaction with both healthcare and service systems (Austin et al., 2018). There are multiple opportunities to assess and address various social, emotional, and clinical factors that may impact a mother and her family (Austin et al., 2018).

Early and regular prenatal care is associated with better health of both pregnant women and their children (Johnson, 2020); the present study found that the majority of Alaska Native women sampled were able to access prenatal care within their first trimester and reported they were able to begin prenatal care as early as they wanted. The present study also found a protective relationship between early prenatal care and decreased likelihood of interacting with the child welfare system. Further, the present study stratified amount of total prenatal care visits and found significant associations with poverty, maternal mental health and substance use, and community alcohol restrictions and rurality. These findings suggest prenatal care services should interact with social service programs and behavioral health programs in a holistic health approach for the betterment of the mother and child. In order to reach vulnerable women and their children, scholars recommend an evidence-informed multi-agency approach through easily accessible services and interventions (Jamieson, 2020).

Alaskan Native women appear to have better access to prenatal care than other Native women in the US. Other studies, find American Indian women in the US experience significant barriers to prenatal care, including lack of access, dissimilar communication style between

patient and provider, and inconsistent continuity of care (Johnson, 2020). Solutions to improve prenatal care must be tailored to address barriers specific to geography and local Indigenous populations (Baldwin et al., 2002). Even though overall access was high, the present study found significant differences in prenatal care for Alaska Native mothers residing in rural areas compared to urban areas. Geographic differences must be considered in addressing Native health disparities as nationwide information may be unsuitable for policy making and development of interventions at the tribal, state, and local levels (Danielson et al., 2018).

Home Visitation

The present study found a significant relationship in Alaska Native mothers who received home visitation services and having a baby in the NICU; however, the direction and causality of this relationship cannot be established due to the cross-sectional nature of the data. Future research should evaluate Native models of home visitation in relation to interpersonal violence and child developmental outcomes as results could illuminate home visitation access for Native women experiencing interpersonal violence as another plausible intervention point.

Prior work has found that paraprofessional home visitation programs are effective for women using substances (Kvigne et al., 2008). Home visitation programs should integrate care for pregnant women using substances (Kvigne et al., 2008). While the present study failed to find associations between maternal substance use and home visitation there were significant limitations in capturing service use. Future studies should examine the relationship between Native substance use and interaction with home visiting systems.

Poverty

Perhaps the most salient predictor of all measured outcomes throughout the present work was residing below the federal poverty line. Alaska Native mothers who were experiencing

poverty were more likely to experience interpersonal violence, have a decreased amount of prenatal care and social support, and were more likely to be involved with the child welfare system. These findings demonstrate the impact of structural violence throughout Native communities as historical policies continue to perpetuate racism, sexism, and colonialism against Native women.

In order to address poverty among Alaska Native mothers, the gender wage gap must be resolved (Pathak, 2021). The wage gap is much more deeply felt for Native women. In comparison to white, non-Hispanic men, Indigenous women make only 60 cents for every 1-dollar white men make (Tucker, 2021). Prior to the global pandemic, Indigenous women contended with vast socioeconomic disparities, as roughly 18% of Native women and 21% of Native children lived below the federal poverty line in 2019 (Fins, 2020). This racial and gender wage gap has been further exacerbated the COVID-19 pandemic as many working mothers became unable to manage caretaking responsibilities, both within their family and in the broader community, assist in remote learning needs of their children, and responding to the new crises in light of the ever-changing world (Turner, 2021). Managing all of these tasks, expectations, and pressures, in conjunction with worldwide job loss, pushed many Native mothers entirely out of the workforce (Turner, 2021). Ultimately, as Native women are the carriers of their culture, these racialized disparities have ripple effects throughout their communities. The wage gap has implications such as being unable to afford a down payment on a home, pay for their child's higher education, start a business, or even save for retirement (Tucker, 2021). Advocacy and action must be taken in order to bolster equal pay laws, provide increased protections for work-family policies and caregiving protections, and begin to undo the legacy of historical trauma among Native communities.

The present study found significant associations with maternal WIC use (Special Supplemental Nutrition Program for Women, Infants, and Children) and outcomes such as higher likelihood to experience interpersonal violence and a decreased likelihood to have high levels of social support. Programs such as WIC are both proxies for low income and opportunities to help identify pregnant women experiencing interpersonal violence and refer them to the appropriate services. WIC is a unique opportunity to help or potentially intervene for women who are without health insurance but are eligible for WIC services regardless of insurance status (Masho et al., 2019). Results from this study can inform the future viability of reaching Native women experiencing interpersonal violence through social programs like WIC.

Behavioral Health

Further results of this study could illuminate behavioral health initiatives to best support Native moms. Through assessing and addressing depression, postpartum depression, alcohol use, and marijuana use surrounding pregnancy, both mothers and their babies can thrive. Other contextual issues such as social support and stressful life events may help inform pregnancy programming to address outstanding hardships Native mothers may be contending with during their pregnancy and transition to parenthood.

Postpartum Depression. Postpartum depression (PPD) adversely affects both mother and child (Heck, 2021). The present study found significant associations between postpartum depression and maternal experiences of interpersonal violence. These results suggest a need to assess and treat both PPD and IPV. Research has shown that screening for postpartum depression leads to better outcomes, early detection, and ultimately better treatment (Heck, 2021).

In a scoping review of postpartum depression among American Indian and Alaska Native mothers, only 9 articles met criteria (Heck, 2021). No cultural influences, risk or protective

factors were reported; further, findings demonstrate that the majority of postpartum depression literature focuses on middle class white women (Heck, 2021). Future research should investigate culturally grounded responses and interventions to postpartum depression and interpersonal violence among American Indian and Alaska Native mothers.

Depression and Anxiety. The present study found significant associations with maternal depression and anxiety with outcomes such as interpersonal violence, prenatal care, and having a baby in the NICU. This suggests that Alaska Native mothers experiencing interpersonal violence are faced with a multitude of mental health and child-related needs (Owais et al., 2020; Heck, 2018; Mukherjee et al., 2018; Ness et al., 2017). Mental health treatment and prenatal care service points may be ideal places to screen for interpersonal violence among Native women. Prenatal care is an increased time of interaction with both healthcare and social service programs and could be intervention points for mothers experiencing interpersonal violence.

Alcohol Use. The present study found significant associations with maternal alcohol use and outcomes such as maternal interpersonal violence and prenatal care. Prior studies suggest that women of childbearing age should be screened for alcohol use when they present for medical services (Kvigne et al., 2008). Results of the present study indicate that Native mothers should also be screened for alcohol use and interpersonal violence during prenatal care visits. Scholars recommend integrated care for women who use alcohol, such as protective custody options for women escaping violence, case management and treatment services (Kvigne et al., 2008).

Research has found that women perceive alcohol use as a means of coping with problems rather than an addiction (Kvigne et al., 2008). In a qualitative CBPR project with Native mothers from the Pacific Northwest, Schultz and colleagues (2018) focused on

motherhood as a motivation for substance use treatment and recovery. They found that motherhood was a significant motivator and that both pregnancy and motherhood were underexplored factors in Native women's substance use (Schultz et al., 2018). The present study was only able to assess maternal alcohol use but did not investigate motivations for doing so. Future research should investigate the motivations of alcohol use among pregnant and mothering American Indian and Alaska Native women.

Tobacco Use. Tobacco use was significantly associated with maternal outcomes such as interpersonal violence and child outcomes like having a baby in the NICU upon birth and interaction with the child welfare system. American Indian and Alaska Native communities are believed to have high tobacco use before and during pregnancy, but these assumptions are based on very little evidence (Specker et al., 2018). These assumptions are often grounded in racist media stereotypes of Native communities such as the peace pipe and cigar store Indian (Watt, 2012). It is unclear whether tobacco use among Alaska Native mothers in the present study was motivated by traditional or ceremonial use or recreational purposes. Future work should investigate the motivations of tobacco use in relation to maternal child health outcomes and further debunk thinly veiled racist explanations of substance use among American Indian and Alaska Native communities (Specker et al., 2018; Watt, 2012).

Marijuana Use. Interpersonal violence and maternal marijuana use are significantly associated within the literature (Alhusen et al., 2013). The present study found significant associations with maternal marijuana use and interpersonal violence, child developmental outcomes, and interaction with the child welfare system; however, existing literature is unclear on the relationship between maternal marijuana use and subsequent child outcomes (Alhusen et al., 2013; Hayatbakhsh et al., 2012; Fergusson et al., 2002). As marijuana is increasingly

becoming legalized throughout the United States, Alaska was one of the first states to legalize medical marijuana in 1998; however, recreational use was not legalized until 2014 (Andrews, 2018). It is unclear how prevalent marijuana use is among Alaska Native mothers. Future work should investigate marijuana use availability, motivations, and how this use shapes experiences of violence among mothers and their children.

Overall, data on substance use and pregnancy among Native women is scarce, complex, and contradictory (Schultz et al., 2018) but existing research suggests that substance use among Native women is often associated with trauma from childhood experiences or interpersonal violence (Schultz et al., 2018; Evans-Campbell et al., 2006). The present study found several significant relationships between maternal interpersonal violence and substance use including alcohol, tobacco, and marijuana use among Alaska Native mothers; however, it is unclear the motivations for this use as a means to cope with IPV or an increased risk factor for IPV. More work is needed to examine the unique challenges of Native mothers contending with historic and contemporary traumas, substance use, and the impact these have upon the family (Schultz et al., 2018).

Child Outcomes

Finally, linkage to child development outcomes is important to advocate for the cost effectiveness of interventions to prevent and alleviate difficulties related to IPV experiences. Research on IPV and other adult violent experiences is often separate from research on child experiences of violence and development both due to funding siloes and research interests. These hamper our understanding of how interventions with adults (parents) may have positive spillover effects and long-term cost savings. While research on maternal IPV and child IPV experiences are beginning to be examined, it remains unclear what the relationship is particularly

among American Indian and Alaska Native communities. These findings may further indicate a need for supportive parenting interventions in order to prevent adverse consequences that may place the next generation at risk for IPV victimization.

Child Welfare System

While Native communities have a notable and understandable tension with the child welfare system, previous research has found that involvement with CPS can be a direct or indirect pathway to access services and seek recovery (Schultz et al., 2018). Scholars recommend child abuse and neglect and substance use interventions to work in tandem with one another in order to address neglect arising from parental substance use (Cross, 2021; Schultz et al., 2018). Integrated treatment programs that could be accessed at one site would greatly alleviate several access barriers particularly for Native communities (Schultz et al., 2018). Overall, it is important to investigate preconception and prenatal factors that are associated with CPS contact in order to inform child maltreatment prevention (Austin et al., 2019).

Indigenous peoples internationally are overrepresented in administrative child abuse and neglect data including the United States, Canada, Australia, and New Zealand (Cram et al., 2015). Rather than risk and bias models as competing explanations (Drake et al., 2011), Indigenous scholars recommend acknowledging the impact of colonization and existence of systemic bias as key drivers of the increased risk for Native children (Cram et al., 2015). Therefore, future research should consider utilizing Indigenous theoretical frameworks and Indigenous research methodologies to further investigate this overrepresentation of Native communities within child abuse and neglect data.

Prior to 1978 over 25% of American Indian and Alaska Native children were living in foster or adoptive homes and/or Indian boarding schools (Luth, 2016). The Indian Child Welfare

Act was passed in order to protect Native children and families through the establishment of basic federal guidelines for the process of Native children interacting with the child welfare system in a manner that adheres to tribal-specific traditions and values (Luth, 2016). While beyond the scope of this work, future research should consider differences in ICWA states and how Native children fare in these jurisdictions.

Tradition and Culture

American Indian and Alaska Native communities use tradition and values in order to embody resilience and the continued strength-based practices passed down generationally in order to address maternal and child health (James et al., 2021). Previous research has found that integrating cultural values into a family preservation model led to more Native children remaining in the home (Bussey & Lucero, 2013). Cultural teachings are being applied in behavioral interventions; however, these are not represented in peer reviewed literature (James et al., 2021). Several scholars have called for the need for culturally appropriate prenatal care (Johnson, 2020) and family-oriented treatment that integrates culture and traditional healing to support maternal recovery (Schultz et al., 2018). The key to culturally sensitive care is to talk to Native women about their unique spiritual beliefs, ceremony, and medicine (Johnson, 2020). More research is needed to evaluate how cultural practices may be integrated into OBGYN and home visiting services and whether such programming improves maternal and child health outcomes.

6.4 Conclusion

Previous research has called for an increased integration of protective factors in research and services for Native children and families (Austin et al., 2020). The present work examined both protective factors of home visitation, social support, and prenatal care in conjunction with individual risk factors but also extended the analysis to examine structural factors that are in place via historical oppression and the structuring of society. Informed by structural violence theory and guided by the social ecological framework, this dissertation extended previous individual level risk and protective profiles to examine the broader picture surrounding Alaska Native mothers' experiences of interpersonal violence at the partner, family, and community level.

The present work found that pregnancy is a time of increased risk for Alaska Native mothers. Several mental health and substance use relationships were found among Native mothers experiencing violence which suggest a need for concurrent substance use treatment with trauma treatment. Socioeconomic status indicators at both individual and community level were substantial predictors of various maternal and child health outcomes among this sample of Alaska Natives. This overarching pattern of poverty as one of the most salient factors in examining interpersonal violence demonstrates structural violence impacting Indigenous communities. Further contributions of the present study demonstrate the intergenerational impact of maternal trauma upon their children both at birth and as they develop throughout their lifetime. In order to ensure the continuance and survivance of Native nations, maternal-child health must be prioritized and improved. Finally, results of this work found several intervention points for Native mothers including prenatal care, home visitation, social service programs like WIC, and even interactions with the child welfare system. These interactions with systems and

organizations must take a trauma-informed approach in honoring the lived experience and expertise Native women have about their own health while providing culturally relevant services to improve the lives of mother, child, and community overall.

Indigenous motherhood is the ultimate embodiment of survivance and resilience in the face of historical oppression, settler colonialism, and the resulting present-day disparities that continue to oppress American Indian and Alaska Native communities. Native mothers carry their culture and ensure its continuance into the next generation. Many Native communities have deep cultural beliefs that children are a gift from the Creator and childbearing women are to be honored and respected (Johnson, 2020). The present work, situated in the context of historical oppression and ongoing settler colonialism, centered Indigenous mothers and their children as they persist and thrive in the face of oppression and colonialism. It is the hope of the present author that this work can ultimately inform a pathway toward protecting motherhood for American Indian and Alaska Native communities for generations to come.

Netàhoonevohtanone heškestovestòtse!

Let's protect motherhood! (Cheyenne)

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