10-3-2025

Alternative and Traditional Schooling on Sexual Risk Behaviors Among Alaska Native Youth in the Lower Kuskokwim

Nathaniel Hebert
Walden University

Walden University

College of Health Sciences and Public Policy

This is to certify that the doctoral study by

Nathaniel G. Hebert

has been found to be complete and satisfactory in all respects,
and that any and all revisions required by
the review committee have been made.

Review Committee
Dr. Patrick Dunn, Committee Chairperson, Public Health Faculty
Dr. Claudia Kozinetz, Committee Member, Public Health Faculty

Chief Academic Officer and Provost
Sue Subocz, Ph.D.

Walden University
2025

Abstract

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Nathaniel G. Hebert

MPH, Grand Canyon University, 2019

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Doctoral Study Submitted in Partial Fulfillment

of the Requirements for the Degree of

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November 2025

Abstract

Alaska Native youth experience disproportionately high rates of sexual risk, yet disaggregated data and school-contextual analyses remain limited. Understanding how school type (alternative vs. traditional) and individual factors influence sexual risk among Alaska Native youth is essential for informing targeted, culturally responsive health interventions and addressing ongoing health disparities. This quantitative study aimed to examine the association between three behaviors (condom use, multiple sexual partners, and substance use) by school type, controlling for gender, grade level, body mass index, and afterschool activity. Guided by the social-ecological model, this cross-sectional study provided new insights into the relationship between school type and sexual risk behaviors among 9^{th} – 12^{th} grade students in Alaska's Lower Kuskokwim region. Secondary data, with a sample size of 458 students, were obtained from the Alaska Department of Health, Division of Public Health, Section of Chronic Disease Prevention and Health Promotion, Alaska Youth Risk Behavior Survey. Descriptive statistics, complex samples crosstabulations, and multiple binary logistic regressions were used to identify significant associations between variables, while controlling for other factors. Results showed that school type was not significantly associated with condom or substance use; however, students in the traditional school had significantly higher odds of having multiple partners ($OR = 3.76$, $p = .001$), challenging common assumptions about alternative school settings. Field-based products developed in response to this study may be used to raise awareness of Alaska Native-specific health risks related to school type, to encourage further studies, inform health legislation, and expand resources for Alaska Native youth.

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Acknowledgments

This study reflects over a decade of learning, growth, and determination in my educational journey. It has been shaped by many challenges, frustrations, and moments of joy. To those who have supported me along the way, I owe a debt of gratitude that I can never fully repay, but I can at least offer this heartfelt acknowledgment. To my parents, thank you for everything you have done to support my journey, the late nights filled with encouraging words, the countless hugs, and the times when you provided a safe space to release my frustrations. To my partner, who not only stood by me during one of the most challenging times of my studies, but also took on the role of breadwinner, allowing me to focus entirely on this final chapter. You gave me a sanctuary to express my struggles and a sense of security; I don’t know how I would have made it without you. To my extended family, friends, and furry pups, who have shown understanding as I prioritized my studies, thank you for allowing me to be selfish when I needed it most. I look forward to reconnecting and renewing our bonds; you all mean the world to me. Lastly, I sincerely thank my teachers who have supported this long journey, especially Dr. Dunn, my chair, and Dr. Kozinetz, my committee member. Your dedication, guidance, and unwavering support have brought me to this point. Each of you has played a role in my success, helping me through the darkest days and celebrating the brightest ones. Thank you.

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Section 1: Foundation of the Study and Literature Review

Introduction

Sexual risk behaviors (SRBs) or risky sexual behaviors (RSBs) are complex public health issues that impact adolescents in different ways (Centers for Disease Control and Prevention [CDC], 2024b; De Ravello et al., 2012; Leichliter et al., 2022; Rusley et al., 2022; Szucs et al., 2023; Vasilenko, 2022). As a subset of high-risk behaviors, SRBs increase the likelihood of disease, injury, and other adverse outcomes, including engaging in unprotected, early, or risky sexual activities (Chawla & Sarkar, 2019). Risky sexual behaviors such as unprotected sex, having multiple partners, and using substances like alcohol or drugs during sex are common among young people and contribute to high rates of sexually transmitted infections (STIs) and pregnancies. These behaviors are often interconnected and shaped by factors such as mood disorders, drug addiction, and childhood abuse (Tariq & Gupta, 2023).

In 2023, approximately 44 million youths aged 10 to 19 comprised 13% of the population (U.S. Census Bureau, 2024). Within this group, males comprised about 51%, while females comprised 49%. Among adolescents aged 12 to 17, racial and ethnic diversity was as follows: 49% White, 26% Latinx, 15% Black, 5% Asian, 4% multiracial, and 0.5% American Indian or Alaska Native (AI/AN; Meerwijk & Sevelius, 2017). A recent CDC study (2023) found that 32% of U.S. high school students had engaged in sexual intercourse, and 48% had not used a condom during their last sexual encounter. Additionally, adolescents who use substances are more likely to engage in SRBs, such as having multiple partners, failing to use condoms, and experiencing early pregnancies. A reciprocal relationship exists between SRB and substance use, as each tends to reinforce the other (Cho & Yang, 2023; Clark et al., 2020; Ritchwood et al., 2015).

Each year, millions of new STIs occur, with half affecting individuals aged 15 to 24. In 2018, this age group accounted for significant proportions of the three most common STIs: 62% of chlamydia cases, 43% of gonorrhea cases, and 22% of syphilis cases (Keller, 2020). Racial and ethnic minority youth, including American Indian/Alaska Native youth, are at a higher risk of contracting STIs (Office of Population Affairs, n.d.). The impact of SRB is also evident in teen pregnancy rates, which are disproportionately higher among racial and ethnic minority youth, particularly AI/AN adolescents. In 2022, teen pregnancy rates among minority youth were twice as high as those of White adolescents and 10 times higher than those of Asian adolescents (Office of Population Affairs, n.d.).

Adolescents regularly underestimate risks and perceive greater potential benefits from risky behaviors than adults, who rely on gist-based reasoning shaped by their experiences. This discrepancy arises from a developmental gap between biological and social maturity, marked by puberty (Crone & van Duijvenvoorde, 2021; Kahn et al., 2019). Adolescents tend to use emotion-based reasoning and focus on social outcomes, such as peer rejection, often failing to grasp the potential consequences of their actions, with their environments significantly shaping their behaviors. Supportive and structured settings encourage positive development and decrease risky behaviors, whereas unstable or restrictive environments can increase vulnerability to problem behaviors (SRBs, substance use, risk-taking, problematic self-control), underscoring the need for nurturing and stable surroundings for healthy growth (Bonell et al., 2019; Browning et al., 2015; Holmes et al., 2019; Thomas et al., 2023).

Schools are central in shaping youth, providing the physical, social, and emotional contexts in which young people learn, grow, and build the foundations for their future well-being and success. Nearly two decades of research show that youth in alternative schools (ASs) are underrepresented in studies and are particularly vulnerable to health disparities compared to their peers in conventional schools (Ballard & Bender, 2022; Fortems et al., 2023; Grunbaum et al., 2000; Grunbaum et al., 2001; Henderson et al., 2019; Johnson et al., 2012; Johnson & Taliaferro, 2012; Welsh et al., 2022). Alaska ranks 10th in the nation for the prevalence of youth attending alternative schools (Kho & Rabovsky, 2022). A key aspect of the differences between these types of schools is the variation in ethnic and racial group enrollment. While enrollment rates for White and Hispanic students have declined, rates among Black and AI/AN youth have remained steady (Nowicki, 2019, 2022). Students in Alaska's alternative schools face a greater risk of SRB, are more likely to engage in alcohol and marijuana use, have a higher likelihood of being overweight or obese, and are less likely to participate in afterschool activities compared to their peers in traditional schools (TSs) statewide (Mannix, 2018).

The following section includes the implications for positive social change, the study's background, the problem statement, and the study's purpose. It also presents the three research questions, each accompanied by its respective null and alternative hypotheses. The study's theoretical framework, research design, and literature search strategy will be summarized, followed by a comprehensive literature review that defines key variables and terms. Finally, the study's assumptions, scope of delimitations, and limitations are discussed before Section 1 concludes with the significance of the study.

Social Change Impact

SRBs, school types, and demographic factors represent complex public health issues, as changes to any variable could impact the health and well-being of youth. At its core, this study aims to foster healthier environments and reduce health disparities. Brown et al. (2021) and McCuistian et al. (2023) emphasized that effective sexual health interventions must be culturally relevant, community-integrated, and focused on personal growth, communication, and holistic well-being. Through this study, I seek to enhance data and research visibility for an underrepresented population, which local, state, and federal levels could incorporate to (a) develop culturally relevant and age-appropriate programs that address sexual health knowledge and attitudes while reducing the burden of SRBs, (b) recognize and respond to the diverse challenges facing Alaskan youth in both alternative and traditional schools, (c) align public health actions with the current lack of data and research regarding Alaska Native youth, (d) equip leaders and advocacy groups with community-level knowledge to support Indigenous communities, and (e) create opportunities for improved outreach while fostering a sense of urgency and prioritization within AN communities.

My research promotes positive social change by highlighting gaps in sexual health interventions for high-risk youth through culturally rooted, community-driven approaches. By utilizing the social ecological model (SEM), this study has implications for social change, in that it can help inform support at the intrapersonal, interpersonal, and environmental levels, guiding community-based research; increasing school-based programs related to sexual knowledge, attitudes, and behaviors; and enhancing connections and accountability within the community, family, and peer groups. By prioritizing empowerment and sexual well-being over prevention, this study advocates for promoting agency, overcoming barriers, and investing in the long-term health of marginalized youth.

Background

This study emphasizes the need for further research examining the association between schooling type and SRBs among U.S. Alaska Native youth. The literature on youth and SRBs is well documented, exploring similar variables and health outcomes around the globe (Gbordzoe et al., 2023; Kabiru et al., 2024; Lindberg et al., 2020; Ndagijimana et al., 2023; Risley et al., 2023; Shrestha et al., 2025). Although research in this area continues to grow, the representation of AN youth is frequently excluded or entirely absent (Gatewood et al., 2024). AI/AN youth face challenges shaped by individual, cultural, historical, and social factors (Skewes et al., 2020) and face a greater risk of substance use (Hunter et al., 2024), SRB (Anastario et al., 2020), higher BMI (Hill et al., 2023), and lower participation in afterschool programs (Alaska Children's Trust, 2024).

Singh et al. (2024) revealed significant health and socioeconomic disparities among AI/AN populations compared to other racial and ethnic groups in the United States, highlighting their disproportionate burden of risk outcomes. AI/AN life expectancy in 2021 was just 70.6 years, and the COVID-19 pandemic contributed to a steep 6.3-year decline. AI/AN members face the highest poverty rate (27%), with some tribal communities exceeding 60%, alongside the lowest educational attainment (16.8% with a college degree) and highest uninsured rate (20%). The digital divide further expands disparities, with only 71.4% of AI/AN households having high-speed internet, compared to 89.4% of Asian/Pacific Islanders. Despite these alarming inequities, AI/AN populations are often excluded from national health analyses due to small sample sizes and racial misclassification.

Studies have revealed that the misclassification of Indigenous people in health research, driven by colonial definitions and biased methodologies, leads to inaccurate data, systemic exclusion, and misrepresentation of their health needs and outcomes (Gartner et al., 2023; National Indian Health Board, 2023). Research often fails to adequately recognize AI/AN populations, whether as a combined or disaggregated group, and their demographic impact on studies is frequently minimized or neglected due to their relatively small population size in many contexts (Evans, 2024; Evans-Lomayesva & Lee, 2022; Jones & Satter, 2022; Ninez Ponce, 2019).

The environment plays a crucial role in learning, growth, and development, particularly during adolescence. As young people observe, engage with, and transition into adulthood, their behaviors can significantly impact their health and well-being, often continuing throughout their lives (Campbell et al., 2020; Pergamit et al., 2021). Research indicates that youth in alternative educational settings are disproportionately more likely to participate in various risk behaviors, including substance use and sexual risk-taking (Ballard & Bender, 2022; Carver et al., 2010; Fortems et al., 2023; Grunbaum et al., 2000; Grunbaum et al., 2001; Hiratsuka & Heath, 2024; Johnson et al., 2013; Johnson et al., 2019; Johnson & Taliaferro, 2012). While the body of research continues to expand, Alaska Native youth remain underrepresented in the literature.

According to the Alaska Department of Education and Early Development (n.d.), Alaska Native youth in alternative schools report higher levels of victimization and hopelessness, as well as lower community support, which contribute to risky behaviors and disparities in sexual health outcomes compared to their White peers. Additionally, literature on SRBs and school types can vary, likely due to broad classifications of schools and differing influencing factors. For instance, Thepthien and Celyn (2022) found that vocational students in Bangkok were significantly more likely than their traditional high school peers to engage in risk-related behaviors, use substances, and experience higher rates of adverse childhood experiences. However, a study between two types of traditional U.S. school (private and public) students found that private school youth were less likely than those from traditional schools to report most risk behaviors, with differences across school types remaining relatively consistent across sex and grade (Deputy et al., 2021).

Furthermore, this study acknowledges that BMI and SRB present inconsistent findings, with some reporting no significant association (Lima et al., 2019). Other research, such as that by Duckworth et al. (2020), indicates that a higher BMI during childhood is linked to increased SRBs among Black and White females and Black males, while a more rapid rise in BMI correlates with higher rates of SRB for Black males and White females. Moreover, research on race has shown that youth of minority groups see high SRBs, substance use, and mental health issues; however, Al/AN youth were missing from this study (Aslam et al., 2023). More research is required to fill gaps in the literature surrounding AI/AN youth and these behaviors.

Problem Statement

The issue prompting this study stems from the recognition that while existing research highlights weighty public health concerns, the relationship between SRBs, schooling type, and variables such as age (grade-level), gender, BMI (overweight or obese), and self-reported afterschool activity (ASA) remains unclear. This disconnect is especially striking for AN youth in the Lower Kuskokwim School District (LKSD), an understudied and underreported area and population where risky sexual behaviors are high. Evans (2024) indicated through their systematic review that only 17 studies related to AI/AN people were found and focused primarily on condom use. Without this study, public health efforts may fail to address the target population's needs.

In the United States, SRB remains a high priority among public health professionals. The recent 67% decline in teen birth rates from 2007 to 2022, which reached a historic low of 13.6% in 2022, signals positive progress nationally, yet disparities remain. Among AI/AN youth, teen birth rates were consistently the highest across all racial groups from 2018 to 2022, peaking at 29.7. Additionally, AI/AN youth experience the highest rates of first births (18.7) and repeat births (3.8) per 1,000 females aged 15 to 19. The national decline in teen birth rates did not lead to a significant reduction in sexual activity; instead, it reflects an increase in the use of long-term contraception methods, such as IUDs and birth control. However, condom use shows inconsistent patterns, suggesting irregular usage (Congressional Research Service, 2024b; Evans, 2024). According to Skye et al. (2021), Native youth are not monolithic and see variations in health behaviors across communities, indicating that AI/AN youth see variations among substance use, sexual risk patterns, and gender, with a lack of research focused on youth to support these differences. Their study mentioned that nearly half of AI/AN youth (45.6%) reported not using condoms during their last sexual encounter, and a substantial majority (82.7%) had never tested for STIs. Furthermore, 8.3% of youth reported having their first sexual intercourse before age 13, and early initiation was associated with a higher likelihood (16.6%) of having sexual intercourse with four or more partners over their lifetime. Among the 32.8% of currently sexually active youth, 22.9% reported using substances before their most recent sexual encounter. Notably, AI/AN youth had 1.4 to 2.1 times higher odds of sexual activity metrics compared to their White peers (de Ravello et al., 2014; Garcia, 2020; Singh et al., 2024). Greene et al. (2018) indicated that the literature on SRBs among AI/AN youth tends to isolate factors without considering broader influences, such as personal, school, and community contexts, often relying on small samples or primarily reservation-based groupings.

Obesity is a significant concern among AI/AN populations, with rates exceeding those of all other racial and ethnic groups. In 2015, 29.7% of AI/AN youth aged 2–19 were classified as obese nationally. AI/AN youth born after 2019 face a life expectancy of 5.5 years shorter than the national average (73.0 years). In Alaska, 17.5% of AN high school students reported obesity in 2019. There was no statistically significant difference in obesity prevalence between AN and White high school students. However, in Alaska's rural YK Delta region, 68% of AN children aged 3 to 5 years were classified as overweight, with 43% meeting the criteria for obesity based on CDC growth charts; between 2004 and 2010, around 40% of AN adults in YK Delta were obese. This high prevalence contributes to elevated mortality rates among AI/AN populations from obesity-related conditions such as heart disease, diabetes, stroke, and chronic liver disease (Alaska Native Tribal Health Consortium, 2021b; Bullock et al., 2017; George Washing University, 2019; Walch et al., 2021).

Afterschool programs (extracurriculars) and activities are essential in understanding adolescent health outcomes, but the current literature shows notable inconsistencies. Lee et al.'s (2018) and Hsieh et al.'s (2023) longitudinal studies highlight the risks of unsupervised time and the benefits of structured activities during adolescence. However, AI/AN youth were excluded or represented as "other." Both studies found that unsupervised peer time is linked to risky behaviors, with Hsieh et al. explicitly noting its complex connection to binge drinking (*OR* = 1.22) and marijuana use (*OR* = 1.31) in adulthood. Structured activities, such as employment, sports, or music, saw positive and negative results, such as increased self-identity and work orientation and earlier exposure to risky behaviors. By contrast, voluntary work and the performing arts lower the risk of substance abuse. These results highlight the critical role of supervised, organized environments for youth development. Conversely, Lester et al.'s (2020) and Maynard et al.'s (2015) meta-analyses concluded that afterschool programs have a mixed and often biased positive outcome based on a lack of stringent quality criteria. Lester et al. reported from one study a minimal, nonsignificant negative impact on behavioral and social skill development, with high variability and no significant differences across participant characteristics or study designs. The lack of quality studies indicates that meta-studies showcasing the positive impact of ASAs have limited their samples. Similarly, Maynard et al. found minimal, nonsignificant effects of ASPs on school attendance and externalizing behaviors, with moderate to high variability and no significant differences based on program focus. Both studies highlight the limited effectiveness of ASPs in achieving these outcomes, partly due to the lack of standards, which introduces a high risk of bias in studies.

Study Purpose

The purpose of this nonexperimental quantitative study was to examine the association (correlation) between alternative and traditional schooling and SRBs (condom use during sexual intercourse, number of sexual partners [≥ 4], and substance use, defined as the use of alcohol or drugs before engaging in sexual activity), while adjusting for the covariates of age (grade-level), gender, BMI, and self-reported afterschool activities among Alaska Native high school adolescents in the Yukon-Kuskokwim (YK) Delta, one of the 12 public health regions in Alaska. Specifically, it focused on the Lower Kuskokwim School District, the largest rural school district, which consists of 27 schools and approximately 4,000 students (Lower Kuskokwim School District, 2020). The findings and subsequent field-based products arising from this study will provide clarity for legislators, health professionals, and Alaska Native elders/communities, aiding in the design of targeted interventions aimed at reducing high-risk sexual behaviors within educational environments to improve the health outcomes of AN youth while contributing to the existing literature.

Research Questions and Hypotheses

This study used three distinct research questions, each examining a specific SRB as the dependent variable (condom use during sexual intercourse, number of sexual partners, and substance use before sexual activity), schooling type (alternative and traditional) as the independent variable, and age (grade-level), gender, BMI (overweight or obese), and self-reported afterschool activities as control variables.

Research Question 1 (RQ1): What is the association between alternative and traditional schooling and SRB (in the past 3 months, did you or your partner use a condom during sexual intercourse) among Alaska Native youth in Grades 9–12 in the Lower Kuskokwim School District when controlling for age (grade-level), gender, BMI (overweight or obese), and self-reported afterschool activity?

> Null hypothesis ($H_0 1$): There is no significant association between alternative and traditional schooling and condom use during sexual intercourse, controlling for age (grade-level), gender, BMI (overweight or obese), and afterschool activity.
>
> Alternative hypothesis ($H_a 1$): There is a significant association between alternative and traditional schooling and condom use during sexual intercourse, controlling for age (grade-level), gender, BMI (overweight or obese), and afterschool activity.

Research Question 2 (RQ2): What is the association between alternative and traditional schooling and sexual risk behavior (students who have had sexual intercourse with four or more people during their life) among Alaska Native youth in Grades 9–12 in the Lower Kuskokwim School District when controlling for age (grade-level), gender, BMI (overweight or obese), and self-reported afterschool activity?

Null hypothesis ($H_0$2): There is no significant association between alternative and traditional schooling and the likelihood of having had sexual intercourse with four or more people during their lives, controlling for age (grade-level), gender, BMI (overweight or obese), and afterschool activity.

Alternative hypothesis (H_a2): There is a significant association between alternative and traditional schooling and the likelihood of having had sexual intercourse with four or more people during their lives, controlling for age (grade-level), gender, BMI (overweight or obese), and afterschool activity.

Research Question 3 (RQ3): What is the association between alternative and traditional schooling and SRB (in the past 3 months, did you drink alcohol or use drugs before you had sexual intercourse) among Alaska Native youth in Grades 9–12 in the Lower Kuskokwim School District when controlling for age (grade-level), gender, BMI (overweight or obese), and self-reported afterschool activity?

Null hypothesis ($H_0$3): There is no significant association between alternative and traditional schooling and the likelihood of drinking alcohol or using drugs before sexual intercourse, controlling for age (grade-level), gender, BMI (overweight or obese), and afterschool activity.

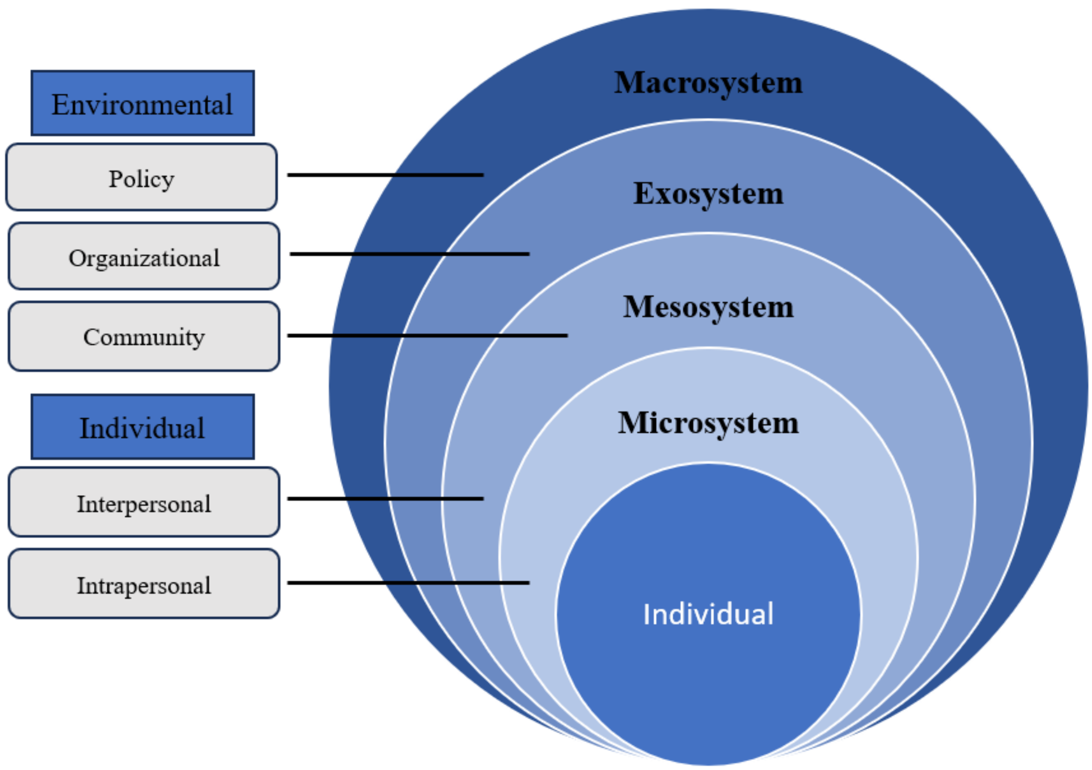
Alternative hypothesis (H_a3): There is a significant association between alternative and traditional schooling and the likelihood of drinking alcohol or using drugs before sexual intercourse, controlling for age (grade-level), gender, BMI (overweight or obese), and afterschool activity.

Theoretical Framework Employed

The theoretical framework used in this study was the social ecological model (SEM), as presented by McLeroy et al. (1988). This model builds on Bronfenbrenner's initial work, *The Ecology of Human Development* (1977), and takes a multilevel approach to understanding how interactions within and between interrelated systems impact behavior. These systems include the microsystem, mesosystem, exosystem, and macrosystem. McLeroy et al. emphasized interpersonal and intrapersonal influences, institutional dynamics, community factors, and public policies (UNICEF, 2023; see Figure 1). The framework was initially developed in psychology and has become a cornerstone in public health for examining and tackling complex behavioral and health-related phenomena (Sallis et al., 2008; Wold & Mittelmark, 2018). The SEM framework was crucial to this study's exploration of SRBs, as I examined how intrapersonal and interpersonal factors such as age, gender, BMI, and participation in afterschool activities interact with environmental influences, including school type (alternative and traditional). A core component of the SEM is its dynamic nature, as changes at one level of influence can affect outcomes at others (McLeroy et al., 1988). Ecological models' main advantage is their ability to address multiple levels of impact and prompt population-wide interventions to sustain behavior change through policies and environmental shifts. However, their primary disadvantages include a lack of clarity regarding critical influences, tools across levels, and limited guidance for developing targeted and testable interventions (Sallis & Owen, 2008).

Figure 1

Social Ecological Model



Nature of Study

This quantitative study employed a cross-sectional design to address three research questions using data collected at a single point in time (Wang & Cheng, 2020). The study reflects the positivist paradigm, grounded in the belief that a single, measurable reality exists and that causal relationships can be understood through controlled, objective observation and experimentation. It emphasizes separation from participants to prevent bias, requiring strict protocols and quantitative analysis to investigate associations and ensure internal validity. Rigor in positivist research is achieved by controlling confounders, minimizing threats to validity, and employing statistically robust designs with adequate sample sizes to detect meaningful effects (Park et al., 2020). This is important for this study, as the positivist paradigm's focus on objectivity, causality, and quantitative analysis closely aligns with its aim of determining quantifiable relationships and confounding factors to produce accurate and robust findings. By controlling for demographic and behavioral characteristics, the study aims to identify whether attending alternative schools is associated with different SRB patterns compared to traditional schooling. Secondary data for this study were obtained from the Centers for Disease Control and Prevention's (CDC) Youth Risk Behavior Surveillance System (YRBSS) for 2017. Although YRBSS data are collected biennially, the 2021 cycle was canceled due to COVID-19. In the Lower Kuskokwim region, the 2023 dataset was merged with data from 2019, which limited its utility for independent analysis. Therefore, the 2017 dataset, as the most complete and unmerged dataset available, was selected for this study. The research questions were analyzed using multiple logistic regressions.

The dataset provided all necessary variables to produce a viable study, including:

1. Independent variable: public schools–alternative and traditional [excluding boarding, correspondence, home study, and correctional schools]
2. Dependent variables: SRB(s)
    i. In the past three months, did you or your partner use a condom during sexual intercourse

ii. Throughout your life, how many people have you had sexual intercourse

iii. In the past three months, did you drink alcohol or use drugs before you had sexual intercourse

3. Control variables:

i. Grade-level [proxy of age] 9^{th} grade through 12^{th} grade

ii. Gender [male, female]

iii. BMI [overweight or obese: at or above the 85th percentile for BMI, using sex- and age-specific reference data from the 2000 CDC growth charts]

iv. Self-reported afterschool activity [during an average week, on how many days do you take part in organized afterschool, evening, or weekend activities– such as school clubs; community center groups; music, art, or dance lessons; drama; church; or cultural or other supervised activities]

Literature Search Strategy

The literature search strategy utilized three databases, PubMed, ERIC, and CINAHL, along with Google Scholar, Google, and the Walden University Library, to identify peer-reviewed articles. To locate relevant articles, Google Scholar provided initial sources that were further researched using the Walden Library. The initial search focused on seminal papers with no limit to publication year to ensure the broadest search was conducted, with concurrent searches for studies published within the last five years.

A snowballing approach was used, with specific parameters to prioritize peer-reviewed scholarly articles published over the previous five years (2020 to 2024). The study's theoretical framework was grounded in the social ecological model (SEM); thus, some seminal studies were included. Keywords and search terms consisted of *schooling, education, learning, alternative schools, alternative education, alternative programs, or traditional education; youth, adolescents, young people, teen, or young adults; American Indian/Alaska Native, Yupik, Central Yup'ik, Yukon-Kuskokwim Delta, Indigenous, American Indian, Alaska Native, or AI/AN; substance abuse, alcohol abuse, drug abuse, or health risk factors; sexual risk behaviors, risky health behaviors, sexual risk-taking, risky sexual behavior, or sexual risk; gender disparities, health outcomes, health impacts, health effects, effects on health; public health, population health, or community health.*

Theoretical Framework

The SEM guided this study, drawing from McLeroy et al.'s (1988) expanded framework, which examines the interactions between individuals and their environments across multiple interconnected levels of influence. The following section outlined each level of influence, addressing the barriers and facilitators of SRB, which extend across all levels of the model. These include intrapersonal factors such as age (grade-level), gender, and BMI; interpersonal factors such as family, teacher, and peer influences on SRBs; organizational factors such as schools, including alternative and traditional settings in the Lower Kuskokwim School District, and afterschool activities; community factors such as neighborhood characters or cultural norms within AN groups; and policy-level factors such as state or federal policies focusing on health education and adolescent health disparities. The SEM provided a structure for examining how individual, relational, organizational, community, and policy factors collectively influence SRBs among AN youth. This framework guided the identification of relevant variables and informed the interpretation of relationships across multiple levels of influence

Studies Employing the Social Ecological Model

Recent quantitative studies from the Bahamas applied the SEM framework to examine how parental monitoring and environmental risks influence adolescents' behavioral intentions and engagement in risky sexual activity. Arabi-Mianrood et al. (2019) and Schieber et al. (2024) reported that among intrapersonal factors (age, grade-level, gender, religion, and personality traits) and interpersonal factors (family, peers, and sex education), environmental risks were most strongly associated to increased behavioral intentions and participation in delinquency, substance use, and SRBs. They also reported that cultural gender norms surrounding sexual activity, body image ideals, and media influences were associated with SRBs. The increase in parental monitoring saw a positive protective reduction in risk behaviors. Additionally, the longitudinal quantitative study from Kim et al. (2024) identified gender-specific patterns in adolescent SRBs. Boys consistently exhibited higher risks, while girls showed faster increases in behaviors like drinking before sex and inconsistent condom use. Peer influence was the most significant factor among girls, whereas boys were more affected by combined risks, such as poor parental monitoring and high-risk neighborhoods. The findings emphasized the need to address multilevel social risks, such as peer norms and parental communication.

The study by Banks et al. (2020) showed how individual, social, community, and structural factors interact to increase HIV/STI and SRBs among African American youth. Personal conditions such as psychological symptoms, individual attitudes, partner attitudes, gender dynamics, BMI status, and substance use; social conditions including parental influences, peer groups, and sexual networks; and societal issues such as neighborhood poverty, sex ratio imbalance, and prejudice all contributed to existing inequalities. Structural elements like poverty, crime, low social connectedness, segregation, and incarceration exacerbate these risks by creating environments that foster vulnerability. Furthermore, a quantitative study utilizing the SEM framework established by Ancheta et al. (2023) demonstrated how individual, interpersonal, and community factors influence adolescent BMI. Individual factors such as sexual identity, physical activity, and diet intersect with interpersonal experiences, including school violence, which disproportionately affects sexual minority youth. Lastly, at the community level, LGBTQ-inclusive school climates mitigated victimization by promoting safety and belonging.

Social Ecological Model—Individual Perspective

The first level, established by McLeroy et al. (1988), focuses on the individual level, positioned within Bronfenbrenner's (1979) microsystem. As Stokols (1996) illustrated, this level involves intrapersonal factors such as genetics, personality, health practices, and their interaction with environmental conditions.

Intrapersonal Level

McLeroy et al. (1988) characterized this interaction as the connection between an individual's knowledge, attitudes, beliefs, and perceptions and their social environment. According to the SEM, specific characteristics can differentially impact the likelihood of engaging in SRBs across various levels of influence (Inanc et al., 2020; Jabareen & Zlotnick, 2023; Simons & Landor, 2024). This study's intrapersonal factors include age (grade-level), gender, BMI, and afterschool activity. For example, SEM posited that gender (male, female) could be a significant indicator of SRB, as boys report more sexual freedom, higher rates of partners, and more positive emotions regarding sex. In contrast, girls face stricter norms, have fewer partners, and experience more ambivalence or shame after sexual encounters. Attitudes and knowledge about sex, reproduction, contraception, and STIs, labeled "reproductive schemas," strongly predict future adult sexual behaviors, including the number and concurrency of partners. Adolescents' sexual attitudes influence their behaviors; those who perceive more negative consequences are less likely to engage in risky activities. Conversely, adolescents who see greater benefits of sex tend to report more sexual experiences over their lifetime, while women who perceive higher costs tend to have fewer lifetime partners (Boislard et al., 2016; Guzzo et al., 2021; Vasilenko, 2022).

Additionally, the SEM indicated that ethnic minority youth frequently experience earlier sexual initiation and participate in risky behaviors due to socioeconomic disparities, systemic racism, and cultural differences (Bae et al., 2022). Collectivist cultures generally postpone sexual onset due to traditional norms, while individualistic cultures emphasize personal choice (Boislard et al., 2016; de Graaf et al., 2024; Kim et al., 2021; McLeroy et al., 1988). Continuous stress from systemic racism, poverty, and violence can significantly impact the mental health and coping mechanisms of Indigenous youth and youth of color, leading to risky sexual behaviors. Factors like low parental supervision, experiences of trauma, and reliance on peers or media for sexual education worsen these behaviors, heightening vulnerability to negative outcomes (Boutrin & Williams, 2021). According to Liu et al. (2023), knowledge and awareness of condom use for STI prevention are the lowest among adolescents, indicating a significant gap in prevention practices and underscoring the need for improved education about associated risks; age is a vital factor influencing SRBs among adolescents. Furlanetto et al. (2019) stated that the average age of sexual debut is 13.6 years, and early initiation (before age 15) correlates with increased rates of substance use and inconsistent condom application. Younger adolescents who perceive greater family autonomy were more inclined to engage in early sexual activity, whereas consistent emotional family support tends to postpone sexual initiation.

Moreover, the SEM has suggested that higher obesity rates in boys, driven by differences in body composition, hormones, and behaviors such as lower physical activity and calorie-dense diets, affect self-esteem and decision-making. Meanwhile, girls contend with societal pressures for thinness, which impacts their body image and health behaviors (McLeroy et al., 1988; Shah et al., 2020). Logan et al. (2019) emphasized that afterschool activities, particularly sports participation, serve as protective intrapersonal factors influencing SRBs by promoting healthier choices and reducing risky actions;

adolescents involved in sports are also more likely to use condoms during sexual encounters. Girls who engage in sports have fewer opportunities for sexual activity or becoming pregnant; thus, these behaviors enhance decision-making and self-control while minimizing sexual risk-taking. Although extracurricular involvement seems to decrease externalizing problems among low-income adolescents, it does not affect internalizing issues. Unlike previous studies, the protective benefits of these activities may arise from adult-led programs that offer monitoring and positive role models (Feldman et al., 2021). Contextual factors, such as disrupted and low family support or dynamics, emerged as the strongest predictors of early sexual activity. Among boys, increased participation in organized sports was significantly associated with early sexual initiation. In contrast, for girls, early sexual activity was most closely related to negative body image, lower socioeconomic status, and higher social media use (Gazendam et al., 2020; McLeroy et al., 1988).

Interpersonal Level

According to McLeroy et al. (1988), the next level of influence is the interpersonal level, which corresponds to Bronfenbrenner's (1979) mesosystem, a combination of two or more microsystems. McLeroy et al. (1988) stressed that health promotion efforts frequently focus on individual behavior change through social influences rather than on group norms or social structures. Research has demonstrated that SRB is influenced by key interpersonal factors, including family and parents, peers, community connections, and romantic or sexual partners (Arabi-Mianrood et al., 2019; Inanc et al., 2020; Kabiru et al., 2024; Mollaei et al., 2023; Ngoc Do et al., 2020; Simons

& Landor, 2024). In the context of this study, the interpersonal level emphasizes how the school environment (connectedness), family dynamics, and peer relationships can affect the SRBs of AN youth.

For example, the SEM has proposed that positive parent-child relationships, communication, and monitoring are critical in reducing adolescent engagement in SRBs. A global study analyzing data from 50 countries found that increased parental monitoring significantly lowered the likelihood of sexual activity. Specifically, monitoring academic activities reduced the odds by 15%, while supervision of leisure activities lowered the risk by 29%. Similarly, a study on Native American youth aged 11–19 demonstrated that parental monitoring had a strong protective effect, particularly for female adolescents, who were significantly less likely to engage in alcohol use, smoking, marijuana use, or sex when parental oversight was high; males saw increased condom use intention when communication among parents was high. These findings are essential for addressing gender and cultural differences in parental monitoring (Dittus et al., 2023; Kincaid et al., 2012; Patel et al., 2021; Shawon et al., 2024).

Additionally, the SEM has suggested that peer influence significantly shapes adolescent sexual behaviors. Clark et al. (2021) and Peci (2017) indicated that adolescents with sexually active or substance-using friends are more likely to engage in risky behaviors. In contrast, those with supportive or high-achieving peers tend to postpone sexual activity and make safer choices. Perceived peer norms strongly impact attitudes and actions, particularly when parental guidance is lacking. Notably, antisocial peers promote risky sexual activities, while prosocial peers tend to encourage safer behaviors. Furthermore, SRBs may differ based on peers and gender. For boys, peer acceptance increases the number of sexual partners, partly due to pressures to maintain status. Conversely, girls exhibit a stronger resistance to peer influence and focus on protective behaviors to avoid negative perceptions. Social network dynamics, such as friendship ties and network centrality, also play a role, affecting early sexual initiation, lifetime sexual activity, and STI risk (Wesche et al., 2019; Widman et al., 2016).

Social Ecological Model—Environmental Perspective

Bronfenbrenner (1979) stated that the mesosystem, exosystem, and macrosystem represent levels within the broader environment. McLeroy et al. (1988) expanded on this by framing these levels as community, organizational, and policy influences, emphasizing the role of environmental factors, such as social connections, over individual-level processes. Similarly, Stokols (1996) advocated for a comprehensive approach that integrates organizational culture, community planning, and regulatory perspectives. The complexity of SRB at the intrapersonal and interpersonal levels requires addressing multiple levels of influence, as health outcomes are shaped not only by personal attributes, like behaviors and genetics but also by environmental conditions.

Community Level

As McLeroy et al. (1988) suggested, the community level, synonymous with Bronfenbrenner’s mesosystem, can be described in three ways: (a) as mediating structures, such as families, social networks, and neighborhoods, which influence norms, beliefs, and behaviors; (b) as relationships among local organizations, including schools and health agencies; and (c) as geographically and politically defined populations characterized by power structures, influence the individual's development and behavior. According to this model, the mesosystem encompasses family, schools, peers, and afterschool activities, focusing on how multiple environments interconnect and influence the individual.

This impact is evident in the protective role that supportive family and peer relationships play against youth SRB. Jabareen and Zlotnick (2023) noted that traditional cultural norms and societal taboos create stigma around discussing sexuality, which limits girls' access to accurate sexual knowledge. In these contexts, peers often become the primary sources of sexual information; however, the information they provide is frequently incomplete or inaccurate. Strong parent connectedness and stable friendships act as protective factors against SRB, particularly for girls. Over time, adolescents engaging in SRB reported weaker relationships with both parents and peers (Henrich et al., 2006). From an Indigenous perspective, the concept of relationality emphasizes the importance of family, community, and connections to the natural environment. Core values such as connectedness, reciprocity, and collective healing foster resilience, renewal, and adaptive models of well-being. At the meso-level, AI/AN individuals reinforce supportive adult relationships, cultural pride, and positive community connections, which are critical factors that work to enhance resilience, reduce suicide attempts, and boost self-esteem. These concepts highlight the interplay between individual and community well-being (Heid et al., 2022).

Furthermore, culturally adapted, community-driven partnerships, such as the Listening to One Another to Grow Strong (LTOA) program, engage families, schools, and local Elders in activities designed to strengthen family bonding, enhance communication, and improve youth well-being. These initiatives also foster connections to Indigenous culture and history while addressing structural inequities. By creating accessible and culturally relevant mechanisms within schools, healthcare settings, and communities, such partnerships promote positive well-being (mental, physical, spiritual, and family-social) for Indigenous youth (O'Keefe et al., 2022).

Organizational Level

As Bronfenbrenner (1979) indicated, the exosystem encompasses external social structures indirectly influencing a person's immediate environment and development. McLeroy et al. (1988) developed the organizational level within the ecological perspective, emphasizing not individuals but environments, highlighting the role of interpersonal relationships and organizations. As Jabareen and Zlotnick (2023) pointed out, schools are vital places to deliver sex education. However, they struggle with a lack of resources, insufficiently trained educators, and culturally limited curricula that prioritize abstinence over knowledge. According to this model, Alaskan Native youth living in remote rural villages, such as those in the YK Delta (accessible only by boat or plane), are affected by extreme poverty, low educational attainment, and unsafe environments, which can increase their risk of engaging in SRBs (Alaska Native Tribal Health Consortium [ANTHC], 2021b; Rollman et al., 2021; Singh et al., 2024). As Anastario et al. (2020) and Underwood et al. (2021) explained, youth in high-poverty and rural schools face increased sexual risks. Students in high-poverty schools report higher rates of sexual activity and more sexual partners but lower use of contraceptives.

Furthermore, Miller et al. (2024) and Rose et al. (2024) emphasized that school connectedness has a significant protective effect across various health domains, including substance use, mental health, violence, sexual health, and co-occurring risks. However, the impact of connectedness on SRBs differs by gender. For girls, school connectedness is linked to lower levels of consensual sexual activity, while for boys, it reduces instances of nonconsensual sex. Additionally, girls tend to be more influenced by peer and school relationships than by family factors. In contrast, boys gain more from elements such as higher family income and parental marital status. Youth of color are less likely to feel connected to school, experience lower safety levels, and have fewer supportive relationships with adults. Among American Indian and Alaska Native youth, rates of poor mental health, substance use, SRBs, and school absenteeism due to safety concerns are comparable to or lower than those of their peers (Wilkins et al., 2023).

Policy Level

The final level, the macrosystem (policy level), encompasses the overarching cultural, social, economic, and institutional patterns that influence and shape the structures and activities within micro-, meso-, and exosystems (Bronfenbrenner, 1979). According to McLeroy et al. (1988) and Bronfenbrenner (1979), this level reflects and embodies society's broader norms and practices. It includes media influence, sexual and reproductive health, knowledge of historical trauma, healthcare, and government programs. Governments often underfund and censor sex education to serve their agendas, spreading misinformation and neglecting adolescent needs, which underscores the necessity of comprehensive policies to address these gaps (Jabareen & Zlotnick, 2023).

According to the SEM, the tension between the individualistic framing of sexual and reproductive health (SRH) disparities among AI youth and the traditionally collectivist nature of AI cultures reflects wider societal influences. Structural violence and colonial history have been internalized into distorted narratives that lead young people to perceive SRH outcomes as solely the product of individual choice. This individualist and colonial-based perspective runs counter to community-focused, collectivist, and culturally resilient viewpoints (Cox et al., 2021). Additionally, AI/AN men's sexual health attitudes and service utilization are shaped by systemic challenges, cultural relevance, and access to care, with rural IHS clinics struggling to provide targeted treatment, while urban service gaps further worsen disparities. To tackle these challenges, culturally sensitive interventions are necessary that address STI stigma, promote collectivist approaches to child-rearing, and build trust and collaboration between healthcare systems and AI/AN communities (Cahn et al., 2017; Rink et al., 2017). Moreover, mass media, healthcare systems, and societal structures play a crucial role in influencing SRB among AI/AN females. Media (especially reality TV) normalizes teen sexuality; access to healthcare and providers' trust are essential for safe behaviors and highlight the need for systemic policies and treatment. Additionally, cultural norms, community environments, and transient partnerships all elevate the risk for HIV/STI, underscoring the importance of culturally grounded, community-based prevention strategies that focus on the more holistic (systemic) and environmental factors affecting sexual health (Pearson & Cassels, 2014; Saftner et al., 2015).

Literature Review Related to Key Variables

The following subsection presents a thorough review of the literature. As a prelude, many articles referenced in this review come from international communities, though some of these studies focus on U.S.-based research. The impact of global studies is evident in the scoping literature review by Kabiru et al. (2024), which illustrated a gradual shift in research emphasis toward underrepresented communities abroad. Finding relevant studies required considerable time and effort, particularly regarding school types, demographics, and SRBs among AN youth. These searches yielded few results and often took much longer to identify meaningful articles, if any were found. The review has emphasized that AN youth and their communities remain significantly understudied, frequently excluded, or grouped with broader racial and ethnic categories, as noted by Zhang et al. (2024). International studies are included to provide insights and address gaps in understanding. Many studies report overlapping findings that cover multiple SRBs rather than isolating individual factors.

Data Disaggregation

Alaska, the largest state in the U.S., was the least populated (n=733,391), with Alaska Native people constituting approximately 15.2% of the state's population in 2020 (U.S. Census Bureau, 2021). This population comprises over 200 tribes and at least four distinct cultural groups: Eskimos, Aleuts and Alutiiq, Athabascan Indians, and Northwest Coastal Indians (Caldwell et al., 2005). Research methods should account for the cultural diversity that exists across Alaska Native communities and be tailored to their specific needs. However, national datasets and studies often group AI/AN individuals with other racial and ethnic minorities, such as Asians, Native Hawaiians, or Pacific Islanders, to address sample size limitations (Brewer et al., 2023; Congressional Research Services., 2024a; Caldwell et al., 2005). The belief (homogeneity assumption) that AI/AN youth represent a uniform group might enhance statistical power but eliminate specific identities and cultural backgrounds. This approach overlooks important cultural and geographic differences, thereby reducing the applicability of findings to public health practice and initiatives. Studies emphasize that data should consider factors like geography (e.g., on or off tribal land), demographics (e.g., age, gender), and tribal affiliation (e.g., Alaska Native or American Indian; Santos et al., 2024; Villegas et al., 2016; White et al., 2023). Without these details, public health initiatives risk producing misguided services (The Urban Indian Health Institute, 2020; Ninez Ponce, 2019).

The importance of disaggregating data is apparent by Gatewood et al. (2024) and Gartner et al. (2021), who argued that public health's racial categorization of Indigenous peoples undermines tribal sovereignty, erases cultural diversity, and obscures structural causes of health disparities. Disaggregating data by tribal affiliation and collaborating with Native communities are essential for developing accurate, ethical, and effective health interventions. Small-Rodriguez and Akee (2021) continued the discussion to include tribally enrolled and nonenrolled AI/AN individuals. Their analysis of 2017–2018 California Health Interview Survey data revealed that tribally enrolled individuals face higher rates of type 2 diabetes (20.5% vs. 13.6%), obesity (47.0% vs. 34.9%), and smoking (23.6% vs. 17.3%) compared to their nonenrolled peers. These results show the inadequacy of current data collection practices, which include inconsistent standards, as only 33 states collect tribal enrollment data, and nine states collect nothing. Alaska is one of 17 states that does not mandate the disaggregation of race/ethnicity data, perpetuating inequities in health outcomes. (Civil Rights, 2023). Rhodes et al. (2023) traced the historical roots of these challenges to the upheaval of Indigenous data and practices through colonialism. Emphasizing the need for tribal data sovereignty and partnerships with Tribes to prevent misclassification, promote ethical data-sharing agreements, and provide accurate representation. Integrating cultural frameworks like the Medicine Wheel into public health models ensures that data reflect Indigenous values and better align with community needs. Broader implications for health equity are echoed by Ponce et al. (2023), who stressed that disaggregated data has been vital for uncovering health disparities not only among AI/AN populations but also among other racialized and minoritized groups. Community participation and increased sample sizes in data collection allow equitable policies and interventions while addressing systemic inequalities.

This study does not directly address the issue of data aggregation by focusing specifically on differences between AI/AN youth; however, it emphasizes the notion that analyzing SRBs within the unique cultural, geographical, and demographic contexts of this population is vital to addressing broader implications of misrepresentation, misclassification, or perceived homogeneity between minority groups. This study on AN youth could add insight into existing public health data inaccuracies and help create tailored interventions and policies to address health disparities. While drawing on secondary YRBS aggregated data, this research isolates AN youth and highlights their specific health behaviors and risks while pointing to inequalities that would go unnoticed. This study supports culturally responsive public health by placing AN youth at the center of the analysis while insisting on the need for future disaggregated data to address Indigenous populations better.

Social Ecological Model—Intrapersonal

At the intrapersonal level, age (grade-level), gender, and BMI influence decision-making processes related to SRBs. In addition, emotion-driven reasoning and peer norms often lead to underestimated risks and unhealthy decisions, while self-efficacy and life skills act as protective barriers (Kahn et al., 2019). Risk-taking can support adolescents in exploring identity and values, but gaps in health literacy, particularly in sexual health and substance use, heighten vulnerability. This review explores how intrapersonal factors impact knowledge, attitudes, and behaviors which shape sexual risk-taking behavior (e.g., condom use, number of sexual partners, and substance use).

The 2024 systematic review by Martinez-Casanova et al. revealed that higher self-esteem reduces engagement in risky sexual behaviors, such as unprotected sex or multiple sexual partners, by fostering better decision-making and resilience to peer pressure. Gender differences indicated that females with lower self-esteem internalize risks through disordered eating, whereas males externalize through aggression or risky sexual practices. Self-esteem mediates relationships between knowledge and protective behaviors, such as condom use, and interacts with factors like family support, socioeconomic status, and cultural norms. Adolescents from supportive, higher-income families demonstrated greater resilience to SRBs. Kabiru et al. (2024) conducted a global scoping review identifying individual-level factors influencing adolescent SRBs. Risks included substance use, limited sexual knowledge, negative attitudes, mental health challenges, and childhood adversity, such as exposure to violence and bullying. Meanwhile, protective factors, such as adolescent agency and religiosity, promote resilience.

Sexual Risk Behaviors

In the United States, adolescent sexual activity became a significant public health concern in the 1970s (Ramirez-Valles et al., 1998). Adolescence represents a critical developmental stage, encompassing both internal and external behaviors, during which adverse childhood experiences can arise, potentially increasing SRBs, with lasting implications for health and well-being. SRBs, such as inconsistent condom use (CU), having multiple sexual partners (MSP), and engaging in substance use (SU) before sex, contribute to higher rates of HIV/STI, unintended pregnancies, and psychosocial challenges; these behaviors are influenced by socioeconomic, environmental, and individual disparities (Kar et al., 2015; Kovensky et al., 2020; Mytton et al., 2024; Scott et al., 2011; Vasilenko, 2022).

During puberty, children experience cognitive and physical changes that increase curiosity, impulsivity, and self-awareness, influencing their sexual activity. These changes, along with the timing of puberty, affect readiness and risk behaviors, while sociocultural factors such as family, peers, and socioeconomic status further shape these behaviors (Hegde et al., 2022; Riser et al., 2024). As Hegde et al. (2022) indicated, social gender (the gendered lens) impacts youth specifically through expression (boys feel pride, girls feel shame), control and double standards (virginity holds significance mainly for girls), and objectification (women are viewed as objects, which exacerbates mental and physical issues among women). Adolescence is also a period of behavioral formation, encompassing the development of attitudes, self-concepts, relational skills, opinions, and beliefs regarding sex and sexual activity (Kotiuga et al., 2022). Despite a decrease in the prevalence of sexual activity from nearly half in the 1990s to about three in ten students today, SRBs remain a significant concern. Recent data indicated that 32% of high school students have had sex at some point, 6% report having four or more partners, and 52% used a condom during their last sexual intercourse (CDC, 2024b). Similar trends were observed in other Western countries, such as the United Kingdom, which has experienced declines in SRBs, substance use, and teen pregnancies (Mytton et al., 2024).

Compared to 2015, the 2017 YRBS reveals a slight decline in sexual activity and related behaviors. Nationwide, 39.5% of students reported ever having had sexual intercourse in 2017, down from 41.2% in 2015, with males (41.4%) more likely than females (37.7%) to report this behavior. Similarly, early sexual initiation (before age 13) decreased slightly from 3.9% in 2015 to 3.4% in 2017, with males (4.8%) at higher rates. Condom use among sexually active students also decreased, from 56.9% in 2015 to 53.8% in 2017, with males (61.3%) maintaining higher rates of use than females (46.9%). The prevalence of current sexual active dropped from 30.1% in 2015 to 28.7% in 2017, reflecting a consistent downward trend in SRB (Kann, 2016; Kann, 2018). However, disparities between Alaskan high school students are evident, with 47% of AI/AN students reporting ever having had sexual intercourse, significantly higher than the 31.8% of white students and exceeding the national averages of 39.1% for AI/AN students and 39.9% for white students. Additionally, 6.2% of AI/AN students in Alaska reported initiating sexual intercourse before age 13, compared to just 1.9% of white students in the state, with national rates at 1.8% for AI/AN students and 2.5% for white students. Additionally, 29.4% of AI/AN students in Alaska were currently sexually active, notably higher than the 24.8% of white students (SEICUS, 2016). Furthermore, Tuitt et al. (2020) highlighted a stark gap in research on SRBs among AI/AN youth, as only two studies were published over a decade ago. These studies identified peer approval of sexual activity and self-efficacy to abstain or use condoms as key predictors of SRBs. Lastly, factors such as historical trauma, chronic stress, and limited access to sexual health services in rural communities were found to exacerbate these risks.

Sexual Knowledge, Attitudes, and Beliefs

Research has consistently highlighted the critical role of sexual knowledge in influencing the development of sexual behaviors, particularly those related to risk (Hastuti et al., 2023; Keto et al., 2020; Moreira et al., 2023). The decisions youth make about sexual activity are strongly linked to access to educational services that enhance their knowledge of these topics. As demonstrated in a meta-analysis by Kim et al. (2023), comprehensive sexuality education significantly improved adolescents' sexual knowledge (OR=2.00), attitudes (OR=1.76), self-efficacy (OR=1.76), and cognition, which is highest among all (OR=5.76) for reducing risky practices, unplanned pregnancies, and STI spread. However, AI/AN youth were not included in these studies.

In the longitudinal study by Knopp et al. (2023), 955 traditional high school students participated, 13% of whom were AI/AN youth; however, explicit racial differences were not examined. The study reported on cognitive factors (normative beliefs, risk-avoidant intentions, refusal skills) and found that conservative sexual attitudes and higher self-efficacy in refusal skills consistently predicted fewer sexual partners and encounters over time. Bidirectional effects indicated that those with a higher number of partners exhibited decreased refusal skills. Given previous research showing the contrary, perceived peer norms had less predictive power, suggesting that sexual attitudes, beliefs, and behaviors interact in a complex and reciprocal manner.

Expanding this perspecitive, Evans-Paulson et al. (2021) sampled 171 traditional high school students and found that adolescents with positive beliefs and attitudes about their sexual self-concept were more confident and communicative with partners regarding pregnancy risk, consent, and pleasure. Youth who engaged in sexual activity helped reinforce this self-concept, creating a cyclical pattern in which their behavior enhanced self-perception and, consequently, improved communication. It was noted that youth with a higher self-concept might experience more frequent discussions with parents about sex, strengthening their sex-specific skills for engaging in healthy conversations with partners. Societal norms further perpetuated the gender gap, as boys reported more favorable sexual self-concepts than girls, who were often encouraged to embrace their sexuality, while girls frequently faced stigmatization that shaped their beliefs and attitudes.

Using latent class analysis, Leeper et al. (2023) showed that among traditional high schools, demographic, psychological, and social factors impact sexual perceptions.

Among clustered groupings, The Happy, Brown, and Not Down cluster, constituting predominantly Hispanic/Latinx and American Indian/Alaska Native (only 5.9%), exhibited low sexual activity, conservative sexual attitudes, and strong refusal skills, which was likely influenced by cultural and familial norms; White and Waiting clusters displayed low sexual activity and conservative beliefs but had slightly higher internalizing symptoms.

In contrast to these adolescent-focused studies, Guzzo et al. (2021) analyzed how adolescent attitudes and knowledge about sex, contraception, and reproduction shaped sexual behaviors later in adulthood. Although American Indian/Alaska Native individuals fell into the "Asian/American Indian/Other" category (5.0% of women, 6.1% of men), specific details among racial groups were not provided. Among 4,152 adolescent virgins aged 15 and older (2,144 women, 2,008 men), perceptions (attitudes) regarding the physical benefits of sex during adolescence were associated with more lifetime sexual partners and higher odds of concurrent sexual partnerships in adulthood. Specifically, women who perceived greater social costs of sex had 40% fewer partners, while those who felt more confident about birth control had 22% more sexual partners. In contrast, men with greater knowledge about condoms were 2.63 times more likely to have concurrent partners. By adulthood, men reported an average of 15.6 lifetime partners (median = 11), while women reported an average of 6.6 partners (median = 4), with men being more likely to report concurrent partnerships.

For AI/AN youth specifically, Markham et al. (2015) identified predictors of lifetime sexual experience among rural and urban AI/AN youth in Alaska, Arizona, and the Pacific Northwest (N = 537). Their findings revealed similarities to previous studies, including the significance of risky situations, early substance use, and sexual experiences. However, the protective effect of lower intentions to have sex in the next year was notable among AI/AN youth. This suggests that intrapersonal factors were the strongest predictors of sexual experiences, even when considering family and extrafamilial influences, highlighting the importance of early initiation along with parental monitoring. Interestingly, reduced sexual intentions decreased the odds of sexual activity by 73%. Additionally, cultural identification and self-efficacy to refuse sex were not significant in this study, while significant risk factors included older age (OR = 1.79), prior alcohol use, and exposure to risky situations.

Similarly, Hafner and Craig Rushing (2019) reported significant gaps in sexual knowledge and attitudes among AI/AN youth, which contributed to dangerous behaviors. Due to high levels of substance use, low sexual education, trauma, stigma, and poverty, AI/AN emerging adults experience significant disparities. Previous studies indicate the necessity of prioritizing teen pregnancy prevention and STI education/reduction; however, findings reveal that engagement in risky behaviors remained critically high, with an average of 3.45 sexual partners and the lowest risk score (2.14) among all three groups (study arms). This suggests that AI/AN youth not only engage in sexual activity but also partake in risky sexual behavior, leading to inconsistent condom use, substance use, and the overall lack of sexual health knowledge. Adding to this body of work, Tuitt et al. (2019) found that AI/AN youth with frequent residential mobility (higher among AI/AN youth) see a direct negative impact on sex refusal self-efficacy and vulnerability to early sexual activity, with a (nonsignificant) indirect association with deviant peers. This impact is seen as a disruption among protective social networks (extended family networks, structured school activities) and increased affiliation with deviant peers.

Condom Use

Adolescent condom use (CU) has varied significantly across the globe, consistently revealing gaps between knowledge and behavior.

The 2019 YRBS revealed significant gaps in condom and contraceptive use among traditional U.S. high school students. Only 54.3% of sexually active students reported using condoms during their last sexual intercourse, and just 9.1% combined condoms with other highly effective contraceptives such as IUDs or birth control pills. Muheriwa-Matemba et al. (2024) observed trends among U.S. middle school youth (N = 66,366) aged 11–14, with 56% of sexually active participants reporting CU during their last sexual intercourse; the impacts of gender, age, and race were observed. Older adolescents (61.7%) and males (59.7%) were more likely to use condoms, while females (50.8%) and younger participants (36.9), especially 11-year-olds, reported the lowest rates of use. Among racial differences, Whites reported the highest use, with African Americans reporting the lowest; AI/AN youth were not disclosed in the “Other” racial group.

A study by Keto et al. (2020) in Ethiopia reported on factors such as sex, gender, age, grade, and school setting (urban/rural). While 75.9% of adolescents were aware of risky sexual behaviors and 76.5% understood the consequences, 23% were sexually active (with 60.5% being male). Among the sexually active youth, 62% reported having multiple sexual partners (the highest rate among other countries), and 58% had never used condoms; during the last sexual encounter, only 42% used condoms. Compared to other countries, CU in Ethiopia was lower than in the U.S. (61%) but higher than in Nigeria (27%), indicating significant differences in usage among youth groups surrounding knowledge and cultural norms. Similarly, Mesele et al. (2023) using variables related to knowledge, attitudes, and practices demonstrated that while 47.3% of youth had good sexual health knowledge and 41.9% maintained positive attitudes toward safe practices, the rate of youth engaging in sex before age 18 was 36.1%, with very low condom use rates observed at 6.2%. However, youth living in urban areas had three times greater odds of possessing good knowledge regarding SRBs.

Huda et al. (2024) analyzed data from 183,100 adolescents aged 12–15 across 58 countries. They found that 27.6% of sexually active participants did not use condoms during their last sexual encounter (27.9% for boys versus 25.6% for girls). What's more, the prevalence of condom use by region is significant, as Africa exhibited the highest rate at 29.2%, while Southeast Asia had the lowest at 21.1%. This indicates that generalizations among groups were challenging to make. The analysis reveals that factors associated with nonuse included older age (15-16), psychosocial challenges (such as loneliness or being bullied), and cultural norms that disproportionately affected girls.

Benavides-Torres et al. (2023) examined CU among 419 Nahua adolescents in rural Puebla, Mexico, focusing on biological, affective, and cognitive impacts. They found outcomes similar to those in other studies, indicating that intrapersonal factors such as older age (menstruation/ejaculation) exhibited a lower probability of CU. Additionally, positive attitudes and self-efficacy (comfort discussing and negotiating) were associated with greater CU. Factors including cultural and ethnic connections related to Nahua values of social support may increase protective health behavior. Davids et al. (2021) emphasized two perspectives on adolescent sexual behavior: the affective (emotion-based) and rational (fact-based) decision-making processes. The significance of both processes was evident, as youth were seen to use logic and reasoning alongside emotions such as hope, fear, love, regret, and coercion, which often overshadowed rational decision-making in CU. This was connected to adolescents' views on sexual behavior and its impact on their relationships with peers, parents, teachers, and the community (neighbors). Lastly, in their meta-analysis, Ferrand et al. (2021) found that self-efficacy alone, reported by over half of the adolescents in their study, was not sufficient to ensure proper condom use and that many lacked practical skills to apply condoms correctly (use, application, and safety through appropriate education). Interestingly, Tremblay et al. (2024) conducted a systematic review exploring the association between STIs and subsequent CU among participants aged 10–24. The findings revealed that CU and STI history rarely acted in tandem, except for boys, where a history of STIs negatively impacted CU. Young girls with STIs, however, saw an increase in dual methods, while older participants, regardless of gender, experienced an uptick in unprotected sex following STI infection. Additionally, race/ethnicity could not be pinpointed as influential in the relationship between STI history and CU.

Substance Use

Adolescents have been particularly vulnerable to substance use (SU) and its associated consequences due to developmental and social factors (Bozzini et al., 2020). In South Africa, Mohale and Mokwena (2020) highlighted the impact of SU with age, school absenteeism, leisure activities (ASA), and peer influence as significant moderators. The prevalence of SU was 31% (N = 308) among youth, with 46% classified as polyusers. While the data show no differences in rates, males whose friends used substances and females with adults who abused substances were more prevalent. This finding contrasts with other studies showing that males are twice as likely to use substances, potentially due to increased crime, violence, and poor neighborhood environments. Lastly, SU was linked to lower condom use, with an earlier age of SU increasing the likelihood of SU and subsequent risky behaviors. The school environment was identified as a key factor influencing SU.

Khreizat et al. (2024) studied SU before sexual activity (oral, anal, vaginal) and non-condom use (non-CU) with perceived sexual approval (family and peers being supportive of sexual activity), along with risk perceptions related to HIV/STI among youth aged 13–24. Sexual approval was a moderating factor influencing SU and condomless sex. This impacted those with lower perceived sexual approval, suggesting that youth with less overall perceived support would exhibit lower SRBs, including SU and non-CU in anal and vaginal sex, while perceiving HIV/STI as a significant risk moderated SU and non-CU in oral sex. This indicates that youth with higher perceived approval are more likely to engage in SU and SRBs ($OR=2.18$, $p < .001$).

The meta-analysis by Cho and Yang (2023) emphasized the significant association between SU, particularly alcohol, which nearly doubled the odds of early sexual initiation (OR=1.958) and increased the likelihood of inconsistent CU (OR=1.228) and MSP (OR=1.722). Cognitive theories, such as alcohol myopia and inhibition conflict, suggest that alcohol impairs judgment by prioritizing immediate desires over long-term consequences. The impact of age shows substantial differences within and between countries and cultures, with studies indicating a rise in "early age" in the US, the rate before age 13 has declined from 10.2% to 3.4%.

The impact of SU among AI/AN youth is evident. The National Center for Drug Abuse Statistics (2023) reported that Alaskan teens were 25.67% more likely to use drugs than the national average. Marijuana was the predominant substance, accounting for 83.33% of cases. Despite slightly lower alcohol use rates compared to the national average, illicit drug use disorder and alcohol use disorder rates remained high among youth. The 2021 National Survey on Drug Use and Health revealed significant disparities, with AI/AN populations reporting the highest rates of past-month tobacco product use or nicotine vaping (36.1%), past-year illicit drug use (36.1%), and marijuana use (35.0%; SAMHSA, 2022).

Among AI youth, Anastario et al. (2020) conducted a mixed-methods study regarding SU and SRB, revealing a recurring theme of increased STIs and unplanned pregnancies on reservations. In these areas, youth accounted for 61% of alcohol consumption, with 27% having consumed alcohol in the past 30 days. AI youth reported witnessing parents engaged in disordered SU and participating in risky sexual practices, while others mentioned observing parents or directly participating in SU with them. Moreover, sexual acts were used as a form of currency for substance use among AI individuals, exacerbated by high poverty rates and the effects of insufficient services (both bureaucratic and resource-based). The study indicated that with every additional substance, there was a 2.4-fold increase in overall sexual activity, with alcohol increasing the odds by 1.8 times and marijuana increasing them by 1.4 times compared to youth who did not partake.

However, Schick et al. (2021) found that youth living on or near reservations experienced little to no difference in SU in the past month (59.5%) compared to national trends, which indicated that one-third of youth by grade 12 report past-month SU, alongside high rates of abstinence among AI youth. Nevertheless, those who did use substances faced disproportionately higher consequences. Moreover, the combination of marijuana and smoking revealed higher rates than the combination of alcohol, marijuana, and smoking, with varying perceptions of marijuana as the less risky substance, along with individual beliefs about specific substances and their consequences.

Conversely, Douglas et al. (2024) independently identified SU patterns among 45 reservation area schools, including specific attention to AI youth and their associated risks. These risks include simultaneous light and heavy use of alcohol and marijuana, primarily alcohol use, and primarily cannabis use. The impact of this study is vital as it delineates differences by race (AI or AI with other races like AN), gender, and grade level. The outcomes show differences even among groups of AI/AN youth and their substance use. AI youth exhibit riskier substance use patterns compared to the national average, a shift in substance use from cannabis to alcohol as they age, and a gendered impact of substance use (alcohol and cannabis), with females facing higher social pressures.

Cultural and community factors play dual roles in SU risks among AI/AN youth. Brockie et al. (2022) and Soto et al. (2022) found that communal mastery, tribal identity, and high school education were linked to lower odds of polysubstance use, even after accounting for early initiation and systemic barriers. Soto et al. (2021) indicated many of the same risk factors, such as socioeconomic disparities (high poverty, geographic remoteness), along with interpersonal and intrapersonal impacts. With community and culture comes a strengthened identity, enhanced emotional resilience, and stronger community and family support, all vital to reducing SU in AI/AN communities. Brockie et al. (2022) echoed these statements, emphasizing the role of education in SU and the significance of fostering protective upstream effects while integrating SU prevention and interventions within tribal communities to build a stronger and supportive communal and family network. In the absence of supportive environments, vulnerability takes hold. Sussman and Sinclair (2022) indicated that poverty, unsafe communities, discrimination, and weak social support systems lead to SU and addiction as coping mechanisms. Nadeau et al. (2024) and Woods et al. (2022) provided an ecological summary outlining the roles of schools as both protective and risk factors. Protective aspects include a positive school atmosphere and resources offered by schools, such as afterschool activities, while risks involve peer perceptions (higher levels of substance use) and racism (exclusionary practices).

Multiple Sexual Partners

An element within risky sexual behavior is that of multiple sexual partners (MSP), which is strongly associated with adverse health outcomes (Dendup et al., 2023). The study by Thepthien and Celyn (2022) surveyed 6,167 young people in Bangkok, Thailand, finding that 14.1% were sexually active and 42.4% reported MSP. A key factor was vocational school students, who accounted for a large portion of sexually active participants (66.9%). Gender differences were evident; 44.8% of females and 39.2% of males reported MSP, with females more often experiencing coercive sex and unintended pregnancies. Marijuana use (AOR = 2.84) and not using contraception during the last sexual encounter (AOR = 2.74) were key predictors. Female vocational students reported the highest MSP rates linked to socioeconomic risks, adverse experiences, and coercion, while males cited SU and peer pressure. Additionally, early sexual initiation was notable, with 28.7% of sexually active participants reporting their first sexual experience before age 15. Inconsistent CU was prevalent, with 53.1% of participants not using condoms during their most recent sexual encounter. Klu et al. (2024) similarly found that 51.6% of sexually active adolescent girls in Ghana reported MSP, with early sexual debut before age 15 doubling the likelihood of engaging in MSP; substance use not only impaired decision-making but also increased the likelihood of unprotected sex and exposure to multiple partners.

Among 910 students from 12 secondary schools (public and private, boarding and day) in Mbarara Municipality, Uganda, Anyanwu and Tamwesigire (2023) revealed that 34.6% of the youth were sexually active, with 18.8% engaging in SRB, including MSP.

Boarding school students accounted for 84.5% of all SRB cases, highlighting the potential influence of autonomy and peer dynamics in residential settings. In contrast, public versus private schools did not directly affect SRB prevalence. Instead, the mixed-gender environment in most schools appeared to contribute to peer-driven risk factors. Key predictors of MSP included age, gender, and SU, with students aged 18 years or older significantly more likely to engage in SRB and male students 1.69 times more likely than females. Substance use, including alcohol consumption, smoking, and drug use, strongly predicted MSP, with users being 1.46 times more likely to report MSP. Notably, although social (family, friends, community) factors were measured, their associations with MSP were less significant. Mesele et al. (2023) also included geographic location and school type (government and private). These findings showed that urban and private school students had better SRB knowledge and attitudes than their rural and government school peers. Overall, 47.3% demonstrated good understanding, and 41.9% had positive attitudes, yet CU was critically low, with only 6.2% practicing protected sex and 2.8% using condoms during their first intercourse. Among the 9.3% who reported sexual activity, half had multiple partners, and social factors, such as attending parties and limited parental communication (35.6%), further influenced SRB.

Bizuwork et al. (2022) reported that 33.1% of sexually active adolescents engaged in MSP within the past 12 months. Preparatory school students exhibited a higher likelihood of MSP than secondary school students, as preparatory students often cited increased independence, feelings of seniority, and exposure to broader social environments. For instance, students transitioning to higher education were noted to engage in more varied relationships, perceiving it as a sign of maturity or social sophistication. Substance use, particularly alcohol consumption, was linked to a fivefold increase in the likelihood of engaging in SRBs and MSP. Peer pressure also had a profound impact, with students under peer influence being nearly six times more likely to report SRB. Additionally, grade-level was assessed, with students in grade 12 being almost six times more likely to engage in MSP than those in grade 9.

Age, Gender, and Race

Age, gender, and race have played a complex (often entangled) and essential role within SRBs, as evidenced by previous studies discussed in this review; further studies are provided here.

Age

As highlighted in the literature, age has varying impacts. As Prendergast et al. (2019) indicated, sexual activity before age 15 increases the rates of sexual risk-taking, substance use, and antisocial behavior. Similarly, Cunha et al. (2023) demonstrated that Brazilian adolescents who initiated sexual activity before age 14 faced higher risks of unprotected sex, mental health problems, and substance use. While Osborne et al. (2024) and Abdulla et al. (2023) substantiated these details with protective factors such as higher education reducing poverty and the risk of early sexual initiation, as Osborne et al. (2024) stated, uneducated girls saw a 3.61 times greater likelihood of early sexual initiation. However, in the Caribbean, as Pengpid and Peltzer (2020) found, older adolescents (16+) had a higher chance of engaging in MSP and inconsistent CU. Sepúlveda Sepúlveda et al. (2024) further highlighted that romantic relationships were significant risk factors for early sexual initiation in Colombia, while strong social networks acted as protective factors. Johansen (2021) found that young-for-grade females in Denmark were disproportionately involved in early initiation and unprotected sex, driven by developmental and social influences. In the U.S., Ma et al. (2021) reported that older 9th graders were more likely to have MSP, highlighting the nuanced effects of age even within grades.

Gender

In various cultures, boys often engage in earlier initiation, transactional relationships, and unprotected sex, primarily affected by sociocultural pressures and societal norms that present masculinity with fertility and dominance (Mogotsi et al., 2024). Studies in South Africa and Jamaica highlight how aggressive masculinity, community disorganization, and family dynamics contribute to boys initiating sex earlier and demonstrating lower condom use (Gordon-Strachan et al., 2024; Hallit et al., 2021; Seff et al., 2021). Using qualitative analysis, Arruda et al. (2020) found that among Brazilian adolescents, 63% of girls had sex at an average age of 14.6 (similar to boys 14.1), with 60.5% of girls reporting condom use during their first sexual encounter, but only 35.7% continued to use them consistently. In contrast, 47.7% of boys used condoms initially, with 38.6% reporting regular use afterward. In an additional study among Brazilian adolescents aged 13 to 18, girls were significantly more at risk for lower CU and MSP, which was inversely associated among boys (higher number of partners with higher CU; Noll et al., 2020).

Race

Among AI/AN populations, condom use rates are influenced by cultural, geographic, and systemic factors. Evans (2024) and Chambers et al. (2021) highlighted that AI/AN youth are at a heightened risk of early sexual initiation, unintended pregnancies, and STIs. Among sexually active AI/AN adolescents, 53.4% of boys reported using condoms during their last sexual encounter, compared to 42.3% of girls (Skye et al., 2021). The lack of culturally tailored health services addressing inequities and barriers complicates risks. In the study by D'Amico et al. (2021), AI/AN youth showed unique protective factors, including strong cultural engagement and parental involvement. For those who reported no condom use (44%), there were still lower rates of STI within the community; this was attributed to their cultural ties and community belonging, which increased resiliency. Saftner et al. (2021) conducted a secondary analysis of Minnesota's student survey, revealing that consistent communication with sexual partners about STI prevention enhanced CU by 27% among AI/AN youth; dual-method use increased by 34% for females; and CU rose by 21% when partner communication remained consistent for men. However, SU before intercourse decreased CU by 15% among males.

Body Mass Index

Childhood obesity is an ongoing public health concern both nationally and globally. The U.S. national obesity rate is 19.7%, affecting approximately 14.7 million youth aged 2–19 (CDC, 2024a; CDC, 2024b). These conditions contribute to the development of noncommunicable diseases such as hypertension, type 2 diabetes, cardiovascular disease, and metabolic syndrome, emphasizing their deep-rooted impact on public health (Obita & Alkhatib, 2022). Although the following articles are dated, they remain essential for illustrating the current state of BMI literature. Previous research has examined the relationship between BMI and SRB, but findings have varied across populations and contexts. Several studies (e.g., Akers et al., 2016; Chambers & Rodgers, 2013; Gordon et al., 2016; Leech & Dias, 2012; Lowry et al., 2014; Ratcliff et al., 2011) identified associations between BMI categories such as underweight, overweight, and obese and behaviors like CU, MSP, and SU before sex. However, the direction and magnitude of these associations differ, with some studies finding increased SRB among obese females (Akers et al., 2016; Ratcliff et al., 2011), while others report little to no significant relationship for certain groups, such as Black adolescents (Leech & Dias, 2012).

Research has demonstrated that cultural and racial backgrounds shape the influence of BMI, such that Whites could experience weight-based stigma at higher rates, which negatively impacts sexual behavior (Chambers & Rodgers, 2013). Despite these contributions, the studies do not provide a unified narrative about how BMI impacts SRB, with inconsistent findings across different populations and methodologies. Current literature, such as Wójcik et al. (2023), illustrates how childhood obesity results from poor nutrition, sedentary lifestyles, disrupted sleep, chronic stress, and factors like family dynamics, bullying, and mental health challenges; environmental risks, including urbanization and pollution, also contribute. Building on this, Iguacel et al. (2021) pointed to social vulnerabilities, including parental unemployment, adverse childhood experiences (ACEs), and gender inequalities, as independent drivers of obesity. These stressors often lead to unhealthy behaviors, particularly in socioeconomically disadvantaged groups. For example, children in lower socioeconomic households are significantly more likely to have limited access to healthy food and face barriers to physical activity, increasing their risk of obesity and related conditions (Anekwe et al., 2020).

Research on the relationship between BMI and adolescent behaviors presents a mixed picture. Cho et al. (2024) studied Korean adolescents (N = 54,948) and found that obesity was associated with lower engagement in multiple risk-taking behaviors, potentially due to risk-averse traits. Similarly, Becnel et al. (2022), using YRBSS data, identified different SU profiles among adolescents with severe obesity. Interestingly, nonusers of substances reported higher depressive symptoms, highlighting the complex psychological dynamics linked to BMI. In contrast, Duckworth et al. (2020), using longitudinal data from the National Longitudinal Survey of Youth (N = 12,686), observed that obesity was linked to earlier sexual initiation and higher SRBs among specific subgroups, such as Black males and White females. Walsh et al. (2022), drawing on qualitative data from 19 adolescents, highlighted how obesity can increase vulnerability to high-risk sexual activities worsened by weight stigma and body dissatisfaction. Furthermore, Lima et al. (2019) analyzed 1,169 Brazilian adolescents but found no significant relationship between BMI and SRBs, while Lott et al. (2018) reported a notable link among Mississippi high school students (N = 4,738), with obesity increasing the likelihood of sexual intercourse (OR=1.218). Aslam et al. (2023), using latent class analysis with data from 13,583 high school students, emphasized how obesity interacts with other risk factors, such as depression and SU, to shape adolescent behaviors. These discrepancies suggest that cultural, regional, and environmental factors influence the connection between BMI and behaviors.

AI/AN populations face some of the highest obesity rates, influenced by a complex interplay of social determinants of health. Johnson-Jennings et al. (2023), analyzing data from 26,226 AI/AN adolescents, found that 32.5% were obese, with higher rates among males. Obesity was associated with poverty, mental health disorders, and limited access to healthy foods, while cultural practices like traditional food consumption offered protective benefits. Further emphasizing this point, Hill et al. (2023) documented a staggering 70% prevalence of overweight or obesity among Yup'ik preschoolers in Alaska. Their findings highlighted the damaging impact of ultra-processed foods and dwindling traditional food consumption. Fyfe-Johnson et al. (2023), in a study of 23,950 AI/AN children aged 2–11, noted that children living in higher poverty areas (structural barriers) had 28% greater odds of being overweight or obese. Zamora-Kapoor et al. (2019) argued that historical and sociocultural forces drive obesity, highlighting parental obesity, sedentary lifestyles, and chronic stress as central contributors. However, they also noted the protective role of cultural traditions, such as language use and traditional food practices. Maurice et al. (2019), in a study of 28 parent-child dyads in Yup'ik communities, demonstrated how parental engagement in traditional food practices positively influenced children's dietary patterns and reduced obesity risks.

Additionally, body dissatisfaction among adolescents amplifies the risk of engaging in unhealthy lifestyles like smoking and excessive alcohol consumption. Among 668 adolescents in Brazil, body image pressures intersected with obesity and health risk behaviors, often with gendered outcomes (Gonçalves et al., 2023). Similarly, Ramseyer-Winter et al. (2022) explored weight misperception among U.S. adolescents. They found that underestimating or overestimating weight can influence sexual behaviors differently for males and females, further linking body image to health behaviors. Adolescents with severe obesity often face barriers to healthy romantic relationships, leading to risky behaviors such as inconsistent contraceptive use (83% of sexually active participants) and SU before sexual activity (Walsh et al., 2022). Likewise, Lima et al. (2019) emphasized the significant role of SU in increasing SRBs. Christian et al. (2021), using survey data from Ghanaian adolescents (n=1,093), found that higher BMI was a protective factor against SRBs in urban settings, contrasting sharply with Duckworth and Waldron (2018). Further studies linked early sexual debut and psychological distress to obesity in Italian adolescents, showing just how important mental health is in mediating these outcomes (Castellini et al.,2021). Lastly, Vazquez et al.'s (2024) study on alcohol use patterns and obesity in rural and urban U.S. adolescents found that rurality with lower alcohol consumption among adolescents exhibited higher obesity rates, with a notable 20% prevalence compared to 15% in urban areas.

Social Ecological Model—Interpersonal

Social relationships at the interpersonal level, such as interactions with peers/partners and parents/families (not integrated into this study), are still key mediators to discuss, given their impact on individual-level factors. Supportive relationships foster healthy behaviors, while negative influences exacerbate risk.

Social and Familial Context

Family structure significantly influences adolescent sexual initiation. Furlanetto et al. (2019) found that Brazilian adolescents from extended family structures were nearly seven times more likely to initiate sex early, and youth from single-parent households also faced increased risk. In contrast, adolescents who perceived higher levels of affective-consistent family support were 15% less likely to engage in early sexual activity per unit increase in perceived support. Kaufman-Parks et al. (2023) extended these findings by showing that exposure to high parental conflict in adolescences was associated with a greater likelihood of engaging in casual sex in emerging adulthood, which supported social learning and attachment theories that suggest individuals model relationship behaviors based on parental interactions. However, this interparental conflict did not significantly predict sexual nonexclusivity in committed relationships, indicating that family background may shape attitudes toward casual sex more than fidelity in partnerships.

The impact of parental monitoring serves as a key protective factor against early and risky sexual behaviors. Youth with higher levels of parental supervision delayed their sexual debut among Dutch adolescents, reinforcing the idea that reduced supervision increases opportunities for risky behaviors (Schuring, 2024). Among U.S. adolescents, higher parental monitoring significantly reduced the likelihood of STI exposure, particularly among younger teens (≤ 14 years; Pullen, 2024). Research has consistently highlighted the importance of parental guidance in reducing SRBs while also supporting the need for quality and frequency in parent-child communication regarding sex and sexual health to enhance long-term effects. Verbeek et al. (2020) found that frequent sexuality-specific communication was associated with increased sexual autonomy over time, which in turn linked to greater positive emotions and fewer negative emotions related to sexual experiences. A recent systematic review emphasized that poor parental communication about sexual risk increased the likelihood of noncoital behaviors (e.g., spending time alone with a partner, kissing, and cuddling). Conversely, adolescents who engaged in open discussions with their parents about sex were more likely to delay initiation and practice safer sex when they became sexually active (Kabiru et al., 2024). Interestingly, the study by Mihic et al. (2022) found no association between family protective factors and youth SRBs. They indicated that peer and school influences may overshadow parental communication as autonomy increases.

Substance use often overlaps with risky sexual behaviors, particularly when parental monitoring is low and family environments are unstable. Alcohol use tripled the likelihood of early sexual initiation, and tobacco and drug use were similarly correlated with early debut and inconsistent condom use (Furlanetto et al., 2019). Therriault et al. (2024) demonstrated that adolescents with externalizing behavior problems at baseline were significantly more likely to engage in SRBs at follow-up. Higher parental attachment scores were associated with a lower likelihood of nonexclusive partnerships combined with inconsistent condom use. Similarly, Kaufman-Parks et al. (2023) found that youth exposed to family conflict or instability were more likely to engage in casual sex during young adulthood.

Luijten et al. (2021) found that higher-quality friendships were linked to greater well-being among boys ($\beta = 0.16$, $p < .001$), while peer attachment did not significantly predict risky sexual behaviors ($\beta = -.01$, $p = .878$). Conversely, Pullen (2024) discovered that strong peer connectedness was associated with a lower risk of STI exposure and suggested that positive peer influences can strengthen family-based protective factors. Saftner et al. (2021) reported that among 739 AI 9th and 11th graders, 49.5% discussed STI prevention with every partner. Communication with partners boosted condom use (for males) and reliable contraception and dual methods (for females). Bibby et al. (2023) found that sexual communication with parents and friends peaked by 10th grade, while discussions with partners increased, surpassing parental talks by 12th grade. Females reported frequent discussions, and Black and Latinx youth engaged in more parental communication than their White peers. Hor et al. (2022) discovered that Malaysian adolescents who viewed their peers as sexually active were much more likely to engage in sex, with males exhibiting a stronger correlation. Lastly, Laursen and Veenstra (2021) clarified this phenomenon through the influence-compatibility model, which suggests that peer norms reinforce behavioral similarity and social cohesion. Adolescents are neurologically attuned to peer influence, which guides their decisions regarding sexual behavior.

Social Ecological Model—Environmental Level

The independent variable of this study at the environmental level was school type, defined by the comparison between alternative and traditional schools, which represents an organizational-level factor that shapes health outcomes through school climate, student connection, and the influence of afterschool activities (control variable). Community-level factors such as rurality (geographic isolation), poverty, cultural norms, and limited resources intersect with school environments, affecting opportunities for engagement, mentorship, and structured engagement. Schools are essential environments for implementing policies, resources, and norms that directly impact health-related outcomes.

School Type

Schools are environments where youth develop intellectually and socially, shaping their future identities while forming attitudes and behaviors around sex and sexuality, which can be influenced positively or negatively by the knowledge and guidance they receive. Alternative schools, or alternative education (AS), lack a standardized national classification or definition, resulting in significant regional variation in their conceptualization and implementation (Jacobs, 2024; Lange & Sletten, 2002). AS vary in philosophy, student demographics, and settings but are often categorized into three types: Type I, gifted or specialized education; Type II, chronically disruptive; and Type III, remedial or rehabilitative support (Smith, 2005). In Alaska, alternative schools serve middle and high school students who struggle to succeed in traditional environments. These schools, accredited or affiliated with accredited institutions, provide regular academic or career-focused instruction tailored to the specific needs of their students (Porowski et al., 2014). Alaska Statute AS 14.30.365(c)(1) defines alternative education programs as diverse in nature, encompassing public secondary schools with nontraditional curricula, including vocational, remedial, and theme-based programs, as well as charter and correspondence schools (ASAA, 2016). Despite variability in definitions, alternative schools share standard structural features, including smaller student populations, individualized attention, supportive environments, and flexibility in approach. These schools have served marginalized students, those with problematic behaviors, disabilities, or academic challenges, and those seeking environments unavailable in traditional settings (Ballard & Bender, 2021; Best, 2024; Lange & Sletten, 2002; Raywid, 1994; Tierney, 2020).

The potential benefits of alternative schools, such as smaller classes and closer teacher-student engagement, were highlighted by Perzigian and Braun (2020), who compared school climate perceptions among students, parents, and staff across four urban secondary school types: traditional, innovative, behavior-focused alternative, and academic remediation-focused alternative. Despite generally positive perceptions of alternative schooling, which fosters learning-focused environments, enhances academic preparation, encourages community engagement, and high ratings of staff connection, Best (2024) indicated that not all students internalize feelings of belonging and improved motivation when removed from traditional to alternative schools. The exclusionary impact of “moving” to an alternative school can reinforce barriers, including practices or policies that favor traditional school performance metrics, limiting students’ ability to transition back while reinforcing cycles of educational marginalization rather than providing long-term pathways to success. This is evident among the demographics for racial/ethnic populations in alternative schools. Research indicates that AI/AN students have the lowest graduation rates nationwide. Key factors contributing to this include (a) cultural misunderstandings regarding stepping out, where temporary absences due to familial obligations are misconceived as dropping out and discourage re-enrollment; (b) early literacy struggles play a role, with over half of AI/AN fourth graders reading below the basic level; and (c) most dropout prevention programs focus on short-term solutions instead of addressing systemic barriers like inequitable policies, cultural dissonance, and structural inequalities (Executive Office of the President, 2014; Nelson-Barber & Boxerman, 2023).

Welsh (2022), using data from a southeastern U.S. urban district, examined enrollment and disciplinary placements in alternative schools. Black students represented 50% of the student population but accounted for 81% of disciplinary actions and 76% of alternative placements, compared to only 6% of White students. Males, who comprised 52% of enrollment, made up 70% of those expelled or placed in alternative schools; ninth grade was a key transition year with the highest exclusionary discipline rates. Alternative schools often act as “dumping grounds” with unstable staffing, poor transportation, and ongoing debates on balancing discipline with academics (Losen & Martinez, 2020). The impact of unfair disciplinary actions is highlighted in a CDC report from 2024, which stated that 81. 7% of AI/AN youth and 51.7% of mixed-race youth receive unfair punishments in school (Krause, 2024). In 2024, racial data from the Anchorage School

District (urban area) revealed that AI/AN youth represented 9.11% of alternative school students, while White youth comprised 54.73%. However, among the total district enrolled, only 10.52% were AI/AN, compared to 39.94% who were White (AKSD, 2024).

The literature shows that youth in alternative education settings differ significantly from their traditional school peers and further how Indigenous and non-Indigenous youth experience disparities in AS (Panina-Beard & Vadeboncoeur, 2022). Youth in AS often face compounded risk factors: higher rates of substance use and SRBs, weaker familial bonds, academic struggles, and disproportionate representation of ethnic minorities (Fortems et al., 2023; Szydlowski, 2016). A longitudinal study examining substance use among AS and sensation seeking was reported at higher rates compared to traditional schools. Youth were at least twice as likely to use substances such as cigarettes, alcohol, and marijuana; three times more likely to engage in sexual activity (98.2%); had multiple sexual partners, with a median of six lifetime partners; initiated sex before age 13 (23%); and used substances before their last sexual encounter (33%). Males reported more lifetime sexual partners (median = 7) than females (median = 4), with 23% initiating sex by age 13. Differences among ethnicities indicate that Latino participants had a later age of sexual onset (median = 16 years) compared to non-Latinos (median = 14 years) and reported lower levels of sensation-seeking and substance use. This suggests that AS environments expose students to heightened risks, emphasizing the need for targeted interventions that combine substance use prevention with comprehensive sexual health education (Espinoza et al., 2019). In the UK, Henderson et al. (2019) examined poly-substance use (PSU) and SRBs among students in AS and traditional schools (TS). The findings indicated that AS students had 4.35 times greater odds of PSU for males and 3.70 times greater odds for females. With SRBs higher among AS students, 63.5% of males and 51.8% of females reported having had sex, compared to 27.3% of males and 22.6% of females in TS. Additionally, MSPs were observed in 53.1% of males and 45.8% of females in AS, compared to 17.6% of males and 21.2% of females in TS. AS students were less likely to use condoms at first sex or discuss protection beforehand.

Adolescents in alternative and special education settings reported significantly higher ACE rates than the general population, with 69.5% to 95.1% experiencing at least one ACE and 35.6% to 81.3% reporting two or more (Mercera et al., 2024). Similarly, Diedrick et al. (2023) found that youth in traditional schooling with one ACE had a 22% higher likelihood, while those with six ACEs were nearly three times as likely to engage in high-risk sexual behaviors, such as MSP, SU, and participating in unprotected intercourse. However, Szydlowski (2016) indicated that data concerning adolescent youth on SRBs remains low among minority youth, including American Indian/Alaska Native populations, who are disproportionately represented in alternative educational environments and face a higher risk of STI and early, unplanned pregnancies, along with a lack of sexual health education provided by these schools.

School-level socioeconomic status and rurality further influence SRBs within the educational environment. Underwood et al. (2021) indicate that students (N = 26,989) attending high-poverty schools were more likely to be sexually active (APR = 1.4) and to have four or more lifetime sexual partners (APR = 1.6) compared to those in low-poverty schools. Youth in rural schools were more likely to be sexually active (33.1%) and to have multiple sexual partners (11.3%) than their urban and suburban peers, highlighting how socioeconomic status and geography influence and shape youth health disparities. The study by Wilkerson et al. (2018) helped explain how AS types in urban districts produce disparities in placements based on student demographics like gender, ethnicity, socioeconomic status, and disability. Males (77.9%), Black students (28.2%), and students with disabilities (32.2%) were disproportionately placed in behavior-focused alternative schools. Overrepresentation was seen with Hispanic students (71.6%) in academic remediation-focused programs, and economically disadvantaged students were more likely to attend alternative schools overall.

Although the national YRBS has provided valuable health data since 1990, its focus on traditional high school students leaves youth in alternative schools underrepresented (Kann, 2018). Li et al. (2022), analyzing national YRBS data from 101,728 high school students, found that school-level factors explained 12.7% of the variance in multiple sexual partners (MSP), 11.5% of the variance in ever having sex, and 9.2% of the variance in current sexual activity. These factors also intersected with demographics, showing disparities by race (Black and Other) and by gender, with 14.5% of males and 9.8% of females reporting MSP. This indicated the need for comprehensive, multilevel interventions tailored to school and district contexts. Risley et al. (2023) reported a similar outcome on youth SRBs in Mississippi compared to the U.S., including sex before age 13, ever having sex, and four or more sexual partners, while looking specifically at gender, race, and grade level.

While a national survey of alternative high school (AHS) youth was conducted in 1998, subsequent data collection has been limited (Johnson et al., 2016; Johnson et al., 2017). Given the vast differences, Lindberg et al. (2020) emphasize the importance of observing and examining SRB among alternative schools at both the state and regional levels. For example, nationally, 38% of youth reported ever having sex, while California reported a much lower rate of 28%, and West Virginia showed a much higher rate at 49%. In Montana, alternative school data is further delineated into the specific impacts on urban and reservation AI/AN, Black, and Hispanic populations. The data shows that alternative school youth, compared to traditional schooling youth, had higher rates of sexual intercourse with four or more partners (35.7% vs. 10.7%), substance use during the last intercourse (35.1% vs. 17.8%), and lower condom usage during their last intercourse (42.5% vs. 51.7%) comparatively (Montana Office of Public Instruction, 2021). Notably, AI/AN students are disproportionately represented in alternative schools, with 2.2% in behavior-focused schools and 1.4% in academic remediation-focused schools, compared to 0.7% nationally (Kho & Rabovsky, 2022; Wilkerson et al., 2018).

In Texas, ASs have predominantly served low-income and minority youth, with reported higher levels of SRBs. Among a sample of 515 students, only 43% used a condom, 84% had ever had sex, and 33.5% had four or more sexual partners. Moreover, 30% of females reported one pregnancy. None of the schools sampled provided comprehensive sexual health services (STI or pregnancy testing, or condoms), and abstinence-based and restrictive policies limited comprehensive sexual health education, worsening racial and socioeconomic inequities (Johnson et al., 2022). Additionally, Johnson et al. (2023) found that AS nurses primarily provided reactive, individual-level interventions for substance use (3.78 per nurse) and sexual health (2.41 per nurse). Structural barriers, including staffing shortages, outdated curricula, and restrictive policies tied to abstinence-only education, limited proactive efforts. AHS students, especially Black, Hispanic/Latino, and Indigenous youth, faced systemic inequities, with over 50% placed in AHSs for drug-related offenses, fueling the school-to-prison pipeline. These findings have highlighted the need for policy reform to integrate equitable, culturally responsive health services in alternative education. Alaska has tracked health-risk behaviors in alternative schools through convenience sampling since 2009, complementing national YRBS data from traditional schools (Alaska Department of Education and Early Development, n.d.; Johnson et al., 2017). However, no study has addressed the impact of AS on AN youth within Alaska, specifically among AN youth.

In Canada, the study by Gazendam et al. (2020) used a similar youth survey, the "Canadian Health Behaviour in School-aged Children (HBSC)," to examine SRBs such as early sexual activity (before age 16) and intrapersonal and social determinants, while excluded AS and First Nation or Inuit reservations. Sexual activity was slightly higher for girls (19.3%) than boys (17.8%), though the difference was not statistically significant. Key predictors varied by gender: for girls, poor body image, high social media use, and low family affluence were notable, while for boys, participation in team sports was the strongest predictor. Low family support and disrupted family structure were linked to early sexual activity for both genders, although boys were more affected by family disruption than girls. The literature has shown how schools play a pivotal role in shaping and supporting health behaviors among youth through sexual education.

Sexual Education

The systematic review by Goldfarb and Lieberman (2021), covering three decades, indicated that school-based comprehensive sexuality education should go beyond just pregnancy and STI prevention. It should include broader topics like promoting sexual diversity, preventing dating and intimate partner violence, fostering healthy relationships, and improving social-emotional learning and media literacy. Strong evidence supports early, scaffolded, and multigrade approaches to comprehensive sexuality education, which help reduce dating and intimate partner violence, increase bystander intervention, and improve children's ability to disclose sexual abuse. The qualitative interviews with 220 youth in Barcelona helped explain how schools act as pathways for sexual education, along with peer groups (which many act as safe spaces for discussion), digital media (where pornography, social media, and the internet can increase knowledge, though often inaccurately), and families (less often involved, but still a place for discussion). Youth frequently viewed the school's role as infrequent, clinical, and inadequate, focusing mainly on contraception and menstruation, while neglecting the exploration of emotions, relationships, or pleasure, and lacking safe, nonjudgmental spaces for student questions. The impact of school connection and the climate among students and teachers/faculty are crucial in SRBs, with differences observed among various school types (Fedele et al., 2025; Wilkins., 2023).

School Climate and Connection

The longitudinal study by Peterson et al. (2020) examined school climate and SRBs, finding that (after identifying interactions and adjusting for school-level factors) belonging, commitment to learning, and positive relationships with teachers help reduce early sexual activity. Notably, teacher-student relationships were linked to lower early activity, especially among boys, and schools that support the proxy of higher value-added education based on attendance and academic success experienced increased early sexual activity.

Additionally, Mihic et al. (2022) indicated that school protective factors, more so than family factors, significantly reduced adolescent risk behaviors. Higher school commitment, assessed through students' academic efforts and engagement, was linked to a 14% reduction in risk behaviors among females and an 18% reduction among males. Furthermore, school attachment was associated with a decrease in risk behaviors among males (11%) but not females, suggesting that an emotional connection to school and teachers may particularly influence boys when making safer sexual decisions. Furthermore, the protective impact of family communication and satisfaction was lower in males (10% and 9%), while females showed a greater effect from family satisfaction (12%).

The study by Choi et al. (2024) investigated racial and ethnic differences in the relationship between school connectedness and both internalizing and externalizing behaviors among adolescents. They discovered that higher levels of school connectedness were linked to lower levels of internalizing behaviors (e.g., depressive symptoms, anxiety) and externalizing behaviors (e.g., aggression, substance use) due to the mitigating role that strong connections with teachers, peers, and school personnel play in behavior. The protective effects of school connectedness varied by race and ethnicity, with White students experiencing greater benefits than racial minority youth, as youth of color face higher rates of negative school experiences and discrimination from teachers and peers. Spier et al. (2012) illustrate how Alaska Native youth's perspectives on school climate resemble those of White youth; however, they emphasize the importance of academic engagement opportunities and instances of unfair treatment in the school experience. Alaska Native youth, particularly those from rural areas, strongly desire more diverse and relevant coursework that aligns with their interests and goals.

Additionally, Miller et al. (2024) examined the role of school connectedness (feeling included, valued, and safe within the school environment) in shaping adolescent sexual behaviors, including engagement in sexual intercourse and experiences of nonconsensual sex. In the study, gender was a critical factor in school connectedness, with girls showing higher connectedness and a 45% reduction in engagement in sexual intercourse, but not significantly for nonconsensual sex. In contrast, boys with higher connectedness had a 71% decreased risk of nonconsensual sex. Inevitably, school connectedness and SU were a decisive factor for gender and sexual intercourse, with girls being ten times more likely to engage. Among risk factors, self-control was significant for sexually active girls but not for boys, while delinquency increased the risk for boys. Socioeconomic status, indicated by higher parental education and income, was protective against early activity. Lastly, school connectedness protected boys but not girls, who were more likely to report nonconsensual sex if they came from highly educated families and less likely if from lower-income households; boys in extracurricular activities faced a higher risk, supporting research that male-dominated environments can normalize coercion.

Afterschool Activities

In this study, afterschool activities were grouped as a single variable to examine their overall impact on SRB, rather than analyzing the influence of specific activities separately. However, the literature examines specifics within the variable.

The study by Feldman et al. (2021) found that structured involvement, particularly for low-income children, significantly reduced externalizing behaviors, including substance use, delinquency, and risk-taking behaviors, but did not impact internalizing behaviors. These benefits were attributed to increased adult supervision, decreased exposure to deviant peers, and the promotion of prosocial connections. Internalizing behaviors may differ due to the sampling of all low-income youth and the enjoyment derived from participation in the activities. McWood et al. (2021) looked at how ASAs address youth’s internalizing and externalizing behaviors and found that increased involvement in these activities correlated with fewer internalizing problems through enhanced skill and competence development in enjoyable and structured environments. However, the effect on externalizing behaviors was influenced by initial adjustments; adolescents showing low initial externalizing problems benefited from ASAs, reducing subsequent externalizing behaviors. In contrast, those with higher initial externalizing problems experienced an increase in difficulties. This suggests that youth tend to engage in similar behaviors, reinforcing negative behaviors.

Tjaden et al. (2019) found that time use in high school had mixed effects. Academic achievement improved by 7% for each additional hour spent on homework, and participation in extracurricular activities supported positive development. However, these structured activities did not fully protect youth from adverse outcomes, as spending weekday evenings unsupervised increased the likelihood of negative developmental behaviors. Furthermore, O'Donnell and Barber (2021) emphasized the protective role of non-sport-organized activities in socioeconomically disadvantaged environments. The longitudinal study revealed that consistent participation reduced externalizing behaviors, such as skipping school and engaging in risky activities. Meanwhile, disadvantaged youth who dropped out of organized activities experienced the highest increases in these behaviors, highlighting the dual challenge of their increased need for participation and the barriers they face. Students from socioeconomically disadvantaged schools were at greater risk of externalizing behaviors if organized participation ceased; conversely, students from higher-level schools were protected against all harmful outcomes.

Similarly, Gülseven et al. (2024) conducted a study of 2,914 low-income, ethnically diverse children and early adolescents that identified four afterschool participation patterns: program with activities, program with activities and unsupervised time, mainly unsupervised time, and supervised informal settings. The findings indicated that older children were more likely to participate in structured or supervised environments, while early adolescents spent more time unsupervised. Youth in structured programs demonstrated significant academic and social improvements, whereas increased unsupervised time reduced these benefits. Additionally, supervised informal settings offered protective effects, underscoring the importance of structured programming and adult supervision for positive youth development. Gender differences were noted, with boys being 1.58 times more likely to be in supervised/informal groups and girls being 1.26 times more likely to be in program/activity groups. Vandell et al. (2022) presented a similar study that illustrated how specific groups, such as Latino families, engaged in family-focused activities provided comparable benefits and offered valuable insights into culturally supportive environments for fostering positive outcomes. Belošević (2023) found that participants in structured leisure activities who performed well academically were more likely to engage in safer sexual practices, including limiting the number of sexual partners and using contraception.

Conversely, some studies emphasize the complexities and limitations in the relationship between ASA participation and risk behaviors. Rapp-McCall et al. (2023) offered a unique perspective by examining the prodigy cultural arts program, which combines cultural arts with life skills training. This program significantly enhanced problem-solving, communication, and anger management skills among at-risk youth from low-SES and high-crime neighborhoods; however, there were few to no significant changes in self-esteem or affective empathy. This outcome sheds light on the impact of various ASAs in promoting positive youth development, primarily through enrichment and skill-building. Similarly, physical activity, as noted by Lee et al. (2023), serves as a proxy for ASAs (like sports) aimed at reducing SRBs, indicated that physical activity alone did not significantly reduce unhealthy behaviors such as unsafe sexual practices; however, among those who did not exercise, anxiety levels were lower among individuals who did not engage in harmful behaviors (SRB), except for alcohol consumption. Buchtova et al. (2020) and Tafro et al. (2024) highlighted the role of religiosity, which acts as a proxy for church involvement in ASAs, in reducing risk behaviors. Studies reveal negative, neutral, and positive associations between religiosity and SRBs. The study by Tafro et al. (2024) indicated a weak but positive association between religion and early sexual activity and MSP, though it was inconsistent among CU. Gender differences emerged in the relationships between religiosity/faith and the age of sexual debut and the number of partners, while culture was identified as a potential moderating factor. Buchtova et al. (2020) revealed that participation in religious activities and communities was the only factor linked to generally lower risky behavior. This study contributes to the ongoing debates concerning the role of religion in SRBs.

In 2017, Alaska's southwest region (YK Delta) had only 49% of youth participating in structured activities, with a staggering 21,584 Alaskan youth in 2020 alone being unsupervised once the school day ends, leaving a significant proportion of youth potentially vulnerable to high-risk behaviors (Alaska Children's Trust, 2024; Afterschool Alliance, n.d.). As Lee et al. (2018) and Kahn and Graham (2019) mention, youth need opportunities to engage with other peers through diverse channels; thus, ASAs can and should be directed in a way that supports alternative health behaviors to prevent and reduce risk-taking. As the meta-analysis by Christensen et al. (2023) indicates, ASAs have the potential to impart positive effects among marginalized youth.

However, the overall effect size was relatively small but significant across various domains, with a more generalized impact on health rather than a specific change in one outcome. Additionally, Meier et al. (2018) show how gender, ethnicity, and social class impart differences among ASA participants. Where girls tended to benefit more from non-sports and combined activities, and boys exhibited higher outcomes in sports, youth maturation shifted from sports to a greater focus on non-sports and fewer combined activities. Among ethnicities, Black and Latino youth were more likely to participate in sports, White youth in arts, and Asian and Latino youth in academic activities; AI/AN youth were excluded from this data, and social class (middle and high) was the strongest predictor of ASA participation.

Definitions

Alternative schooling: Alternative public schools include nontraditional curricula, vocational, remedial, and theme-based programs, as well as charter and correspondence schools (ASAA, 2016). The variable was measured as nominal, with 0 = Traditional and 1 =Alternative.

Traditional schooling: Traditional public schools, funded by local, state, and federal governments, provide K-12 education and extracurricular activities to most students in the local community and are governed by local school districts (ADEED, n.d.). The National Youth Risk Behavior Survey (YRBS) excluded boarding, correspondence, home study, and correctional schools (CDC, 2017; Kann, 2018). The variable was measured as nominal, with 0 = Traditional and 1 =Alternative.

Sexual risk behaviors (SRBs): Defined as the actions that increase the likelihood of adverse outcomes such as sexually transmitted infections (STIs) or unintended pregnancies. This includes unprotected sex, having multiple sexual partners, and substance use before sexual activity (Senn, 2013; Tariq & Gupta, 2023).

Condom use: Defined as a SRB, it is measured by whether condoms are used during sexual intercourse (CDC, 2017). Consistent and correct condom use is a reliable and effective method to prevent STIs, including human immunodeficiency virus (HIV) and unplanned pregnancies (WHO, 2024). It was assessed as a categorical nominal variable with 0 = used condom and 1 = didn't use.

Number of sexual partners: Defined as a SRB, it is measured by the total number of individuals with whom a person has had sexual intercourse during their lifetime. This is assessed as an ordinal variable, with 0 = 0–3 and 1 = 4+ people (CDC, 2017).

Substance use before sexual activity: Defined as a SRB, it refers to the consumption of alcohol, marijuana, or other drugs before engaging in sexual intercourse. This variable is assessed as a categorical nominal variable with 0 = no and 1 = yes (CDC, 2017).

Age [grad-level]: Defined as individuals between 9^{th} and 12^{th} grade, categorized into two groups: 9^{th} and 10^{th}, and 11^{th} and 12^{th}. Grade level was presented as a nominal variable, where 0 = 11^{th} and 12^{th} grades, and 1 = 9^{th} and 10^{th} grades.

Gender: Study participants were defined as male or female, with 0 = female and 1 = male. Gender was presented as a nominal dichotomous variable (CDC, 2017; Gazendam, 2020).

Race: The racial/ethnic self-identification of study participants was categorized as only those who identified as Alaska Native/American Indian (Brewer, 2023).

Body mass index (BMI): In this study, BMI is defined as the weight relative to height, interpreted using sex-specific BMI-for-age percentiles to account for growth differences among youth of the same age and sex compared to their peers (CDC, 2024a). According to the 2017 Alaska YRBS Codebook, BMI is categorized based on the percentage of students classified as overweight or obese (at or above the 85th percentile for BMI, using sex- and age-specific reference data from the 2000 CDC growth charts). This variable is nominal, as 0 = not overweight or obese and 1 = overweight or obese.

Afterschool activity: Afterschool activity is defined as the number of days you participate in organized afterschool, evening, or weekend activities (such as school clubs, community center groups, music, art, or dance lessons, drama, church, or cultural or other supervised activities) on an average week. This is assessed as a dummy-coded nominal variable, ranging from 0 = no afterschool activities and 1 = participated in afterschool activities (CDC, 2017).

Assumptions

This study relies on several critical assumptions to ensure the meaningfulness of its findings. First, this study assumes that state-level YRBS data fully represent all Alaskan youth, including Alaska Native youth in the Lower Kuskokwim School District (State of Alaska Department of Health and Human Services, 2020). Second, it assumes that students provided truthful and accurate responses to self-reported sensitive survey questions about sexual behavior (condom use, number of sexual partners, and substance use before sex) as the validity of self-reported data depends on the honesty and understanding of participants (e.g., social desirability and misunderstanding of questions; Underwood et al., 2020). Third, this study assumes that data collection procedures were consistent across traditional and alternative schools, so observed differences can be attributable to school type rather than variations in survey administration. Fourth, this study assumes that school type serves as a meaningful proxy for microsystem-level differences (peer influence, teacher engagement, school climate), consistent with McLeroy's ecological framework.

Scope of Delimitations

The delimitations of this study create specific boundaries to ensure a focused and manageable inquiry into the associations between school type and engagement in high-risk sexual behaviors among Alaska Native youth. The research problem addresses specific aspects of sexual health by examining three dependent variables (DVs): (a) condom use during sexual intercourse, (b) having four or more lifetime sexual partners, and (c) substance use before sexual activity. These behaviors were chosen as critical indicators of sexual risk that contribute to adverse health outcomes, providing a targeted lens for addressing gaps in the literature. The independent variable (IV) is school type, categorized as alternative versus traditional schooling. The covariates include age (grade-level), gender, BMI, and self-reported afterschool activity. These covariates were selected due to their potential influence on the dependent variables, helping to account for confounding factors and enhance the study's internal validity. The study is limited to U.S. Alaska Native youth in grades 9-12 within the Lower Kuskokwim School District, excluding other populations such as non-Alaska Native youth or those from other districts. The comparison is limited to alternative and traditional school types, excluding other educational settings such as charter schools, private schools, or homeschool environments. By focusing exclusively on this population and school context, the study enhances external validity by defining clear boundaries for the research. The theoretical framework guiding this research is McLeroy's Social Ecological Model. Although the Social Ecological Model includes multiple levels of influence, this study focused primarily on the intrapersonal and environmental levels. Community and policy-level influences were acknowledged but not directly investigated.

Limitations

Several limitations must be considered when interpreting the findings of this study. This research used secondary data from the 2017 YRBS, which inherently confines it to the variables and timeframe available in that dataset. More recent data from 2019 and 2023 were inadequate due to COVID-19 disruptions that led to a low participation rate and the merging of two cycles. The exclusive reliance on 2017 data prevented the ability to examine changes in behaviors or school environments over time, and the accuracy and completeness of the dataset depended on the original collection process, which was outside the control of this study.

The cross-sectional design further confines the research to identifying associations rather than establishing causal relationships, as data were collected at a single point. In addition, the use of self-reported data may also introduce biases, such as recall bias or social desirability bias, particularly when addressing sensitive topics like sexual behavior and substance use. Although the accuracy of self-reported data cannot be directly verified, prior research has demonstrated the reliability of the YRBS instrument. For instance, Charles et al. (2024) reported substantial test-retest reliability for substance use and sexual behavior questions among high-risk youth populations, highlighting the instrument's value in monitoring health risks.

The findings are generalizable only to Alaska Native youth attending alternative or traditional schools in the Lower Kuskokwim School District. Exclusion of students in boarding, correspondence, home study, or correctional schools further limited the applicability of results. Finally, while the YRBS allows for racial classifications, "Alaska Native" is grouped with "American Indian," preventing nuanced analysis of intragroup differences. Given the study's design, disaggregated analyses were not possible (CDPHP, 2019; Kann, 2018).

Significance

This study is significant because SRBs, sociodemographic characteristics, and schooling type are well-documented determinants of adolescent health and represent a critical global public health concern. By focusing on Alaska Native youth, an understudied and underserved population facing heightened health disparities compared to other racial groups, this study addressed a critical gap in the literature and responds to recent calls to action for culturally informed equity-driven studies. Unlike many studies that focus narrowly on individual behaviors, this study emphasizes the broader social and environmental contexts influencing decision-making. The use of multilevel, intersectional representation is essential for developing culturally appropriate frameworks for

Indigenous youth (Azzopardi et al., 2024; Beckwith et al., 2024; Kizilkan et al., 2024; Leston et al., 2022).

The findings have practical implications for stakeholders. Public health providers, educators, and policymakers can use the results to strengthen interventions tailored to vulnerable youth in Alaska. Schools may implement strategies that account for differences by school type, age, gender, grade level, and cultural identity, while communities could increase or integrate the findings into afterschool programming and outreach efforts to build knowledge, shape attitudes, and promote healthier decision-making among AN youth. At the policy and administrative levels, this study may justify increased and targeted funding or resource allocation that would otherwise remain overlooked.

Summary and Conclusion

Among American Indian/Alaska Native youth, SRBs are a significant public health concern. According to Skye et al. (2021), nearly half of AI/AN youth reported not using condoms during their last sexual encounter, most had never been tested for STIs, and early sexual initiation was associated with higher lifetime partner counts and greater substance use during sex. In 2019, Alaska Native youth exhibited higher rates of substance use and sexual activity, lower levels of physical activity, and higher obesity rates compared to White youth (ANTHC, 2021a).

Despite substantial evidence linking Alaska Native youth to risky behaviors, the relationship between school type and SRBs, along with the role of covariates, remains unexplored. Addressing this gap is essential, as the findings from this study can inform future conversations and studies while guiding interventions that promote protective behaviors. The following section builds on this foundation by outlining the study's research design, methodology, and analysis of potential threats to validity.

Section 2: Research Design and Data Collection

Introduction

The goal of this quantitative cross-sectional study was to examine the associations between school type and involvement in high-risk sexual behaviors among Alaska Native youth. By increasing our understanding of this overlooked region and population, the results could offer vital insights for policymakers, public health professionals, and Alaska Native elders and communities. Section 2 provides an overview of the research design along with its rationale and a detailed explanation of the methodology, covering the primary population, sampling procedures, data collection methods, data quality and availability, power analysis/sample size, operationalization of variables, and the data analysis plan. Finally, the section addresses potential threats to validity and ethical considerations.

Research Design and Rationale

The Youth Risk Behavior Surveillance System is a nationally representative, biennial survey administered by the Centers for Disease Control and Prevention in partnership with the Department of Education and Early Development and the Alaska Department of Health. Since 2009, the Alaska Department of Health has collected YRBS data from both traditional high schools and 12 alternative schools statewide. The survey monitors long-term trends in adolescent health behaviors, including demographics (sex, race/ethnicity, age, and grade), sexual activity, afterschool involvement, obesity, and substance use (tobacco, alcohol, and drugs; Kann, 2018; Underwood et al., 2020).

For this study, racial data from the 2017 YRBS were analyzed for participants who self-identified as *Alaska Native or American Indian*. The dependent variables included three SRBs: (a) condom use (over the past three months), (b) number of sexual partners (≥4), and (c) substance use (alcohol or drugs) before sexual activity over the last three months. The independent variable was school type (alternative or traditional). The control variables included age (grade-level), gender, BMI (overweight or obese), and self-reported participation in afterschool activities within the past seven days among 12- to 18-year-olds in the Lower Kuskokwim region of Alaska, all of which were extracted from the dataset.

An analytical cross-sectional design was employed to examine associations among these variables. Cross-sectional studies are valuable tools in public health research because they generate significant insights without being constrained by limitations in time, resources, or scope (Setia, 2016). As Wang and Cheng (2020) explained, these designs are well-suited for capturing multiple outcomes simultaneously. With minimal ethical concerns due to the lack of interventions, these studies are widely utilized to monitor health outcomes, identify risk factors, and inform public health interventions. Cataldo et al. (2019) indicate that while cross-sectional studies are used to describe population characteristics through aggregated data, they cannot establish causal relationships; instead, they reveal associations among the variables.

Comparable studies have used similar designs with secondary data. For example, Oksuz et al. (2025) examined adolescent health risk behaviors, such as early sexual initiation, SU, and unhealthy lifestyle choices, highlighting gender-specific behavioral patterns. Likewise, Ali et al. (2021) investigated the prevalence of MSP and contraception nonuse in relation to socioeconomic determinants like place of residence, household wealth, and education. These examples demonstrate the suitability of a cross-sectional approach for investigating the intersection of sexual risk behaviors and contextual factors.

Methodology

Population

The priority population for this study was Alaska Native youth in grades 9 through 12, typically aged 12 to 18 years. The Alaska YRBS, a component of the CDC's national biannual survey, collects statewide data on this population (State of Alaska Department of Health and Human Services, 2020). In 2017, the CDC randomly selected 43 traditional high schools across 19 districts. Of those, 40 schools (93%) participated, yielding 1,343 completed surveys (66% of sampled students) and an overall response rate of 62%. All 13 eligible alternative high schools were included, with 816 students responding (63% of those sampled). The overall response rate was 63%, surpassing the CDC's 60% threshold for statewide census samples. As a result, the data were weighted to accurately represent the population of Alaskan students enrolled in alternative high schools. (State of Alaska Department of Health and Human Services, 2020).

Sampling Procedures

The section of Chronic Disease Prevention and Health Promotion (CDPHP) employs complex sampling methods to ensure the representativeness of YRBS data across Alaska AKYRBS, 2023). Data collection occurs in two ways: through statewide sampling, where the CDC selects schools for the YRBS. Traditional schools utilize a two-stage cluster sampling method. First, schools are chosen based on enrollment size, followed by a random selection of a class period in which all students participate. Alternative schools adopt a census approach, surveying all eligible schools, and a class period is selected in which all students participate. Exclusions apply to schools with fewer than ten students, certain special education/ESL classes, and nontraditional settings such as homes, boarding facilities, treatment centers, or prisons. The second method involves district-level sampling overseen by the Alaska YRBS program. Most districts conduct a census, surveying all eligible schools and classes. Large urban districts (Anchorage, Matanuska-Susitna, Kenai Peninsula, and occasionally Juneau and Fairbanks) implement two-stage sampling, selecting all traditional high schools and then choosing a random sample of classes. Since 2009, data from alternative schools have been extracted from the statewide dataset and reweighted for district reporting (AKYRBS, 2023).

Data Collection and Quality

The 2017 CDC YRBS questionnaire included 99 items: 89 standard questions and 10 optional topics such as drug use, dietary habits, physical activity, indoor tanning, sunburns, food allergies, and sexual minority status. States and large urban school districts may adapt their surveys but must retain at least 60 of the core questions. The survey is developed by national and state-level experts and refined each cycle to maximize clarity, reliability, and precision (CDPHP, n.d.; Underwood et al., 2020).

In Alaska, the 2017 survey expanded to 114 items by adding state-specific topics. Eight of these items aligned with *Healthy Alaskans 2020* indicators, covering marijuana use while driving, phone use while driving, experiences of sexual violence, and whether individuals who attempted suicide had discussed it with someone (Kann, 2018; Mannix, 2018). The survey was anonymized, voluntary, and primarily multiple-choice (except for height and weight). Students completed the survey within one class period, with parental consent obtained in advance. The CDC's Institutional Review Board approved the 2017 YRBS protocol (Kann, 2018).

To ensure high-quality data, the CDC employs a multistep editing process, with statewide data finalized by the CDC and additional edits performed by the Alaska YRBS Program. At the district level, the same procedures apply, but they are conducted by CDPHP (AKYRBS, 2019). Incomplete surveys, such as those with fewer than 20 valid responses or 15 or more identical consecutive answers, are removed. Single-question edits address out-of-range values and multiple selections, except for race/ethnicity. Height, weight, and BMI are checked for biological plausibility, and since 2017, Alaska has applied retroactive edits to improve consistency, including expanded BMI classifications (AKYRBS, 2023). Logical edits also reconcile conflicting responses while preserving demographic data.

The Alaska YRBS occasionally retains items the CDC removes, labeling them "state-added questions," to maintain comparability across survey years. This process, combined with over 30 years of national YRBS implementation, ensures data consistency and reliability. Thus, all variables used in this study are drawn from a rigorously tested and credible source (CDPHP, n.d.; Underwood et al., 2020).

Data Availability

Alaska-specific YRBS aggregate data is publicly available in various formats through the Statewide Dashboard, which includes the 2023 results, and through district-level dashboards. Both platforms allow users to filter variables and create customized visualizations, fostering a deeper and more nuanced understanding of the dataset.

Access to the Alaska YRBS raw dataset required the establishment of a formal Data Use Agreement (DUA) with the State of Alaska, Department of Health, Division of Public Health, Section of Chronic Disease Prevention and Health Promotion, located at 3601 C Street, Suite 722, Anchorage, Alaska 99503. This agreement was facilitated via email correspondence with the YRBS Data Manager. Once formalized, authorization to use the dataset was granted.

The DUA included the following requirements:

1. Data Ownership & HIPAA Compliance: The CDPHP retains ownership of the dataset. Under HIPAA, the individual or patient is the true owner of their data, and all others have limited rights of use.
2. Compliance with Laws & Regulations: All prevailing laws and regulations related to the protection of individually identifiable information will be followed, including HIPAA privacy regulations.
3. Data Destruction & Usage Compliance: Upon completing the approved analyses, all copies of the data must be destroyed, with confirmation sent via

email (brfss@alaska.gov or yrbs@alaska.gov). If data must be retained, the reason and duration must be explicitly stated in the Data Request. Extending data usage beyond the approved timeframe requires a signed amended DUA, and no analyses beyond the approved study protocol may occur without a written amendment agreed upon by CDPHP and all study partners.

4. Institutional Review Board (IRB) Approval: IRB approval is required if the data will be used for purposes other than public health research, public health program evaluation, or public health planning. A copy of the IRB determination letter must be shared with CDPHP. If no IRB approval is sought, justification must be provided in the study protocol or data request.
5. Data Security Measures: The recipient must implement administrative, technical, and physical safeguards to prevent unauthorized use, disclosure, storage, or transmission of the data beyond what is permitted by this DUA.
6. Data Analysis Expertise & Software Requirements: The recipient acknowledges they have training and experience in analyzing complex survey data and access to appropriate analysis software. CDPHP program staff may request initial code and output to ensure analyses are conducted correctly.
7. Restrictions on Data Sharing & Publication: Nonaggregated or semiaggregated data cannot be shared with any individual or agency without CDPHP's explicit permission. Only aggregate/summary data meeting State of Alaska HIPAA release criteria and suitable for public reporting may be shared or published.

8. Protecting Individual Identities: The recipient must take necessary measures to protect the identity of individuals in the dataset. Although names are not included, combinations of data points (such as date, age, sex, race, and location) may still be identifiable in certain communities. If an individual's identity is inadvertently discovered, CDPHP must be notified immediately. Recipients must follow data suppression guidelines to ensure confidentiality.
9. Review of Findings Prior to Publication: The recipient must allow CDPHP at least three weeks to review findings before presentation, journal submission, or report publication to ensure correct interpretation of the data. If there is a disagreement, CDPHP must be given the opportunity to provide comments for inclusion in the published document.
10. Citing CDPHP as the Data Source: The recipient must cite CDPHP in any written or oral presentations using the data. The citation must include:
    a. Organization name: Alaska Department of Health, Division of Public Health, Section of Chronic Disease Prevention and Health Promotion
    b. Dataset name: (e.g., Alaska Youth Risk Behavior Survey statewide traditional high school sample)
    c. Years of data used

The dataset was rigorously de-identified to remove all personally identifiable information before its release for this study. Upon email approval, the dataset was downloaded, and individual-level data for all eligible participants were systematically extracted based on the study's inclusion criteria.

Power Analysis and Sample Size

Determining an adequate sample size is vital as it affects the ethical integrity, statistical power, and overall validity of study results (Andrade, 2020). As Suresh and Chandrashekara (2012) noted, an adequately powered study increases confidence in the validity of its findings, ensuring that a true difference exists between groups. The distinction between statistical and scientific significance highlights that, although larger samples enhance the detection of statistical differences, these outcomes may not necessarily translate into substantive or practically relevant findings. Over time, power analysis has become an increasingly integral part of health and behavioral research, supporting methodological rigor and empirical validity.

Statistical power stems from four interrelated factors: α (alpha), representing the probability of a Type I error; β (beta), representing the probability of a Type II error; the effect size; and the sample size. If three of these factors are known, the fourth can be calculated (Kyonka et al., 2018). In an a priori analysis, researchers state their desired α, β (or desired power), and effect size to estimate the minimum sample size required. The alpha level (commonly set at .05) defines the threshold for statistical significance, while power is typically set at .80 (80%). Statistical power is determined through (1 - β), with a lower β indicating a higher likelihood of correctly rejecting a false null hypothesis. A Type I error occurs when the null hypothesis is incorrectly rejected, while a Type II error occurs when the null hypothesis is not rejected, even when the alternative hypothesis is true (Cohen, 1988; Serdar et al., 2021). The effect size reflects the magnitude of the difference between the null and alternative hypotheses. It quantifies the distance between the specified values, with Cohen's standardized benchmarks classifying small (.02), medium (.50), and large (.80; University of Cambridge, 2021; Sullivan & Feinn, 2012). A smaller effect size is harder to detect, requiring a larger sample size to demonstrate deviation from the null hypothesis (Cohen, 1988).

For this study, G*Power Version 3.1.9.7 was used to conduct an a priori power analysis with five predictor variables, a power level of 0.80, an alpha level of .05, and a medium effect size defined as an odds ratio of 3.5. The analysis indicated that a minimum sample size of 259 participants was required to achieve sufficient statistical power (Faul et al., 2007).

Operationalization of Variables

The 2017 YRBS dataset provided all variables necessary for conducting this cross-sectional secondary study. Table 1 presents a detailed overview of each variable, including name, type, definition, and coding. The dataset was obtained through the Alaska Department of Health's Division of Chronic Disease Prevention and Health Promotion in collaboration with the Centers for Disease Control and Prevention. The independent variable was school type, classified as either alternative or traditional. The dependent variables consisted of three SRBs: (a) condom use during sexual intercourse, (b) number of sexual partners, and (c) substance use before sexual activity. The covariates included age group (grade-level as proxy for age), gender, BMI, and participation in afterschool activities.

Table 1

Operationalization of Study Variables

Variable name	Variable type	Coding methodology	Level of measurement
Schooling type	Independent	Coded as 0 = Traditional; 1 = Alternative	Nominal
Condom use (CU)	Dependent	Coded as 0 = Used; 1 = Not Used	Nominal
Number of sexual partners (MSP)	Dependent	Coded as 0 = 3 or less; 1 = 4 or more people	Ordinal
Substance use before sexual activity (SU)	Dependent	Coded as 0 = No; 1 = Yes	Nominal
Age (grade-level)	Control	Dummy coded for 1 = 9^{th} and 10^{th} grade and 0 = 11^{th} and 12^{th} grade	Ordinal
Gender	Control	Coded as 0 = Female; 1 = Male	Nominal
BMI (overweight or obese)	Control	Coded as 0 = Not overweight or obese; 1 = Overweight or obese	Nominal
Afterschool activity (ASA)	Control	Coded as 1 = No afterschool activities and 0 = Participated in afterschool activities	Nominal

Data Analysis Plan

The raw dataset was obtained via email from CDPHP and analyzed using IBM Statistical Package for the Social Sciences (SPSS), version 30.0 (IBM Corp., Armonk, NY, USA). CDPHP also provided the official YRBS user guide and codebook, which confirmed that the data had been cleaned and checked for inconsistencies and incomplete submissions. The raw Excel file was converted into an SPSS dataset, and only the variables relevant to the study were retained. Before conducting analyses, key assumptions were tested for binary logistic regression, including: (a) a binary dependent variable, (b) independent observations, (c) relevant predictors, (d) no multicollinearity, (e) no extreme outliers, and (f) adequate sample size. Missing data were addressed using listwise deletion, checking for missing completely at random (MCAR). After checking that these assumptions, the following actions were taken to test the hypotheses of each research question: (i) descriptive statistics, Part 1; (ii) inferential analysis, Part 2; and (iii) binary logistic regression, Part 3 (see Table 2).

Table 2

Assumptions (Hypothesis), Variables, and Statistical Testing

Assumption (hypothesis)	Variables and type	Statistical tests
H_a1: There is an association between alternative and traditional schooling and condom use during sexual intercourse, controlling for age (grade-level), gender, BMI, and afterschool activity.	Categorical: School type, Condom use, Age (grade-level), Gender, BMI, ASA	Descriptive statistics—(frequency distribution) Complex samples—crosstabulation Binary logistic regression
H_a2: There is an association between alternative and traditional schooling and the likelihood of having had sexual intercourse with four or more people during their lives, controlling for age (grade-level), gender, BMI, and afterschool activity.	Categorical: School type, MSP, Age (grade-level), Gender, BMI, ASA	Descriptive statistics—(frequency distribution) Complex samples—crosstabulation Binary logistic regression
H_a3: There is an association between alternative and traditional schooling and the likelihood of drinking alcohol or using drugs before sexual intercourse, controlling for age (grade-level), gender, BMI, and afterschool activity.	Categorical: School type, Substance use, Age (grade-level), Gender, BMI, ASA	Descriptive statistics—(frequency distribution) Complex samples—crosstabulation Binary logistic regression

Statistical Tests

The analysis began with univariate descriptive statistics to summarize categorical variables using frequency distributions, providing an overview of data distribution patterns. Next, complex sample crosstabs assessed whether a statistically significant association existed between schooling type (independent variable), each SRB outcome (dependent variable), and the control variables (gender, BMI, ASA, and grade-level). Given the nature of the data, adjusted F statistics were used to evaluate associations, incorporating the CSA plan. Odds ratios and 95% confidence intervals were calculated for 2 × 2 comparisons to describe the strength and direction of associations.

Binary logistic regression was subsequently conducted to examine the relationship between school type and SRBs while controlling for grade-level (proxy for age), gender, BMI, and participation in afterschool activities. Due to the complex sample design, model fit was evaluated using the corrected model-adjusted F-statistic rather than the Hosmer-Lemeshow test. Nagelkerke pseudo-R^2 values were reported to assess the explanatory power. The results were interpreted using odds ratios [Exp(B)], which indicated the likelihood of each SRB based on schooling type and other predictors.

For RQ1, descriptive analyses summarized the dataset using frequencies and percentages for all categorical variables, followed by crosstabulations to compare groups. Complex samples crosstabs provided adjusted F-statistics, degrees of freedom, p-values ($p \leq 0.05$), odds ratios (ORs), and 95% confidence intervals (CIs). Binary logistic regression was then used to evaluate the association between school type and condom use while controlling for grade-level (as a proxy for age), gender, BMI status, and afterschool activity. Outputs included regression coefficient (B), standard errors (SE), adjusted Wald F statistics, p-values, odds ratios [Exp(B)], and 95% CIs. Overall model fit was assessed using the adjusted F statistic from the corrected model, rather than the Hosmer-Lemeshow test, due to the complex survey design. A Nagelkerke pseudo-R^2 value was also reported to describe model explanatory power. Statistical significance was set at a p-value of ≤ 0.05.

For RQ2, descriptive analyses summarized the dataset using frequencies and percentages for all categorical variables, followed by crosstabulations to compare groups. Complex samples crosstabs provided adjusted F-statistics, degrees of freedom, p-values ($p \leq 0.05$), odds ratios (ORs), and 95% confidence intervals (CIs). Binary logistic regression was then used to evaluate the association between school type and condom use while controlling for grade-level (as a proxy for age), gender, BMI status, and afterschool activity. Outputs included regression coefficient (B), standard errors (SE), adjusted Wald F statistics, p-values, odds ratios [Exp(B)], and 95% CIs. Overall model fit was assessed using the adjusted F statistic from the corrected model, rather than the Hosmer-Lemeshow test, due to the complex survey design. A Nagelkerke pseudo-R^2 value was also reported to describe model explanatory power. Statistical significance was set at a p-value of ≤ 0.05.

For RQ3, descriptive analyses summarized the dataset using frequencies and percentages for all categorical variables, followed by crosstabulations to compare groups. Complex samples crosstabs provided adjusted F-statistics, degrees of freedom, p-values ($p \leq 0.05$), odds ratios (ORs), and 95% confidence intervals (CIs). Binary logistic regression was then used to evaluate the association between school type and condom use while controlling for grade-level (as a proxy for age), gender, BMI status, and afterschool activity. Outputs included regression coefficient (B), standard errors (SE), adjusted Wald F statistics, p-values, odds ratios [Exp(B)], and 95% CIs. Overall model fit was assessed using the adjusted F statistic from the corrected model, rather than the Hosmer-Lemeshow test, due to the complex survey design. A Nagelkerke pseudo-R^2 value was also reported to describe model explanatory power. Statistical significance was set at a p-value of ≤ 0.05.

Assumptions must be considered before applying a logistic model to data. As Warner (2020) indicated, logistic regression requires specific assumptions to be met: the dependent variable must be binary, which is satisfied since all variables are dichotomous;

observations must be independent, which can be tested by plotting the observations and checking for a random pattern, with mixed-effects logistic regression using the log odds to test for clustered or correlated data; only relevant predictors should be included, which is assumed in any statistical study, but it is important to ensure that no erroneous or irrelevant variables are present, as assured through forward stepwise selection; and outcome variables must be mutually exclusive and exhaustive (no perfect multicollinearity), assessed using the variance inflation factor (VIF) to indicate the strength of the relationship between predictor variables. Although not mentioned in Warner's (2020) *Applied Statistics II: Multivariable and Multivariate Techniques,* additional assumptions include the absence of extreme outliers, which can be evaluated using Cook's distance for observations and removed if they have a high impact; and finally, the sample size should be sufficiently large. These assumptions are discussed again in the presentation of findings and results section. From here, three distinct research questions were developed:

Research Questions and Hypotheses

RQ 1: What is the association between alternative and traditional schooling and SRB (in the past three months, did you or your partner use a condom during sexual intercourse) among Alaska Native youth when controlling for age (grade-level), gender, BMI (overweight or obese), and self-reported afterschool activity?

> Null hypothesis: There is no significant association between alternative and traditional schooling and condom use during sexual intercourse, controlling for age (grade-level), gender, BMI, and afterschool activity.

Alternative hypothesis: There is a significant association between alternative and traditional schooling and condom use during sexual intercourse, controlling for age (grade-level), gender, BMI, and afterschool activity.

RQ 2: What is the association between alternative and traditional schooling and SRB (students who have had sexual intercourse with four or more people during their life) among Alaska Native youth when controlling for age (grade-level), gender, BMI, and self-reported afterschool activity?

Null hypothesis: There is no significant association between alternative and traditional schooling and the likelihood of having had sexual intercourse with four or more people during their lives, controlling for age (grade-level), gender, BMI, and afterschool activity.

Alternative hypothesis: There is a significant association between alternative and traditional schooling and the likelihood of having had sexual intercourse with four or more people during their lives, controlling for age (grade-level), gender, BMI, and afterschool activity.

RQ 3: What is the association between alternative and traditional schooling and SRB (in the past three months, did you drink alcohol or use drugs before you had sexual intercourse) among Alaska Native youth when controlling for age (grade-level), gender, BMI, and self-reported afterschool activity?

Null hypothesis: There is no significant association between alternative and traditional schooling and the likelihood of drinking alcohol or using drugs before sexual intercourse, controlling for age (grade-level), gender, BMI, and afterschool activity.

Alternative hypothesis: There is a significant association between alternative and traditional schooling and the likelihood of drinking alcohol or using drugs before sexual intercourse, controlling for age (grade-level), gender, BMI, and afterschool activity.

Threats to Validity

A study's validity and reliability are vital to its outcomes; therefore, researchers must diligently select reliable and valid data collection tools based on their study design, population, sampling methods, and specific research questions to produce high-quality results (Olmsted, 2024). In quantitative research, reliability is akin to a thermometer, providing consistent and stable results over time, while validity refers to the accurate measurement of what is being measured, as well as the causal relationships and generalizability of findings (Olmsted, 2024).

A study's internal validity (the extent to which observed results accurately represent the priority population) assesses how effectively the design, implementation, and analysis reduce bias and systematic errors, thereby enhancing the credibility of a study's conclusions. However, factors like selection bias, insufficient randomization, and missing data can undermine this process (Andrade, 2018). To achieve high internal validity, researchers should focus on careful planning, quality control, and execution (including recruitment, sample size, and data management; Patino & Ferreira, 2018). This approach can elevate the outcome from low to high internal validity, supporting the idea that observed changes were due to exposure rather than other potential influences.

A study's external validity (the generalizability beyond the study sample) is only as strong as its internal validity. This means that results that do not support internal validity render external validity irrelevant (Patino & Ferreira, 2018). External validity highlights the broader causal relationships among people, places, and periods. The absence of such implications suggests that results may not apply to other settings, leading to low adaptability (Drost, 2011); to increase external validity, it is essential to use broad inclusion criteria (resembling real-life people).

Given the nature of this study, a quantitative cross-sectional investigation of secondary data from the 2017 YRBS on the association of school type and self-reported highly sensitive activities among youth, such as condom use, substance use, and the number of sexual partners, internal and external validity are paramount. Charles et al. (2024), in their study on the test-retest of YRBS substance use and SRB data, helped conclude the reliability and usability of the YRBS in research. Additionally, to ensure reliable data, the CDC has demonstrated that the YRBS is a dependable instrument. With 74 items analyzed, this analysis yielded a reliability rate of 96%, with 73% of the items demonstrating substantial or nearly perfect reliability (Jones et al., 2024).

Ethical Procedures

This study utilizes secondary data that were fully anonymized during the original data collection. To ensure compliance with ethical standards, approval was obtained from Walden University's Institutional Review Board (IRB; approval number 04-25-25-

1185525). The IRB review confirmed that the study met the ethical requirements for analyzing sensitive, de-identified data, including completion of all required research ethics training.

The YRBS data used in this study were previously reviewed and approved by the CDC's IRB, and the Alaska Department of Health Section of Chronic Disease Prevention and Health Promotion confirmed that all personally identifiable information had been removed before release (AKYRBS, 2023; Kann, 2018). Access to data was granted through the formal DUA agreement with CDPHP, which outlines procedures for secure storage, use, and reporting of data. These safeguards ensured adherence to ethical guidelines for the protection of participants and the integrity of this study.

Summary

This section provided a detailed description of the methodological procedures applied in this study, including the research design, methodology (population, sample, data), analysis of potential threats to validity, and ethical considerations. Secondary data from the 2017 YRBS were analyzed to conduct a quantitative cross-sectional study of Alaska Native youth in the Lower Kuskokwim. The study examined the association between school type (independent variable) and condom use, multiple sexual partners, and substance use (dependent variable), while controlling for grade level (proxy for age), gender, BMI, and afterschool activity. A priori power analysis confirmed the adequacy of the sample size for statistical significance. The third section of this study builds upon the methodologies and operationalization of variables to present the results and findings.

Section 3: Presentation of the Results and Findings

Introduction

The purpose of this quantitative study was to examine the association, if any existed, between school type (alternative vs. traditional) and three SRBs (condom use before sexual activity, the number of lifetime sexual partners, and substance use before sexual activity) among Alaska Native youth in grades 9–12 in the Lower Kuskokwim School district, while controlling for gender, grade-level, BMI, and afterschool activities. Three research questions and their associated hypotheses guided this study:

Research Question 1: What is the association between alternative and traditional schooling and SRB (in the past three months, did you or your partner use a condom during sexual intercourse) among Alaska Native youth when controlling for age (grade-level), gender, BMI (overweight or obese), and self-reported afterschool activity?

> Null hypothesis: There is no significant association between alternative and traditional schooling and condom use during sexual intercourse, controlling for age (grade-level), gender, BMI, and afterschool activity.
>
> Alternative hypothesis: There is a significant association between alternative and traditional schooling and condom use during sexual intercourse, controlling for age (grade-level), gender, BMI, and afterschool activity.

Research Question 2: What is the association between alternative and traditional schooling and SRB (students who have had sexual intercourse with four or more people during their life) among Alaska Native youth when controlling for age (grade-level), gender, BMI, and self-reported afterschool activity?

Null hypothesis: There is no significant association between alternative and traditional schooling and the likelihood of having had sexual intercourse with four or more people during their lives, controlling for age (grade-level), gender, BMI, and afterschool activity.

Alternative hypothesis: There is a significant association between alternative and traditional schooling and the likelihood of having had sexual intercourse with four or more people during their lives, controlling for age (grade-level), gender, BMI, and afterschool activity.

Research Question 3: What is the association between alternative and traditional schooling and SRB (in the past three months, did you drink alcohol or use drugs before you had sexual intercourse) among Alaska Native youth when controlling for age (grade-level), gender, BMI, and self-reported afterschool activity?

Null hypothesis: There is no significant association between alternative and traditional schooling and the likelihood of drinking alcohol or using drugs before sexual intercourse, controlling for age (grade-level), gender, BMI, and afterschool activity.

Alternative hypothesis: There is a significant association between alternative and traditional schooling and the likelihood of drinking alcohol or using drugs before sexual intercourse, controlling for age (grade-level), gender, BMI, and afterschool activity.

Section 3 begins with a discussion of the secondary data used in the study and the procedures followed to assess the dataset. It then outlines the statistical tests, including univariate analysis, bivariate analysis, and binary logistic regression. The results are organized around the three research questions, with findings presented for each dependent variable. This section concludes with a summary of Section 3, leading into Section 4.

Secondary Data for Analysis

This study utilized secondary data from the 2017 Alaska Youth Risk Behavior Survey, which was administered in the Lower Kuskokwim School District. The YRBS is a school-based surveillance system developed by the Centers for Disease Control and Prevention to monitor health-risk behaviors among youth. The 2017 dataset was obtained through an IRB-approved Data Use Agreement with the Alaska Department of Health, Division of Public Health, Section of Chronic Disease and Health Promotion. The dataset was delivered in Microsoft Excel format and converted into SPSS version 30.0 (IBM Corp., Armonk, NY, USA) for analysis. The sample included Alaska Native youth in grades 9 through 12 attending either alternative or traditional public high schools. The dataset contained the following variables for the study:

Independent variable: school type (alternative or traditional)

Dependent variables:

- condom use during sexual intercourse
- having four or more lifetime sexual partners
- substance use (alcohol or drugs) before intercourse

Control variables:

- gender (male or female)

- grade level (grouped 9th–10th and 11th–12th)
- body mass index (BMI) status (obese/overweight or not)
- afterschool activity participation (participated or not)

The YRBS employed a complex sampling design that incorporated stratification, clustering (primary sample units or PSUs), sampling weights, and finite population correction (FPC), all of which are crucial for producing population-based estimates and valid standard errors. The stratum is a specific single-year stratification variable (sample design, i.e., school type, geographic regions), the PSU is a clustering measure used in multistage sampling designs, and the FPC is a percentage correction based on the number of students surveyed in a population. These elements were included in the data package provided by CDPHP and used in all subsequent analyses. All analyses were conducted using SPSS complex samples analysis (CSA), which incorporated the PSUs, strata, FPCs, and sampling weights into a usable plan that SPSS incorporates for each analysis. To ensure valid school-type estimates for univariate and bivariate analyses, two separate CSA plans were created using the “Select Cases: IF” function in SPSS: one that included only students in alternative schools (CSA_Alt_Only) and another that included only students in traditional schools (CSA_Trad_Only). This approach allowed for each group to be analyzed using its appropriate sampling design—weighted for the alternative sample and unweighted for the traditional sample—enabling valid within-group comparisons. A third CSA plan (Final_CSA) was created for use in the binary logistic regression models; this plan included both school types.

Sampling Design and Implications

The dataset revealed certain complexities that were not initially apparent, including: the use of a complex multistage sampling design, variable differences (adjustments to covariates), and limited/missing response rates, particularly among the alternative school subgroups.

First, given the complex sampling design, descriptive frequencies, cross-tabulations, and binary logistic regression analyses were derived from the complex samples in SPSS (as opposed to "normal" simple logistic regression). Bivariate analysis yielded adjusted F-statistics, degrees of freedom (*df*), p-values ($p \leq 0.05$), odds ratios (ORs), and 95% confidence intervals (CIs). Logistic regression output included coefficient estimates (B), standard errors (SE), adjusted Wald F statistics, degrees of freedom (*df),* p-values, odds ratios [Exp(B)], and 95% CIs. Due to the complex design, model fit was assessed using the adjusted F statistic from the corrected model. While Nagelkerke pseudo-R^2 is still reported to estimate model explanatory power, it does not fully represent explained variance in the same way as in linear regression and often yields modest values; however, it was retained as a helpful tool for gauging overall model fit and comparing the relative explanatory strength of the logistic model. Additionally, sensitivity analyses were not performed, as they would not be appropriate for this study due to the small sample size of alternative school youth, which would restrict any meaningful variability.

Second, although it was initially planned that age would be dummy-coded (0 = 15 or younger, 1 = 16 or 17, and 2 = 18 or older), the YRBS does not provide respondents' actual ages. Instead, grade level was used as a proxy for age and developmental stage; this approach is widely accepted in adolescent health research due to its strong link with social, cognitive, and physical development (Ma et al., 2021). However, as Ma et al. (2021) pointed out, this method may overlook significant age differences within the same grade, especially among students who are "old for grade," which could lead to residual confounding. Future studies should address this by collecting more detailed age data or using relative age measures. Furthermore, due to small cell sizes and model instability, grade level was recoded into a binary grouped variable (1 = 9th–10th grade and 0 = 11th–12th grade). Similarly, afterschool activity was recoded from its original categories (0 = 0–2 days, 1 = 3–5 days, 2 = 6 or more days) into a binary variable (participated vs. did not participate) to ensure sufficient cases within each category.

Lastly, missing data were addressed through listwise deletion, meaning that any case with missing values on one or more variables included in each analysis was excluded entirely from that analysis (see Appendix E, Table 17 for MCAR results). This method was selected for its simplicity and compatibility across SPSS; however, it assumes that data are missing completely at random (MCAR), which, if not met, could introduce bias or reduce generalizability due to the potential loss of systematic cases. To determine if missing data were MCAR, binary missingness indicators were created for each dependent variable (condom use, multiple sexual partners, and substance use before sex). Chi-square tests examined the relationships between missingness and observed characteristics, including school type, gender, BMI, grade level, and participation in afterschool activities. Results showed that missingness for multiple sexual partners was not significantly related to any covariates, supporting the MCAR assumption and justifying the use of listwise deletion for that outcome. However, missingness in condom use and substance use before sex was significantly related to both school type and grade level, indicating that listwise deletion might have introduced bias for those variables.

Data Collection Timeframe and Response Rates

In 2017, the CDC randomly selected 43 traditional high schools from 19 districts across Alaska to produce results that represent the general high school population. Of those invited, 40 schools (93%) participated, and 1,343 students (66%) from the selected classes submitted surveys, resulting in an overall response rate of 62%. All eligible alternative high schools were surveyed, achieving a 100% participation rate (13 out of 13) and a 63% response rate from sampled students (816 out of 1,298). The overall response rate of 63% surpassed the CDC’s 60% threshold for statewide census samples. As a result, the data were weighted to accurately represent the population of Alaskan students enrolled in alternative high schools. (Alaska DHHS, 2020).

Dataset Variables and Analysis

The dataset for Alaska’s Lower Kuskokwim School District initially included 504 survey responses collected from both traditional and alternative schools. Filtering to include only respondents who identified as Alaska Native/American Indian resulted in 458 valid responses (90.8% of all valid surveys). Among these, 389 (84.9%) attended traditional schools, while 69 (17.7%) attended alternative schools. The dataset is provided through district-level (not state-level) participation, featuring both weighted (alternative) and unweighted (traditional) samples. This indicates that data from the alternative school can be utilized to estimate the prevalence of risk and protective behaviors among participating districts. Conversely, the traditional school can only provide insights into risk and protective behaviors for students who took part in the survey; neither sample can be used to produce state-level estimates, as per CDPHP data guidelines. It bears repeating that, although observed differences may seem evident, these differences could also result from the sampling design rather than the actual prevalence.

Study Results

The following section presents descriptive statistics for the three variables related to SRB, with frequencies broken down by school type (alternative vs. traditional) and further categorized by demographic characteristics, including gender, grade level, BMI status, and participation in afterschool activities.

Descriptive Frequencies: Sexual Risk Behaviors by Demographics

The first dependent variable, condom use during sexual intercourse, is presented in Table 3, *Descriptive Frequencies of Condom Use: Traditional School Sample,* and Table 4, *Descriptive Frequencies of Condom Use: Alternative School Sample.* In traditional schools, males (70.3%, n = 26) were more likely than females (46.9%, n = 15) to report condom use. In alternative schools, 57.8% (weighted n = 16.6) of female students reported condom use compared to 32.6% (weighted n = 5.0) of males. In traditional schools, condom use was more commonly reported among 11th–12th grade students (64.1%, n = 25) than among 9th–10th graders (53.3%, n = 16). In alternative schools, most condom users were in the lower grade group, with 61.1% (weighted n = 7.7) in 9th–10th grade and 44.1% (weighted n = 13.8) in 11th–12th grade. In traditional schools, condom use was more common among students who were not overweight or obese (61.2%, n = 30) than among those who were overweight or obese (56.3%, n = 9). In alternative schools, however, overweight or obese students reported a higher rate of condom use (62.6%, weighted n = 11.3) than their nonoverweight peers (42.4%, weighted n = 10.3). Lastly, in traditional schools, condom use was slightly more common among afterschool nonparticipants (62.2%, n = 23) than among ASA participants (54.8%, n = 17). In alternative schools, 50.8% (weighted n = 11.9) of ASA participants reported condom use, compared to 46.9% (weighted n = 9.7) of nonparticipants. It is worth noting that the sample sizes for the dependent variables varied significantly (e.g., condom use among males: n = 26, and multiple sexual partners among males with ≤ 3 partners: n = 143). This discrepancy may result from patterns of nonresponse to sensitive questions, skipped items, cultural norms, or discomfort with disclosure, or generally low levels of sexual activity among Alaska Native youth in this sample.

Table 3

Descriptive Frequencies of Condom Use—Traditional School Sample

Control variable	Category	Total (*N*)	*N* (didn't use condom)	% (didn't use)	*N* (used condom)	% (used)
Gender	Female	32	17	53.1%	15	46.9%
	Male	37	11	29.7%	26	70.3%
Body mass index	Not overweight	49	19	38.8%	30	61.2%
	Overweight	16	7	43.8%	9	56.3%
Afterschool activity	Yes ASA	31	14	45.2%	17	54.8%
	No ASA	37	14	37.8%	23	62.2%
Grade level	11th–12th	39	14	35.9%	25	64.1%
	9th–10th	30	14	46.7%	16	53.3%

Note. N = 389. Missing values have been omitted in table summary. "N" refers to the unweighted count of students within each category reporting either condom use or nonuse. "%" sum to 100% within each control variable group.

Table 4

Descriptive Frequencies of Condom Use: Alternative School Sample

Control variable	Category	Total weighted (*N*)	*N* (didn't use condom)	% (didn't use)	*N* (used condom)	% (used)
Gender	Female	28.7	12.1	42.2%	16.6	57.8%
	Male	15.3	10.3	67.4%	5.0	32.6%
Body mass index	Not overweight	24.3	14.0	57.6%	10.3	42.4%
	Overweight	18.0	6.7	37.4%	11.3	62.6%
Afterschool activity	Yes ASA	23.4	11.5	49.2%	11.9	50.8%
	No ASA	20.7	11.0	53.1%	9.7	46.9%
Grade level	11th–12th	31.3	17.5	55.9%	13.8	44.1%
	9th–10th	7.7	*	*	7.7	*

Note. N = 69. Missing values have been omitted in table summary. *Suppressed to protect participant confidentiality. "*N*" refers to the weighted count of students within each category reporting either condom use or nonuse. "%" sum to 100% within each control variable group.

The second dependent variable, having four or more lifetime sexual partners, is presented in Table 5, *Descriptive Frequencies of Multiple Sexual Partners: Traditional School Sample*, and Table 6, *Descriptive Frequencies of Multiple Sexual Partners: Alternative School Sample*. In traditional schools, the gender distribution was evenly split, with females and males both reporting 50.0% (n = 13) of this group. In contrast, in alternative schools, a higher proportion of females (29.4%, weighted n = 13.0) than males (20.8%, weighted n = 9.4) reported MSP. In traditional schools, upper-grade students (11th–12th) were more likely to report having four or more sexual partners (12.1%, n = 16) than lower-grade students (5.7%, n = 10). A similar trend was observed in alternative schools, but it was more pronounced: 31.7% (weighted n = 15.3) of upper-grade students reported having four or more partners, compared to 17.7% (weighted n = 7.2) in the lower grades. These findings suggest that older youth, especially in alternative schools, may face higher sexual risk. BMI patterns were stable in traditional schools, where the proportion of students with four or more partners was similar between nonoverweight (8.5%) and overweight or obese students (8.2%). However, in alternative schools, overweight/obese students reported a slightly higher prevalence (29.5%, weighted n = 10.6) than nonoverweight peers (24.4%, weighted n = 11.9), indicating a modest difference based on weight status. In traditional schools, reports of multiple sexual partners were almost evenly split between ASA participants (9.6%, n = 13) and nonparticipants (7.5%, n = 12). In alternative schools, however, a larger percentage of nonparticipants (32.6%, weighted n = 10.8) reported having four or more sexual partners compared to ASA participants (21.3%, weighted n = 11.6).

Table 5

Descriptive Frequencies of Multiple Sexual Partners: Traditional School Sample

Control variable	Category	Total (*N*)	*N* (with ≥ 4 partners)	% (≥ 4)	*N* (with ≤ 3 partners)	% (≤ 3)
Gender	Female	151	13	8.6%	138	91.4%
	Male	156	13	8.3%	143	91.7%
Body mass index	Not overweight	212	18	8.5%	194	91.5%
	Overweight	73	6	8.2%	67	91.8%
Afterschool activity	Yes ASA	136	13	9.6%	123	90.4%
	No ASA	160	12	7.5%	148	92.5%
Grade level	11th–12th	132	16	12.1%	116	87.9%
	9th–10th	174	10	5.7%	164	94.3%

Note. *N* = 389. Missing values have been omitted in table summary. "*N*" refers to the unweighted count of students within each category reporting either with ≥ 4 partners or with ≤ 3 partners. "%" sum to 100% within each control variable group.

Table 6

Descriptive Frequencies of Multiple Sexual Partners: Alternative School Sample

Control variable	Category	Total weighted (*N*)	*N* (with ≥ 4 partners)	% (≥ 4)	*N* (with ≤ 3 partners)	% (≤ 3)
Gender	Female	44.3	13.0	29.4%	31.3	70.6%
	Male	45.4	9.4	20.8%	36.0	79.2%
Body mass index	Not overweight	48.8	11.9	24.4%	36.9	75.6%
	Overweight	35.9	10.6	29.5%	25.3	70.5%
Afterschool activity	Yes ASA	54.7	11.6	21.3%	43.1	78.7%
	No ASA	33.2	10.8	32.6%	22.4	67.4%
Grade level	11th–12th	48.3	15.3	31.7%	33.0	68.3%
	9th–10th	40.5	7.2	17.7%	33.3	82.3%

Note. *N* = 69. Missing values have been omitted in table summary. "*N*" refers to the weighted count of students within each category reporting either with ≥ 4 partners or with ≤ 3 partners. "%" sum to 100% within each control variable group.

The third dependent variable, substance use before sexual intercourse, is presented in Table 7, *Descriptive Frequencies of Substance Use: Traditional School Sample*, and Table 8, *Descriptive Frequencies of Substance Use: Alternative School Sample*. In traditional schools, substance use before sex was reported by 21.9% (n = 7) of female students and 15.4% (n = 6) of male students. Use was also more prevalent among students in grades 11–12 (20.5%, n = 8) compared to those in grades 9–10 (15.6%, n = 5). Among students who were not overweight or obese, 17.6% (n = 9) reported use; however, data for overweight/obese students were suppressed due to confidentiality concerns. Substance use was reported by 19.4% (n = 6) of students who participated in afterschool activities and 15.4% (n = 6) of those who did not. In the alternative school sample, data on substance use were suppressed due to small cell sizes across control variables.

Table 7

Descriptive Frequencies of Substance Use: Traditional School Sample

Control variable	Category	Total (*N*)	*N* (used substances)	% (used)	*N* (didn't use substances)	% (didn't use)
Gender	Female	32	7	21.9%	25	78.1%
	Male	39	6	15.4%	33	84.6%
Body mass index	Not overweight	51	9	17.6%	42	82.4%
	Overweight	13	*	*	13	*
Afterschool activity	Yes ASA	31	6	19.4%	25	80.6%
	No ASA	39	6	15.4%	33	84.6%
Grade level	11th–12th	39	8	20.5%	31	79.5%
	9th–10th	32	5	15.6%	27	84.4%

Note. *N* = 389. Missing values have been omitted in table summary. *Suppressed to protect participant confidentiality. "*N*" refers to the unweighted count of students within each category reporting either condom use or nonuse. "%" sum to 100% within each control variable group.

Table 8

Descriptive Frequencies of Substance Use: Alternative School Sample

Control variable	Category	Total weighted (*N*)	*N* (used substances)	% (used)	N (didn't use substances)	% (didn't use)
Gender	Female	23.9	*	*	23.9	83.3%
	Male	16.5	*	*	16.5	89.9%
Body mass index	Not overweight	22.3	*	*	22.3	82.0%
	Overweight	16.3	*	*	16.3	90.3%
Afterschool activity	Yes ASA	19.7	*	*	19.7	84.4%
	No ASA	20.7	*	*	20.7	87.2%
Grade level	11th–12th	29.6	*	*	29.6	94.4%
	9th–10th	10.7	*	*	10.7	68.6%

Note. $N = 69$. Missing values have been omitted in table summary. *Suppressed to protect participant confidentiality. "*N*" refers to the weighted count of students within each category reporting either having used substances or didn't use substances. "%" sum to 100% within each control variable group.

Assumption Testing

This subsection examines the three research questions and hypotheses by exploring the relationship between the independent variable, school type (alternative and traditional), and each dependent variable: condom use, multiple sexual partners, and substance use before sex, while controlling for gender, BMI category, grade level, and participation in afterschool activities. Statistical analysis was conducted using complex samples, including crosstabulation and binary logistic regression, to determine the level of significance, if any existed. Before performing the analyses, several assumptions were evaluated. The first assumption of binary logistic regression is that all outcome variables must be binary, which is satisfied since all variables are dichotomous: the independent variable of school type (alternative vs. traditional); the dependent variables of condom use (used condom, not used); multiple sexual partners (≤ 3 partners, ≥ 4 partners); and substance use before sex (used substances, not used), along with the control factors gender (male vs. female), grade level (9th–10th vs. 11th–12th), BMI category (overweight/obese vs. not), and afterschool activity (yes, no). The second assumption is that all observations are distinct from one another, which is supported by the fact that each student offers an independent survey response. The third assumption is that no multicollinearity exists among the variables school type, gender, BMI, afterschool activity, and grade level. The variance inflation factors (VIFs) ranged from 1.004 to 1.008, which is well below the accepted level of VIF < 3, as shown in Table 9, *Results to Determine Multicollinearity of Variables.* This indicates an absence of multicollinearity (Green & Salkind, 2014). The fourth and fifth assumptions were satisfied, as continuous variables were not present in the study, and outliers were not assessed for the same reason.

Table 9

Results to Determine Multicollinearity of Variables

		Collinearity statistics	
Model		Tolerance	VIF
	Gender	.995	1.005
	Body mass index	.992	1.008
	Afterschool activity	.996	1.004
	Grade level	.995	1.005

Note. Dependent variable: School type.

Hypothesis Testing and Data Analysis

RQ1: What is the association between alternative and traditional schooling and sexual risk behavior (in the past three months, did you or your partner use a condom during sexual intercourse) among Alaska Native youth when controlling for age (grade-level), gender, BMI (overweight or obese), and self-reported afterschool activity?

$H_0$1: There is no significant association between alternative and traditional schooling and condom use during sexual intercourse, controlling for age (grade-level), gender, BMI, and afterschool activity.

H_a1: There is a significant association between alternative and traditional schooling and condom use during sexual intercourse, controlling for age (grade-level), gender, BMI, and afterschool activity.

To examine the association between gender, BMI, afterschool activity, grade level, and condom use during the last sexual intercourse, complex sample-adjusted F-tests were conducted; Table 10, *Crosstabs: Adjusted F-Test and Odds Ratio for Condom Use by School Type,* presents the results of the complex sample crosstabulation for the variables. Among alternative school youth, no predictor showed a statistically significant association with condom use. Specifically, gender ($F(1,1) = 1.501$, $p = .436$), overweight/obese status ($F(1,1) = 230.846$, $p = .042$), afterschool activity ($F(1,1) = 0.091$, $p = .814$), and grade-level ($F(1,1) = 0.870$, $p = .522$) did not yield stable or interpretable odds ratios due to small sample size with wide confidence intervals. Although the F value for BMI was notably high, this result was interpreted with caution due to unstable estimates (OR = 2.266, CI not reported). Among traditional school youth, gender ($F(1,22) = 17.315$, $p < .001$; OR = 0.373, 95% CI: [0.227 – 0.613]) and grade-level ($F(1,22) = 5.646$, $p = .027$; OR = 1.563, 95% CI: [1.057 – 2.309]) were significantly associated with condom use. Overweight/obese status (F(1,22) = 0.518, p = .479) and afterschool activity (F(1,22) = 0.920, p = .348) were not significant predictors.

Table 10

Crosstabs: Adjusted F-Test and Odds Ratio for Condom Use by School Type

Variable	Data sample	Adjusted *F*	*df*	*p*-value	Odds ratio	95% CI
Gender	Alternative	1.501	1,1	0.436	0.353	*
	Traditional	17.315	1,22	< .001	0.373	[0.227 – 0.613]
Body mass index	Alternative	230.846	1,1	0.042	2.266	*
	Traditional	0.518	1,22	0.479	1.228	[0.679 – 2.221]
Afterschool activity	Alternative	0.091	1,1	0.814	0.854	*
	Traditional	0.920	1,22	0.348	0.739	[0.384 – 1.422]
Grade level	Alternative	0.870	1,1	0.522	1.991	*
	Traditional	5.646	1,22	0.027	1.563	[1.057 – 2.309]

*Estimates for alternative schooling unstable due to low cell counts; interpret with caution.

A complex binary logistic regression analysis was conducted to determine the association between the independent variable, school type (alternative vs. traditional), and the dependent variable, condom use during last sexual intercourse, among 9th to 12th grade Alaska Native youth, while adjusting for gender, overweight/obese status, afterschool activities, and grade level. Table 11, *Logistic Regression: Likelihood of Condom Use by School Type While Controlling for Gender, BMI, Afterschool Activity, and Grade Level,* displays the results of this logistic regression analysis. The logistic regression model was not statistically significant for the independent variable of school type and CU, with a Wald statistic of 0.328 and a p-value of 0.575. The overall model fit for predicting condom use was not statistically significant, F(1.43, 21.50) = 3.14, p = .077, with the Nagelkerke pseudo-R^2 indicating that the model explained approximately 15% of the variance in condom use. Students in alternative schools had 1.31 times the odds of not using condoms compared to those in traditional schools (OR = 1.31, 95% CI

[0.480, 3.577]); however, this association was not statistically significant, as the p-value exceeded .05 and the 95% CI [0.480, 3.577] included 1. Consequently, the null hypothesis was retained, and the alternative hypothesis was rejected.

Although school type was not significantly associated with condom use, two control variables demonstrated statistically significant adjusted relationships in the full model. Gender continued to be an essential covariate, with male students having lower odds of reporting non-condom use compared to females (OR = 0.309, 95% CI [0.121, 0.788], Wald = 7.148, $p = .017$). BMI also showed a significant link, as overweight or obese youth were more likely to report non-condom use than their nonoverweight peers (OR = 1.798, 95% CI [1.195, 2.705], Wald = 9.376, $p = .008$). Afterschool activity and grade level were included as covariates but were not significantly associated with condom use. In summary, school type was not a significant predictor of condom use when controlling for demographic and behavioral factors, and the null hypothesis for RQ1 was retained. It is important to note that missingness in condom use was significantly associated with school type and grade level, indicating the data were not MCAR. As listwise deletion was used, the results, especially for school type and grade group, may be biased. These findings should be interpreted with caution.

Table 11

Logistic Regression: Likelihood of Condom Use by School Type While Controlling for Gender, BMI, Afterschool Activity, and Grade Level

Variable	B	*SE*	Wald *F*	*df*	*p*-value	*OR* (Exp(B))	95% CI for Exp(B)
School type	-0.270	0.471	0.328	1,15	0.575	1.310	[0.480, 3.577]
Gender	1.173	0.439	7.148	1,15	0.017	0.309	[0.121, 0.788]
Body mass index	-0.587	0.192	9.376	1,15	0.008	1.798	[1.195, 2.705]
Afterschool activity	0.278	0.270	1.065	1,15	0.319	0.757	[0.426, 1.345]
Grade level	-0.461	0.284	2.645	1,15	0.125	1.586	[0.867, 2.904]

Note. Dependent variable: Condom use - DV (reference category = Condom used)

Control variables: (Reference category = School type = Traditional, Gender = Female, BMI = Not over/obese, Afterschool activity = Yes ASA, Grade level = 11^{th}–12th)

RQ2: What is the association between alternative and traditional schooling and sexual risk behavior (students who have had sexual intercourse with four or more people during their life) among Alaska Native youth when controlling for age (grade-level), gender, BMI (overweight or obese), and self-reported afterschool activity?

$H_0$2: There is no significant association between alternative and traditional schooling and the likelihood of having had sexual intercourse with four or more people during their lives, controlling for age (grade-level), gender, BMI, and afterschool activity.

H_a2: There is a significant association between alternative and traditional schooling and the likelihood of having had sexual intercourse with four or more people during their lives, controlling for age (grade-level), gender, BMI, and afterschool activity.

To examine the association between gender, BMI, afterschool activity, grade-level, and multiple sexual partners, complex sample-adjusted F-tests were conducted for alternative and traditional school youth; Table 12, *Crosstabs: Adjusted F-Test and Odds Ratio for Multiple Sexual Partners by School Type*, presents the results of the complex sample crosstabulation for the variables. The results among alternative school youth indicated that none of the predictors were significantly associated with the number of sexual partners; gender (F(1,1) = 4.990, p = .268), overweight/obese status (F(1,1) = 1.249, p = .465), and afterschool activity (F(1,1) = 0.835, p = .529). While grade level showed a moderately high F-statistic (F(1, 1) = 5.822, p = .250), the result did not reach statistical significance. Within the traditional school group, only grade level was significantly associated with multiple sexual partners (F(1, 22) = 10.728, p = .003), with younger students (9th–10th grade) having lower odds of reporting four or more partners (OR = 0.442, 95% CI: [0.261–0.749]). No other predictors reached statistical significance including gender (F(1,22) = 0.026, p = .874), BMI (F(1,22) = 0.022, p = .882), and afterschool activity (F(1,22) = 1.430, p = .245).

Table 12

Crosstabs: Adjusted F-Test and Odds Ratio for Multiple Sexual Partners by School Type

Variable	Data sample	Adjusted *F*	*df*	*p*-value	Odds ratio	95% CI
Gender	Alternative	4.990	1,1	0.268	0.629	*
	Traditional	0.026	1,22	0.874	0.965	[0.610 – 1.527]
Body mass index	Alternative	1.249	1,1	0.465	1.302	*
	Traditional	0.022	1,22	0.882	0.965	[0.591 – 1.576]
Afterschool activity	Alternative	0.835	1,1	0.529	1.792	*
	Traditional	1.430	1,22	0.245	0.767	[0.484 – 1.216]
Grade level	Alternative	5.822	1,1	0.250	0.465	*
	Traditional	10.728	1,22	0.003	0.442	[0.261 – 0.749]

*Estimates for alternative schooling unstable due to low cell counts, interpret with caution.

A complex binary logistic regression analysis was conducted to determine the association between the independent variable, school type (alternative vs. traditional), and the dependent variable, reporting four or more sexual partners in one's lifetime, among 9th to 12th grade Alaska Native youth, while adjusting for gender, overweight/obese status, afterschool activities, and grade level. Table 13, *Logistic Regression: Likelihood of Multiple Sexual Partners by School Type While Controlling for Gender, BMI, Afterschool Activity, and Grade Level,* displays the results of this logistic regression analysis. The logistic regression revealed that the independent variable, school type, was significantly associated with reporting multiple sexual partners. Specifically, students in the traditional school were 3.76 times more likely to report having four or more sexual partners than those in the alternative school (OR = 3.756, 95% CI: [0.202, 0.350]), B = -1.326, SE = 0.132, Wald $F(1,21) = 100.883$, $p = .001$). The overall model fit for predicting multiple sexual partners was statistically significant, $F(2.39, 50.15) = 12.655$, p = <.001. The Nagelkerke pseudo-R^2 indicated that the model explained approximately 11.1% of the variance for MSP. Because the p-value was below the .05 threshold and the confidence interval did not include 1, the null hypothesis was rejected, and the alternative hypothesis was accepted for school type.

Gender was also significantly associated with MSP (B = 0.363, SE = 0.154, Wald $F(1,21) = 5.586$, $p = .028$). Males had 30.5% lower odds of reporting four or more partners compared to females (OR = 0.695, 95% CI: [0.505, 0.957]). In contrast, overweight/obese status was not significantly associated with reporting multiple sexual partners (B = 0.011, SE = 0.166, Wald $F(1,21) = 0.004$, $p = .948$), with an odds ratio close to 1 (OR = 0.989, 95% CI: [0.701, 1.397]). ASA also showed no significant association with multiple sexual partners (B = 0.056, SE = 0.331, Wald F(1,21) = 0.028, p = .868). Students without ASA had a 5.4% lower odds of reporting four or more partners compared to their peers. (OR = 0.946, 95% CI: [0.476, 1.881]). Finally, grade level was a significant predictor (B = 0.646, SE = 0.190, Wald F(1,21) = 11.624, p = .003), with students in grades 9–10 having 47.6% lower odds of report four or more sexual partners compared to those in 11th–12th grade (OR = 0.524, 95% CI: [0.353, 0.777]). The results of this logistic regression analysis demonstrated that school type was significantly associated with reporting multiple sexual partners. Therefore, the null hypothesis for RQ2 was rejected, and the alternative hypothesis was accepted.

Table 13

Logistic Regression: Likelihood of Multiple Sexual Partners by School Type While Controlling for Gender, BMI, Afterschool Activity, and Grade Level

Variable	B	*SE*	Wald *F*	*df*	*p*-value	*OR* (Exp(B))	95% CI for Exp(B)
School type	-1.326	0.132	100.883	1,21	0.001	3.756	[2.861, 4.955]
Gender	0.363	0.154	5.586	1,21	0.028	0.695	[0.505, 0.957]
Body mass index	0.011	0.166	0.004	1,21	0.948	0.989	[0.701, 1.397]
Afterschool activity	0.056	0.331	0.028	1,21	0.868	0.946	[0.476, 1.881]
Grade level	0.646	0.190	11.624	1,21	0.003	0.524	[0.353, 0.777]

Note. Dependent variable: Multiple sexual partners - DV (reference category = 3 or less sexual partners). Control variables: (Reference category = School type = Traditional, Gender = Female, BMI = Not over/obese, Afterschool activity = Yes ASA, Grade level = 11th-12th).

RQ3: What is the association between alternative and traditional schooling and sexual risk behavior (in the past three months, did you drink alcohol or use drugs before you had sexual intercourse) among Alaska Native youth when controlling for age (grade-level), gender, BMI (overweight or obese), and self-reported afterschool activity?

$H_0 3$: There is no significant association between alternative and traditional schooling and the likelihood of drinking alcohol or using drugs before sexual intercourse, controlling for age (grade-level), gender, BMI, and afterschool activity.

$H_a 3$: There is a significant association between alternative and traditional schooling and the likelihood of drinking alcohol or using drugs before sexual intercourse, controlling for age (grade-level), gender, BMI, and afterschool activity.

To examine the association between gender, BMI, afterschool activity, grade-level, and substance use before sexual activity, complex sample-adjusted F-tests were conducted for alternative and traditional school youth; Table 14, *Crosstabs: Adjusted F-Test and Odds Ratio for Substance Use by School Type,* presents the results of the complex sample crosstabulation for the variables. For students in the alternative school setting, none of the predictors were statistically significant according to the adjusted F-tests; gender ($F(1,1) = 0.171$, $p = .750$), overweight/obese status ($F(1,1) = 0.785$, $p = .538$), and afterschool activity ($F(1,1) = 0.054$, $p = .855$). Although the F value for grade level was notably elevated ($F(1,1) = 22.321$, $p = .133$; OR = 7.761), it did not meet the threshold for statistical significance, due to low expected cell counts in the alternative sample, Fisher's Exact Tests (see Table 18) were used to validate these findings. This is applied when more than 20% of cells have expected cell counts less than 5, but no less than 1 (Penn State University, 2017). Only grade level was statistically significant in this test (χ^2(1, n = 48) = 5.35, p = .033), indicating that younger students were more likely to report substance use before sex in bivariate comparisons. All other comparisons, including those for gender, BMI, and ASA, were not statistically significant. In the traditional school, none of the predictors were statistically significant according to the adjusted F-tests. Gender (F(1,22) = 2.907, p = .102; OR = 0.649, 95% CI: [0.383–1.100]) was the closest to reaching significance, suggesting a possible trend toward higher substance use among females, though this did not meet the threshold for statistical significance. Overweight/obese status (F(1,22) = 0.034, p = .856; OR = 1.077, 95% CI: [0.467–2.482]), afterschool activity (F(1,22) = 0.884, p = .357; OR = 0.758, 95% CI: [0.410–1.399]), and grade level (F(1,22) = 1.183, p = .289; OR = 0.718, 95% CI: [0.381–1.353]) showed nonsignificance. A Fisher's Exact Test was conducted for BMI due to low expected cell counts, which confirmed the lack of significance (χ^2(1, n = 67) = 0.01, p = 1.000; see Table 15).

Table 14

Crosstabs: Adjusted F-Test and Odds Ratio for Substance Use by School Type

Variable	Data sample	Adjusted *F*	*df*	*p*-value	Odds ratio	95% CI
Gender	Alternative	0.171	1,1	0.750	0.561	*
	Traditional	2.907	1,22	0.102	0.649	[0.383 – 1.100]
Body mass index	Alternative	0.785	1,1	0.538	0.489	*
	Traditional	0.034	1,22	0.856	1.077	[0.467 – 2.482]
Afterschool activity	Alternative	0.054	1,1	0.855	0.792	*
	Traditional	0.884	1,22	0.357	0.758	[0.410 – 1.399]
Grade level	Alternative	22.321	1,1	0.133	7.761	*
	Traditional	1.183	1,22	0.289	0.718	[0.381 – 1.353]

*Estimates for alternative schooling unstable due to low cell counts, interpret with caution.

Table 15

Fisher's Exact Test: Results for Substance Use by School Type and Demographic Factors (Alternative: Weighted; Traditional: Unweighted)

		χ^2 (1, n)	Fisher's exact *p* (2-sided)
Alternative (weighted)	Substance use		
	Grade level	5.350 (n = 48)	0.033
	Afterschool activity	0.170 (n = 48)	1
	Body mass index	0.330 (n = 45)	0.692
	Gender	0.330 (n = 47)	0.692
Traditional (unweighted)	Substance use		
	Body mass index	0.010 (n = 67)	1

A complex binary logistic regression analysis was conducted to determine the association between the independent variable, school type (alternative vs. traditional), and the dependent variable, substance use before sexual intercourse, among 9th to 12th grade Alaska Native youth, while adjusting for gender, overweight/obese status, afterschool activities, and grade level. Table 16, *Logistic Regression: Likelihood of Substance Use by School Type While Controlling for Gender, BMI, Afterschool Activity, and Grade Level,* displays the results of this logistic regression analysis.

The logistic regression model was not statistically significant for the independent variable of school type and SU, with a Wald statistic of 0.569 and a p-value of 0.462. The overall model fit for predicting substance use was not statistically significant, $F(1.63, 24.5) = 1.567$, $p = .229$, with the Nagelkerke pseudo-R^2 indicating that the model explained approximately 4.5% of the variance in substance use. Youth in the alternative school had 18.6% lower odds of reporting substance use before sexual activity compared to those in the traditional school (OR = 0.814, 95% CI: [0.456, 1.455]); however, this was not statistically significant, as the p-value exceeded .05 and the 95% CI [.456, 1.455] included 1. Consequently, the null hypothesis was retained, and the alternative hypothesis was rejected

While school type was not significantly associated with substance use before sex, one control variable—grade level—showed a significant adjusted association in the model. Students in 9th–10th grade had greater odds of reporting substance use before sex compared to those in 11th–12th grade (OR = 1.815, 95% CI [1.236, 2.665], Wald F(1,15) = 10.955, p = .005). Gender, BMI, and afterschool activity were not significantly associated with this SU. In summary, school type was not a significant predictor of substance use before sex, and the null hypothesis for RQ3 was retained. It is also important to note that missingness in substance use was linked to school type and grade level, violating the MCAR assumption. This may have introduced bias in the regression estimates. Caution is warranted when interpreting these findings.

Table 16

Logistic Regression: Likelihood of Substance Use by School Type While Controlling for Gender, BMI, Afterschool Activity, and Grade Level

Variable	B	*SE*	Wald *F*	*df*	*p*-value	*OR* (Exp(B))	95% CI for Exp(B)
School type	0.205	0.272	0.569	1,15	0.462	0.814	[0.456, 1.455]
Gender	0.545	0.522	1.091	1,15	0.313	0.580	[0.191, 1.763]
Body mass index	0.258	0.376	0.470	1,15	0.503	0.773	[0.346, 1.723]
Afterschool activity	0.234	0.413	0.321	1,15	0.580	0.792	[0.328, 1.908]
Grade level	-0.596	0.180	10.955	1,15	0.005	1.815	[1.236, 2.665]

Note. Dependent variable: Substance use— DV (Reference category = No substance used). Control variables: (Reference category = School type = Traditional, Gender = Female, BMI = Not over/obese, Afterschool activity = Yes ASA, Grade level = 11th-12th).

Summary

In Section 3, descriptive statistics for this study were provided, focusing on three dependent variables (condom use, multiple sexual partners, and substance use) based on school type (alternative vs. traditional). The descriptive results were presented in tables that include frequencies and percentages for each assessed variable. Before conducting the bivariate analysis, key assumptions were checked to ensure the data were adequate for regression analysis. Within the secondary data set, the sampling consisted of 458 valid responses (69 alternatives and 389 traditional) from Alaska Native high school students in the Lower Kuskokwim. Next, hypothesis testing and data analysis were conducted to address the three research questions:

For RQ1, "What is the association between school type (alternative vs. traditional) and condom use before sex among Alaska Native youth, controlling for grade, gender, BMI, and afterschool activity?" Bivariate analysis indicated that for students in the alternative school, there was no statistically significant association between any predictor and condom use. Among traditional school students, gender and grade level showed a statistically significant relationship with condom use, while BMI and ASA did not achieve statistical significance. Binary logistic regression within the sample revealed no statistically significant association between school type and condom use. Therefore, the null hypothesis for this question was retained.

For RQ2, "What is the association between school type (alternative vs. traditional) and multiple sexual partners among Alaska Native youth, controlling for grade, gender, BMI, and afterschool activity?" Bivariate analysis indicated that youth in the alternative school showed no statistically significant association between predictors and the number of sexual partners. Within the traditional school, only grade level was significantly associated with multiple sexual partners. Binary logistic regression within the sample revealed a statistically significant association between school type and multiple sexual partners. Therefore, the null hypothesis was rejected, and the alternative hypothesis was accepted.

For RQ3, “What is the association between school type (alternative vs. traditional) and substance use before sexual activity among Alaska Native youth, controlling for grade, gender, BMI, and afterschool activity?” Bivariate analysis revealed that students in the alternative school had no statistically significant predictors. Furthermore, Fisher’s Exact test was conducted to confirm that cells with low counts provided valid results, with grade level as the only statistically significant predictor. In the traditional school, none of the predictors were statistically significant. Additionally, Fisher’s Exact test was performed for BMI due to low cell counts, which confirmed no significant difference. Binary logistic regression within the sample indicated that school type showed no statistically significant association with substance use before sexual activity. Therefore, the null hypothesis for this question was retained.

Section 4 presents a review and interpretation of the findings, including a discussion of how the social ecological model (theoretical framework) guided the analysis. It also addresses the study’s limitations, recommendations for future research, and explores the implications for professional practice and social change.

Section 4: Application to Professional Practice and Implications for Social Change

Introduction

The objective of this quantitative cross-sectional analysis, using secondary data from the 2017 Alaska Youth Risk Behavior Surveillance Survey, was to examine the potential association between a student's school type (alternative or traditional) and its influence on SRBs, including condom use, the number of sexual partners, and substance use, while controlling for gender, grade level, BMI, and afterschool activities among Alaska Native high school youth in the Lower Kuskokwim region. For the first research question, findings did not provide strong enough evidence to reject the null hypothesis, which stated that there was no statistically significant association between school type (alternative vs. traditional) and condom use, after controlling for gender, grade level, BMI, and afterschool activity among AN youth. For the second research question, the findings supported rejection of the null hypothesis, which stated that there was no statistically significant association between school type (alternative vs. traditional) and multiple sexual partners, while controlling for gender, grade level, BMI, and afterschool activity among AN youth. Lastly, for the third research question, findings did not provide sufficient evidence to reject the null hypothesis, which stated that there was no statistically significant association between school type (alternative vs. traditional) and substance use, after controlling for gender, grade level, BMI, and afterschool activity among AN youth. This section provides an introduction, interpretation of findings, limitations, recommendations for future research, implications for professional practice and social change, field-based products, and a conclusion to the study.

Interpretation of the Findings

The following subsection restates each of the three research questions and their statistical results, followed by a detailed interpretation and comparison to existing literature and the study's theoretical framework.

Research Question 1

Regarding RQ1: Is there a relationship between alternative and traditional schooling and SRB (specifically, whether you or your partner used a condom during sexual intercourse in the past three months) among Alaska Native youth when accounting for gender, grade level, BMI, and afterschool activities? The binary logistic regression showed no significant link between school type and condom use. Although not statistically significant, the odds of reporting non-condom use were 1.31 times higher among students in the alternative school compared to those in the traditional school (OR = 1.31, p = .575), suggesting a potential trend that may warrant further investigation with a larger sample. Gender and BMI emerged as significant predictors, with male students more likely to report condom use (OR = 0.309, p = .017), and youth with higher BMI significantly less likely to report condom use (OR = 1.798, p = .008); afterschool activity and grade level were nonsignificant.

Research Question 2

RQ2 explored the following: What is the association between alternative and traditional schooling and SRB (students who have had sexual intercourse with four or more people during their life) among AN youth when controlling for gender, grade-level, BMI, and afterschool activity? The binary logistic regression revealed that school type (alternative vs. traditional) was significantly associated with reporting multiple sexual partners among AN youth, after adjusting for covariates. In an unexpected turn, students in the traditional school were 3.76 times more likely to report multiple sexual partners than those in the alternative school (OR = 3.756, $p = .001$). Gender and grade-level remained significant predictors: males had 30.5% lower odds of four or more sexual partners compared to females (OR = 0.695, $p = .028$). Grade level indicated that students in grades 9–10 had 47.6% lower odds of reporting MSP compared to those in grades 11–12 (OR = 0.524, $p = .003$); afterschool activity and BMI were nonsignificant.

Research Question 3

RQ3 explored the following: What is the association between alternative and traditional schooling and SRB (in the past three months, did you drink alcohol or use drugs before you had sexual intercourse) among Alaska Native youth when controlling for gender, grade-level, BMI, and afterschool activity? The binary logistic regression revealed no significant difference between school type and substance use before sexual intercourse among AN youth. However, youth in the alternative school had 18.6% lower odds of reporting substance use before sex compared to the traditional school (OR = 0.814, $p = .462$), suggesting a potential area for further study. Finally, grade-level was statistically significant (OR = 1.634, $p = .033$), indicating that younger students were more likely to report substance use before sexual intercourse; gender, BMI, and afterschool activity were nonsignificant.

Literature and Theoretical Framework Comparison

What distinguished this study was its deliberate focus on Alaska Native youth, a group often misclassified and overlooked in national health research/datasets, despite not all variables reaching statistical significance. By isolating AN youth and examining school type with SRBs, the study challenged homogenizing assumptions, explored the potential impact of educational settings, and supports the ongoing calls for tribal data sovereignty and culturally grounded research (Brewer et al., 2023; Gatewood et al., 2024; Rhodes et al., 2023; Small-Rodriguez & Akee, 2021). A key reflection here was whether the variations observed in this study reflect not mere coincidence, but meaningful differences rooted in the distinct social, cultural, and environmental contexts shaping Alaska Native youth.

In Section 1, the literature posits that school type plays a complex role in adolescent sexual health. Schools are where youth develop cognitively and socially, shaping their attitudes and behaviors (sexual or not) based on the information, climate, and guidance they collectively experience. In Alaska, ASs serve students who struggle in traditional environments and include vocational, remedial, charter, and correspondence programs (ASAA, 2016; Porowski et al., 2014). Although Alaska has collected data on alternative school health-risk behaviors since 2009 (Alaska Department of Education and Early Development, n.d.; Johnson et al., 2017), no known study had specifically examined the relationship between different school types and SRBs among AN youth at the state level or in part at the district level. The lack of consistent national data collection (Kann, 2018; Lindberg et al., 2020) or the lack of data delineation between AS youth and broader AS types (remedial, vocational, behavioral), particularly among Indigenous populations, hampers evidence-based understanding, policy development, and intervention design. A plausible reason for the overall lack of statistical significance between school type and SRBs is the very nature of schools themselves. Overall, academic research shows mixed results on how school type affects youth sexual health.

Alternative school settings are often perceived as high-risk environments, which may result in higher rates of SRBs. As the studies by Best (2024) and Ballard and Bender (2021) suggest, despite ASs' supportive intentions, smaller class sizes, individualized instruction, and staff engagement, they may also reinforce marginalization due to punitive disciplinary policies, academic tracking, or inadequate health resources. Additionally, even though the Alaska statewide YRBS assessment of alternative schools shows that youth consistently report high levels of victimization, hopelessness, and risky behaviors, it can be argued that within the current population, youth enrolled in the alternative school or across both school types (throughout the district) tend to experience a better school climate. This includes closer bonds with teachers and peers, stronger cultural connections (in a small community where AN is the majority), less generational trauma or systematic racism (supported by policies, programs, and services), and more robust familial and community ties (based on cultural identity, values, and lifestyle). Among AN youth in this sample, the only significant school-type difference observed was in multiple sexual partners (among the traditional school), with no significant associations found for condom use or substance use. These results suggested that in this specific regional context, alternative school students may not uniformly experience the elevated SRB profiles or marginalization often described in the broader literature. Contrary to critiques that alternative schools contribute to cycles of educational exclusion, such as limited re-entry to traditional settings or stigmatized placement (Best, 2024), Alaska's alternative education landscape may function differently. For instance, alternative schools in this area may provide a stronger, tailored support system that mitigates risk factors, as previously mentioned, smaller class sizes, increased staff-student rapport, culturally responsive education, or greater flexibility in addressing personal and academic challenges. These protective features could create an environment where SRBs are not significantly worse than in traditional schools, suggesting that alternative education, when implemented thoughtfully, may mitigate some of the structural disadvantages highlighted in national data.

An additional concept from the literature was how school-level socioeconomic status and rurality influence SRBs among youth. Underwood et al. (2021) found that students in high-poverty schools were more likely to be sexually active with higher rates of MSP than those in low-poverty schools. Rural youth reported a similar trend, with higher sexual activity and MSP than their urban and suburban peers, highlighting how SES and geography contribute to health disparities. Wilkerson et al. (2018) further demonstrated that AS placements in urban districts reflected demographic disparities: behavior-focused ASs enrolled disproportionately more males, and minority groups were overrepresented in remediation-focused ASs. National data indicate that minority students in ASs face exclusionary discipline, placement instability, limited transportation, and reduced access to wraparound services (Welsh, 2022; Losen & Martinez, 2020;

Wilkerson et al., 2018; Krause, 2024). AI/AN youth also encounter lower graduation rates, early literacy gaps, and cultural misunderstandings, such as family obligations being mistaken for disengagement, yet dropout prevention programs often overlook these contextual factors (Nelson-Barber & Boxerman, 2023; Executive Office of the President, 2014). This study revealed different outcomes, despite the youth coming from a highly remote community and attending high-poverty schools. MSP was the only statistically significant finding, but it was observed in the traditional school, not the alternative school. This finding helps shed light on a virtually unexplored dimension and the potential impact of school type, rurality, and poverty on this community. One might deduce that within the traditional school setting, youths might experience lower parental engagement, such as talking with parents, monitored academic and leisure activities, less gender-specific interventions to reduce risk behaviors, either in conjunction with or separately from a school that already faces higher rates of unsafe youth activity (peer pressure, low-quality friendship, bullying, or hostile school climate), less sexual health education, and a lack of engaged teachers. As previous literature indicates, youth from extended family structures, single-parent homes, high parental conflict, or those perceived to have less consistent family support exhibit higher levels of risky behavior (Furlanetto et al., 2019; Kaufman-Pakrs et al., 2023). Alaska Native youth across various school types may experience high levels of parental separation or other forms of guardianship, which could significantly impact the target population. This also suggests that youth at the alternative school might have parents and administrators who are actively engaged and involved in their child's developmental success and the reduction of SRBs.

Prior research shows that condom use, multiple sexual partners, and substance use affect youth health in different ways. For AI/AN students, particularly those in alternative schools, these risks often overlap leading to earlier sexual debut, higher substance, multiple sexual partners, and lower condom use (Espinoza et al., 2019; Fortems et al., 2023; Szydlowski, 2016; Henderson et al., 2019). The result of AN youth in traditional schools being statistically more likely to report MSP, with age and gender also contributing significantly, could be explained in a couple of ways. Such as a broader and more socially complex peer environment seen with traditional schools, where greater opportunity for relationships and stronger peer norms around dating may have increased risk behaviors (Leeper et al., 2023; Anyanwu & Tamwesigire, 2023). Grade level also aligned with general patterns, as older students demonstrated significantly higher odds of MSP than younger classmates (Ma et al., 2021; Cunha et al., 2023; Klu et al., 2024). Additionally, gender played a significant role, but diverged from previous literature where males typically reported higher MSP due to social norms around masculinity and sexual dominance (Mogotsi et al., 2024; Noll et al., 2020). In this study, female students may have been more vulnerable to coercive or emotionally driven relationships, particularly in settings were peer influence and social validation are strong. Prior research has shown that girls may engage in MSP due to complex relationship dynamics or limited communication about sexual health, especially in communities where cultural stigma and inadequate education constrain decision-making (Arruda et al., 2020; Evans-Paulson et al., 2021; Saftner et al., 2021). However, if girls were reporting relationships with more than four boys, might those boys in a small community all have reported the same? Were boys less likely to report within this community?

With condom use, school type was not a significant factor; however, gender and BMI remained significant. This may be explained by a shared psychosocial or relational experience that extends beyond the type of school (structure or curriculum). As the literature states, condom use and many sexual behaviors are shaped by internalized beliefs, emotional experiences, and perceived relationship dynamics that do not always develop or depend on one environment but many or not at all. As Davids et al. (2021) noted, adolescent sexual decision-making often followed dual pathways: rational (knowledge-based) and affective (emotion-based). Even when youth possessed adequate knowledge, emotional variables like trust, fear of rejection, love, or peer expectations may override condom use intentions across school environments. In both traditional and alternative settings, Alaska Native youth may have faced similar barriers to condom negotiation, including embarrassment, stigma, or lack of communication skills, which limited school-type effects. The impact of interpersonal relationships and condom use was reported to be high among AI/AN youth, which indicated that open partner communication significantly could have impacted safer sex behavior and superseded exposure to health messaging across school types. Within AN males, following national and international rates of consistent condom use, females in this area might have struggled with similar power imbalances, less perceived sexual control, and less sexual agency compared to males. This is to say that across racial differences, girls may face a gender struggle to protect themselves while males felt more emboldened to impose personal choice over mutual sexual safety (Arruda et al., 2020; Noll et al., 2020). The level and impact that condom use had might be experienced differently in other communities, but it supported the notion that girls were at increased risk of lower condom use and the importance of gendered messaging. In addition, if girls or boys with higher BMI were placed in similar situations, they experienced additional relational barriers, which may have manifested as body image insecurity or diminished negotiation power, that decreased the likelihood of condom use (Lowry et al., 2014; Gordon et al., 2016).

Regarding substance use before sex, school type was not a significant factor. As Khreizat et al. (2024) found, youth perceptions of peer and family sexual approval were stronger predictors of co-occurring substance use and sexual activity than institutional affiliation. Social exposure through peer-to-peer interactions, especially among older teenagers, could have increased or played a significant role in shaping behaviors, which aligns with Mohale and Mokwena's (2020) research in South Africa, where boys and girls mirrored the substance use patterns of their close peers and adults in their households. Despite the high rates of substance use among Alaska Native youth (Anastario et al., 2020), this study may indicate a leveling of risk exposure across environments, particularly when both school types may face similar resource constraints and serve populations with comparable background risks. Similarly, Soto et al. (2022) highlighted that many AI/AN youth live in environments where substances are normalized due to systemic disparities and inadequate prevention infrastructure. If students in both AS and traditional schools lived in communities with overlapping risk exposure, the school setting itself may not have been the primary factor; furthermore, factors that may be present within this population such as strong cultural identity, religiosity, or personal agency have been shown to decrease polysubstance use among AI/AN youth (Brockie et al., 2022; Kabiru et al., 2024).

The findings on BMI and SRB vary widely depending on the population, gender, and race; some studies show increased SRBs among obese youth, while others show no association or a protective effect (Akers et al., 2016; Cho et al., 2024; Duckworth et al., 2020). However, these studies do not establish an association among AN populations or often use a mixed aggregated sample (AI/AN, Asian, Others, etc.). Based on nondisaggregated research, AI/AN youth show disproportionately higher obesity rates, shaped by intersecting social determinants of health like poverty, sedentary lifestyles, family dynamics, chronic stress, mental health, food insecurity, and limited access to culturally appropriate care (Fyfe-Johnson et al., 2023; Zamora-Kapoor et al., 2019). Some studies report obesity prevalence as high as 32.5% among AI/AN adolescents (Johnson-Jennings et al., 2023) and up to 70% among Yup'ik (Alaska Native specific) preschoolers (Hill et al., 2023). Additionally, protective factors such as traditional food habits (subsistence hunting/gathering), language use, and cultural engagement have been shown to improve dietary habits and reduce the risk of obesity (Maurice et al., 2019). It could be argued that the impact of culturally normalized or accepted higher body weight in this AN community may help reduce or mitigate the association typically observed between BMI and SRBs in other populations (Chambers & Rodgers, 2013; Johnson-

Jennings et al., 2023). Alternatively, it could be that traditional practices, such as shared family meals, are more prevalent among this population, which may increase protective buffers against both obesity and its psychosocial consequences (Maurice et al., 2019; Zamora-Kapoor et al., 2019). In such a remote and rural setting, AN youth may also be less exposed or pressured by predominantly “White” body ideals and media-imposed body dysmorphia, potentially reducing the likelihood of engaging in SRBs as a response to weight-based stigma (Vazquez et al., 2024). Moreover, strong family ties and community cohesion may enhance protective behaviors regardless of body size (Maurice et al., 2019). SRBs among youth may be more strongly influenced by factors such as peer dynamics or emotional coping, rather than by BMI alone (Lowry et al., 2014; Castellini et al., 2021). Research also shows that obesity may contribute to social withdrawal or risk-averse behaviors, thereby reducing opportunities for SRB engagement among certain youth (Cho et al., 2024). Notably, stigma-related consequences, such as body dissatisfaction or misperceived weight status, may be more predictive of SRBs than actual BMI; however, these constructs were not directly measured in the current study (Walsh et al., 2022; Ramseyer-Winter et al., 2022). Finally, school-based and tribal programs may already be in place, reducing the impact of obesity by providing culturally responsive health education and wellness support (Fyfe-Johnson et al., 2023), or the interacting factors like race, gender, and rurality could work together in complex ways to suppress the direct effects of BMI on SRBs, especially in small samples like this one (Duckworth et al., 2020).

The role of afterschool activities in promoting youth development and reducing risk behaviors is documented in the literature. However, this study found no significant associations between ASA participation and any of the three SRBs. This is vastly different from many past findings; however, ASA effects often depend on initial behavioral profiles. Youth with fewer externalizing behaviors tend to benefit the most, while those with higher behavioral challenges may not (McWood et al., 2021). ASAs were more effective at reducing externalizing behaviors than internalizing symptoms like depression, anxiety, and suicide, which are particularly common among AN youth (Feldman et al., 2021). Although literature suggests ASs are the more likely environment for risk behaviors, the influences across school types on behavior may not be fully understood within the target population. This effect on behavior could mean that AN youth, who are at higher risk of internalizing behaviors and, although not currently known, might display fewer externalizing behaviors, and are therefore not experiencing a significant impact from ASAs. However, program design and relevance are also essential, meaning that activities lacking enjoyment, cultural importance, or perceived value may fail to engage youth meaningfully; gender preferences can influence participation, with girls more attracted to non-sport or creative ASAs and boys favoring informal group-based activities (Gülseven et al., 2024). If systems are underfunded or no organizations exist, offerings may not align with these preferences, leading to lower participation. This also relates to a lack of community support, as effective programs often depend on strong adult mentorship and positive peer influence. In under-resourced areas, youth may encounter peers with similar risk profiles or limited supervision, which can reduce the protective effects. In 2017, only 49% of youth in Alaska's Southwest region, participated in structured ASAs and by 2020, an estimated 21,000 Alaskan youth were unsupervised after school, increasing vulnerability to risk behaviors, especially during unsupervised weekday evenings (After-school Alliance, n.d.; Alaska Children's Trust, 2024; Tjaden et al., 2019). It might be argued that there is limited ASAs within the community, and it is worth noting that in a location with a majority of AN people, culturally relevant programming might not be the culprit, but rather the systemic lack of federal or state-level funding. In rural Alaska, limited resources and geographic barriers could hinder access and impede sustained participation.

Limitations of the Study

Several key limitations are acknowledged in the current study. First, the small sample size restricted the robustness of the analysis. Although the total sample included 458 Alaska Native youth, divided into two school groups (alternative vs. traditional), high levels of missing data and listwise deletion further reduced the dataset, especially when some cells contained fewer than five cases, which impacted the stability and reliability of the results. Second, differences in data weighting (complex samples) between school types created additional limitations, with data from the alternative school being weighted to estimate behaviors across the entire school district population, while data from the traditional school remained unweighted and only reflected the behaviors of survey respondents. Therefore, the weighted alternative sample can be generalized only to the district, whereas the traditional sample is only representative of the respondents. Neither sample represents Alaska Natives statewide, which limits broader generalizations and any inferences beyond the local level. Third, causality cannot be determined because of the cross-sectional study design. This method identifies associations but does not establish directional or causal links between school type and SRBs. Fourth, sample selection bias may affect the extent to which the results can be generalized to a larger group. The study only looked at Alaska Native youth in grades 9–12 from the Lower Kuskokwim School District. The experiences and actions of youth in other parts of Alaska or among different American Indian/Alaska Native groups nationwide may differ. Still, the study offers valuable insights by focusing on an underrepresented and often overlooked subgroup in AI/AN health research. Fifth, relying on self-reported survey responses may have led to recall bias, misreporting, or inaccuracies that may affect the results. Sixth, although the Youth Risk Behavior Survey is conducted every two years, this study used 2017 data. This dataset was the most complete and methodologically sound available because the COVID-19 pandemic interrupted both the 2019 and 2023 YRBS cycles. Reduced participation and data completeness in those later years made the 2017 data more suitable for examining differences in SRBs between school types.

Recommendations for Future Research

This cross-sectional secondary data analysis is the first, to the best of available knowledge, to examine SRBs among Alaska Native youth in geographically isolated settings while controlling for key sociodemographic variables.

In this context, there is an urgent need for public health intervention (policy) and sexual health programming. As a foundational study, future research should consider the following: 1. Future studies should replicate this research with a larger, more balanced sample across different school types, including oversampling youth from alternative schools, and should expand to encompass both rural and urban districts, ideally through longitudinal or repeated cross-sectional designs. The mixed and nonsignificant associations found between school type and SRBs (condom use and substance use) suggest that limited statistical power may have masked meaningful patterns. At the same time, the significant associations ($p < .05$) between missingness in condom use and substance use with school type and grade group suggest a violation of the MCAR assumption, which may have introduced bias, thereby affecting the representativeness of estimates (reduction of internal validity). While gender differences aligned with national trends, more nuanced disparities, often reported among alternative school youth, such as early sexual debut and lower condom use, were less evident here (Douglas et al., 2024; Underwood et al., 2021; Mesele et al., 2023). Broader research confirms that school setting, peer influence, and geographic context impact adolescent SRBs, particularly among marginalized groups (Arabi-Mianrood et al., 2019; Klu et al., 2024). Culturally grounded, disaggregated research on AI/AN youth is primarily needed to account for differences in geography, culture, and educational access (Zhang et al., 2024; Small-Rodriguez & Akee, 2021). 2. A limitation of this study was the need to dichotomize variables, such as grade level (a proxy for age) and afterschool activity, due to the small sample size and missing data. This reduced the ability to detect meaningful differences across categories. Literature indicates that SRBs often vary by specific grade (Copen et al., 2016; Mesele et al., 2023) and that more frequent afterschool engagement is associated with lower risk behaviors (Arabi-Mianrood et al., 2019; Underwood et al., 2021). Future studies with larger samples should retain full variable ranges (e.g., grades 9–12 and 0–4+ days of activity) to capture these patterns more accurately. 3. The unexpected yet meaningful finding that traditional school youth were significantly more likely to report having multiple sexual partners (OR = 3.756, 95% CI: [2.861, 4.944]) diverges from existing literature linking alternative school settings with higher SRBs (Mesele et al., 2023; Fortems et al., 2023; Szydlowski, 2016). This result emphasizes the importance of examining contextual and organizational factors such as school climate, perceived connectedness, and disciplinary policies, which vary significantly across different settings (Wilkerson et al., 2018; Miller et al., 2024; Perzigian & Braun, 2020). Additionally, culturally grounded community resilience and supportive relationships, especially within Indigenous contexts, could serve as protective factors and should be explored further in future research using the YRBS dataset (Heid et al., 2022; O'Keefe et al., 2022).

Implications for Professional Practice and Social Change

Professional Practice

A critical component of this study is the insight it offers to professional practice, whereby it expands the current understanding of SRBs among marginalized AN youth and the importance of continued public health research. The present study found that condom use (OR = 1.31, $p = .575$) and substance use (OR = 0.814, $p = .462$) were nonsignificant among AN youth and school type.

The implications for professional practice show that school type alone among AN youth is not a sufficient risk indicator, highlighting the importance of ecological and cultural contexts, and emphasizing that equity in educational access is critical. This study challenges the assumption that alternative school settings are categorically higher-risk environments. Instead, it shows that a shared level of risk exists across different school types and highlights stronger determinants of behavior, such as ecological and cultural influences, wherein historic trauma, limited sexual health education, stigma, or geographic isolation can impose greater risks for AN youth at the environmental level. Secondly, the current study found that among AN youth in traditional schools, contrary to existing literature (which reports higher rates among alternative school students), there were higher rates of multiple sexual partners ($OR = 3.756$, $p = .001$), with males and younger students being less likely to report MSP. Again, this divergence from mainstream assumptions offering vital implications for professional practice, where public health policy, tribal leaders/elders, community groups/services, and schools might reconsider risk assumptions based only on a student's school placement, expand culturally grounded sexual health programming with a greater focus on school climate and engagement, while continuing to support gender- and age-specific factors (known impacts backed by literature), and increase data monitoring and evaluation to understand why AN youth in the current study seem to diverge from "nationally standard" implications of SRBs among youth.

SRBs among AN youth reflect complex, multilevel influences that extend beyond school type alone. While school environments remain an important area of inquiry, these findings underscore the need for public health professionals to adopt a broader perspective. This does not diminish the value of examining school-based differences or replicating studies across Alaska's diverse communities. Instead, it emphasizes the need to situate such research within a broader framework that considers social, geographic, developmental, and systemic factors. Public health efforts should prioritize the development and expansion of age-appropriate, community-informed programs that target knowledge, attitudes, and behavioral skills at multiple levels. This includes recognizing that school type may not be the primary driver of SRBs among AN youth and shifting attention to upstream determinants, including family engagement, peer norms, historical context, and access to care. The outcomes of this study call for action across community, school, and government systems, with a focus on integrated responses that move beyond isolated interventions. Ultimately, public health practitioners should collaborate with tribal elders, policy leaders, educators, and other health professionals to translate these findings into comprehensive support systems that promote cultural identity, resilience, and opportunities. Doing so can strengthen the infrastructure for promoting sexual health and advancing health equity for all youth in Alaska, particularly those living in rural and Indigenous communities.

Positive Social Change

The impact of this study for positive social change stems from its ability to fill a critical knowledge gap while providing a deeper understanding of SRB among a largely understudied group. The central concepts include challenging assumptions, amplifying marginalized voices, and cultivating timely public health action. Notably, this updated research will help promote future research and policy reform among state and local leaders, as well as AN community and tribal elders, in disrupting the current stigmatizing narrative that suggests only alternative youth see heightened SRBs, while among AN youth, the opposite can be observed. For instance, MSPs in AN youth in traditional schools exhibit increased risk behaviors. This heightened awareness of risk among AN youth is vital on a national level, given the lack of visibility and recognition faced by smaller groups of American citizens. By opening the metaphorical doors of research, we can better understand how specific variables and school type impact youth's sexual health in this geographically isolated community in Alaska. This leads to a larger issue: the importance of YRBS itself and continuing to gather comprehensive, detailed health data (which is largely missing from smaller communities in Alaska) to expand our limited knowledge surrounding sexual health within AN communities. Such data is crucial to mitigating the costs and time associated with data collection, especially since this vital work in schools of various types (alternative, nontraditional-brick-and-mortar homeschooling, charter, etc.) is often overlooked. Lastly, using the social-ecological model as the theoretical framework helps provide a broader perspective, as no single level is the sole driver of positive social change. This is evident with AN youth, where the current outcomes suggest that school type alone reveals that broader factors are influencing SRBs. At the intrapersonal and interpersonal levels, age and gender present specific intricacies in providing appropriate health education, while females might experience different social pressures with a need for culturally safe conversations in schools and communities. At the organizational level, school structure alone does not appear to be a influential factor, and health programming is required for all school environments. Finally, geographic isolation and policy changes could impact current health outcomes.

Public Health Practice and Field-Based Products

A policy brief titled *“Empowering the Next Generation: Sexual Health Equity for Alaska Native Youth”* was developed to address the public health concern affecting Alaska Native youth discussed in this study. The memo provides a brief overview of the issue, outlines the scope of the problem, reviews current approaches, and presents a proposed policy recommendation. Key stakeholders and constituencies are identified, followed by the conclusion. This document serves as Field Product 1 and is included in Appendix A. To support the policy recommendations, a comprehensive Community Health Intervention Plan, called *“Bridging School, Culture, and Health: A Community-Based Approach to Reducing Sexual Risk Behaviors Among Alaska Native Youth,”* has been developed to facilitate implementation within communities. This plan includes a clear problem statement, SMART goals, a targeted population, proposed strategies, an implementation timeline, and an evaluation framework. It is designed to be evidence-informed and culturally responsive. This plan is included as Appendix B and is Field Product 2. A visual representation named *“Visualization: Community-Based Approach to Reducing SRBs Among AN Youth”* has been developed to illustrate the core components of the intervention and their delivery methods. This diagram aligns intervention activities with theoretical framework constructs, clarifying the structure, logic, and community-based pathways. It provides a high-level overview of the intervention and is included as Appendix C, representing Field Product 3. Lastly, to facilitate dissemination and engagement with the target population, a one-page information sheet titled *"Alaska Native Youth: Sexual Risk Behavior & School Type"* was created. This informational tool summarizes key aspects of the intervention in an accessible format for community members, educators, and youth-serving organizations. It is culturally tailored and aims to raise awareness, promote participation, and reinforce key messages. This document is included as Appendix D and serves as Field Product 4.

Conclusion

This study emphasizes the complexity of SRBs among all youth, like Alaska Native youth, showing that a student's school type alone may not exactly predict risk patterns. It also highlights the importance of ongoing culturally grounded, multilevel involvement guided by contextual and ecological factors. This is to say that SRBs among youth remain a pressing public health concern that requires ongoing attention and a nuanced understanding of both broad youth populations and subgroups, such as AN youth. Developing and implementing effective interventions requires collaboration among public health officials, policymakers, tribal leaders and organizations, schools, communities, families, and youth themselves. However, health research that disaggregates data by race or examines the unique experiences of AN youth is limited, and even less so regarding how school type may influence health behaviors. Although previous studies have consistently identified higher rates of SRBs among AI/AN youth, these findings are often based on aggregated national datasets, making it difficult to detect specific trends across regions or cultural groups. Similarly, research exploring differences in health behaviors between traditional and alternative school settings remains inconclusive, with few studies addressing how contextual factors, such as gender, grade level, BMI, or afterschool activities, influence outcomes. This study examined school type and its relationship to three SRBs, condom use, multiple sexual partners, and substance use before sex, while controlling for covariates. While most associations were not statistically significant, youth attending traditional schools had significantly higher odds of reporting multiple sexual partners. This finding diverges from established literature and highlights gaps in reliable, context-specific research. The observation that traditional school youth reported higher SRBs challenges common assumptions and suggests that factors influencing AN youth in rural regions like the Lower Kuskokwim may differ from national patterns. These unexpected results emphasize the need for continued, localized, and disaggregated research to inform culturally responsive and setting-specific sexual health promotion strategies.

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Appendix A: Policy Brief

Empowering the Next Generation: Sexual Health Equity for Alaska Native Youth

Introduction: Sexual risk behaviors (SRBs) among Alaska Native youth remain a significant public health concern, with rates of early sexual initiation, multiple sexual partners, and substance use before sex exceeding those of their white and U.S. peers (SEICUS, 2016; Tuitt et al., 2020). The impact of school type on SRBs is not clearly defined, especially among Alaska Native youth, and these disparities are compounded by geographic isolation, limited access to culturally relevant education and healthcare, and systemic misrepresentation in data collection (Johnson-Jennings et al., 2023; Gatewood et al., 2024).

Scope of the Problem:

- Alaska Native youth report higher risk of early sexual initiation, multiple sexual partners, and substance use before sex compared to national averages.
- School plays a critical role in shaping youth behavior, but not all school types are created equally; alternative schools are often associated with high-risk students and greater SRBs.
- Existing school-based SRB literature fails to address the unique socioecological experiences of Alaska Native youth, mainly due to a lack of disaggregated data and targeted research.

Current Approaches: Have primarily targeted AI/AN adolescents and young adults through community-based, CBPR-informed, or tribal-specific initiatives, often using youth empowerment, media, and peer education models. However, few have adopted a fully multi-level socioecological approach or bridged individual, family, community, and system-level strategies, especially within educational settings (Leston et al., 2022). Additionally, Everett-Jones et al. (2024) found that adult caretaking, parental monitoring, and school connectedness are protective against substance use, emotional distress, and violence among AI/AN high school students. While these findings highlight the importance of family and school supports, current approaches have not yet addressed these factors through coordinated, multi-level, or culturally grounded interventions in school-based settings. The Healthy Native Youth Implementation Toolbox, adapted through Implementation Mapping, addresses barriers to culturally relevant, school-based sexual health programs by equipping educators with structured, community-informed strategies. This approach highlights the importance of investing in policy and organizational infrastructure that is culturally grounded to support sustainable behavior change (Markham et al., 2022).

Proposed Policy Recommendations: While these recommendations are grounded in existing evidence and cultural best practices, successful implementation will require sustained funding, staff training, and collaboration across education, health, and tribal systems to ensure feasibility and long-term sustainability.

- Create early intervention programs that address body image, self-esteem, and substance use, tailored to the needs of younger students and those with higher BMI who may be at greater risk for unprotected sex (Feldman et al., 2021).
- Support family/peer-focused initiatives that strengthen communication and relationships, particularly in traditional school settings where higher rates of multiple sexual partners were reported (Heid et al., 2022; O'Keefe et al., 2022).
- Enhance school climate/student connection in traditional schools with culturally affirming, trauma-informed practices that foster a sense of belonging and reduce risk behaviors.
- Require disaggregated data and expand culturally grounded, school-based sexual health education that reflects Indigenous knowledge and is consistent across all school types.

Major Constituencies: 1) Tribal and community leaders/elders and organizations, 2) School administrators and educators, 3) Public health agencies, 4) State/local policy makers, 4) Youth-serving agencies, and lastly, 5) Parents and caregivers as well as AN youth themselves. Potential resistance may arise around curriculum reform, data disaggregation, or resource allocation; thus, early engagement with stakeholders, including parents, educators, and tribal leaders, will be essential to build consensus, address concerns, and foster shared ownership.

Conclusion: To improve sexual health outcomes for Alaska Native youth in all schooling environments, it is essential to implement school-based programs that are culturally responsive, community-led, and holistically designed. Evidence from this study suggests that school type alone does not fully explain sexual risk behavior, but educational context interacts with broader ecological and cultural factors. This calls for policies that bridge education, public health, and tribal leadership to promote the well-being of AN youth.

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Appendix B: Community Health Intervention Plan

Bridging School, Culture, and Health: A Community-Based Approach to Reducing Sexual Risk Behaviors Among Alaska Native Youth

Problem Definition: Sexual risk behaviors (SRBs) among Alaska Native youth remain a significant public health concern, with rates of early sexual initiation, multiple sexual partners (MSP), and substance use before sex exceeding those of their white and U.S. peers (SEICUS, 2016; Tuitt et al., 2020). The impact of school type on SRBs is not clearly defined, especially among Alaska Native youth, and these disparities are compounded by geographic isolation, limited access to culturally relevant education and healthcare, and systemic misrepresentation in data collection (Johnson-Jennings et al., 2023; Gatewood et al., 2024).

Goal Setting: Even though traditional school (MSP) was the only statistically significant SRB, the lack of consistent national representation (research/data), it is essential to continue to reduce all sexual risk behaviors among Alaska Native youth in the Lower Kuskokwim Region by increasing protective factors and culturally relevant sexual health support.

Measurable Objectives (12–24 months): Among sexually active AN youth

- Increase condom use by 15%
- Reduce reports of multiple sexual partners by 10%.
- Decrease substance use before sexual activity by 10%
- Improve student-reported school connection and cultural relevance of health education in participating schools by 20%.

Target Population: All Alaska Native youth in grades 9-12 attending both alternative and traditional high schools in the Lower Kuskokwim Region.

Intervention Strategies: Based on the Social Ecological Model (2 examples per level: Intrapersonal, Interpersonal, Organizational, Community, Policy), explore:

- Culturally tailored, evidence-based sexual health curriculum (e.g., Healthy Native Youth resources); Peer-led health education sessions focusing on identity, decision-making, and SRB awareness.
- Parent/guardian workshops to enhance communication about sexual health and relationships; Youth mentorship programs that pair students with trusted adults (e.g., elders, health aides, or teachers).
- Professional development for educators on trauma-informed sexual health instruction; Integration of cultural content and Alaska Native values into school wellness policies.
- Youth advisory councils to shape programming and build leadership; Collaborations with native corporations and village health clinics to deliver wraparound services (mental health, reproductive health, and substance use screening).
- Advocate for data disaggregation and tribal data sovereignty in regional and state education/health departments; Push for sustained funding for rural SRB prevention and cultural education initiatives.

Implementation Plan:

Lead Roles:
Project Coordinator – overall oversight
School Liaison – coordinates school-based activities
Tribal Health Partner – supports the delivery of culturally informed health content
Evaluation Lead – data collection and reporting

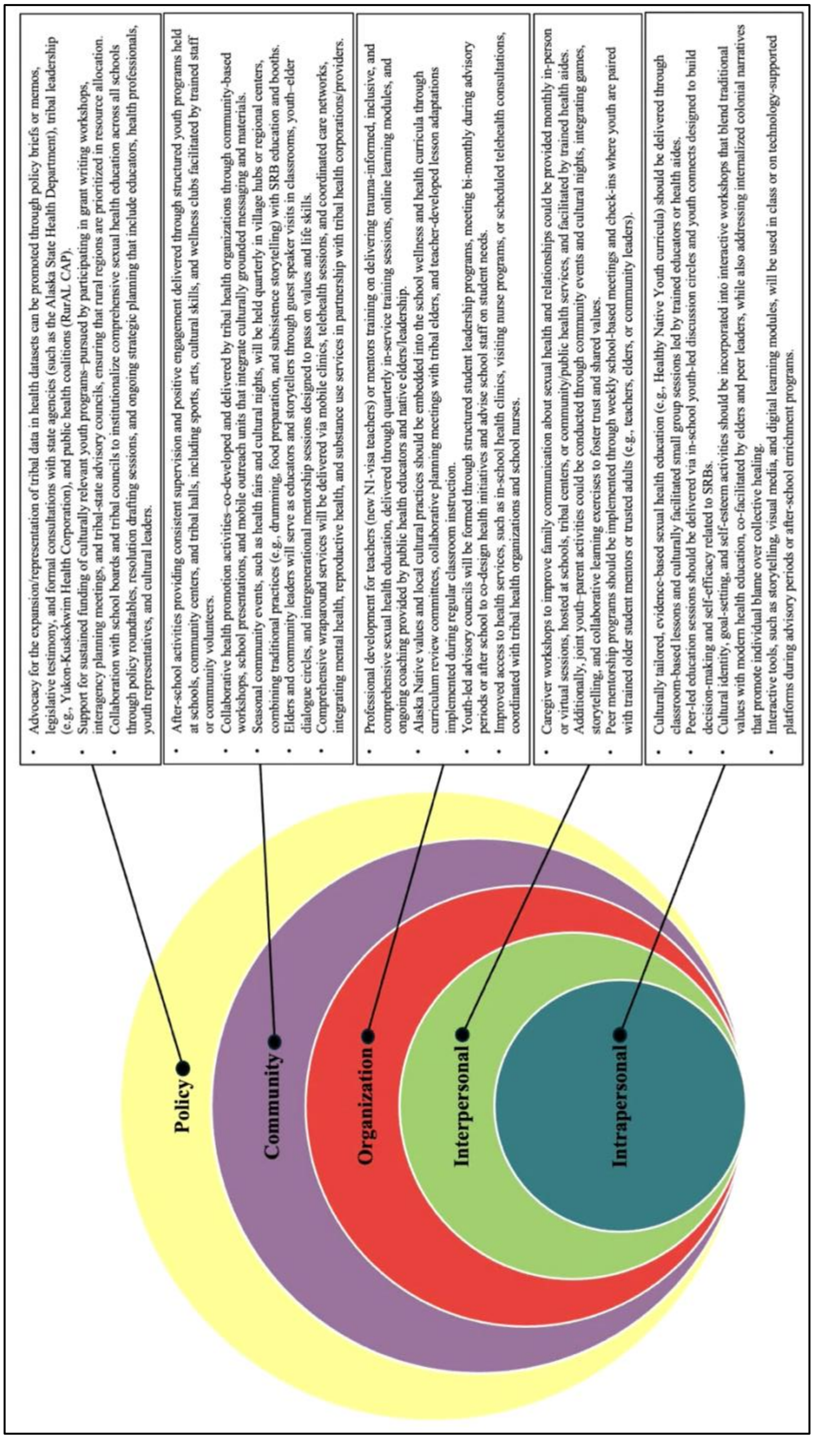
Resources Needed:
Trained local facilitators (preferably Alaska Native or culturally competent staff)
Transportation and telehealth tech for remote villages
Curriculum materials and stipends for peer leaders
Partnerships with health providers and cultural leaders

Phase	Timeline	Key Activities
Planning	Months 1–3	Engage stakeholders, establish MOAs with schools and tribal partners, select curriculum, and form youth councils.
Training	Months 3–5	Train peer educators, teachers, and health aides. Hold family outreach sessions.
Implementation	Months 6–18	Begin school-based and community interventions. Host monthly health and cultural events. Conduct quarterly check-ins with student advisory groups.
Sustainability	Months 19–24	Develop a long-term funding plan, integrate training into the district, and transition leadership to local organizations.

Evaluation Plan:

The intervention will be evaluated using both process and outcome measures. Process evaluation will involve tracking attendance at school-based sessions, parent workshops, and community events, as well as administering brief surveys to assess participant satisfaction and the perceived cultural relevance of the program content. Outcome evaluation will include pre- and post-intervention surveys to measure changes in sexual risk behaviors (such as condom use, number of sexual partners, and substance use before sex) as well as shifts in protective factors like school connectedness and sexual health knowledge. To complement quantitative results, qualitative interviews with students, caregivers, and educators will explore changes in communication, engagement, and attitudes toward sexual health. Success will be indicated by improved behavioral outcomes and stronger school–community partnerships, with results disseminated through community briefings, tribal reports, and policy summaries.

Appendix C: Visualization—Community-Based Approach to Reducing SRBs Among AN Youth



Appendix D: Information Sheet

Alaska Native Youth

Sexual Risk Behaviors & School Type

Did You Know – Sexual risk behaviors (SRBs) among Alaska Native youth remain a significant public health concern, with rates of early sexual initiation, multiple sexual partners (MSP), and substance use before sex exceeding those of their white and U.S. peers (SEICUS, 2016; Tuitt et al., 2020). The impact of school type on SRBs is not clearly defined, especially among Alaska Native youth, and these disparities are compounded by geographic isolation, limited access to culturally relevant education and healthcare, and systemic misrepresentation in data collection (Johnson-Jennings et al., 2023; Gatewood et al., 2024).

SEXUAL HEALTH MATTERS

What's the Challenge – Study findings reinforce the need for multi-level interventions. While multiple sexual partnerships emerged as the only statistically significant outcome by school type, higher among students in traditional schools, the overall patterns of non-condom use and substance use before sex remained high across both school types. This suggests that the school context alone does not fully explain SRB disparities, highlighting the importance of broader ecological influences. Males, following previous studies, were more likely to report condom use, but less likely to report having multiple sexual partners, suggesting the need for gender-responsive programming that encourages protective behavior and challenges stigma among young women. Grade level also mattered, with older youth being more likely to report multiple partners. Interestingly, younger teens reported high risks of substance use before sex, which affirms the importance of early prevention efforts. Youth with higher BMI were significantly less likely to report condom use, a finding that points to the need for trauma-informed, body-positive education. Despite prior literature citing protective effects, after-school activities were not significantly associated with SRBs in this sample, suggesting that participation alone may be insufficient without culturally relevant content, consistency, and engagement. Youth in the Lower Kuskokwim Region face geographic isolation, which could limit their access to adolescent-friendly, culturally grounded health services. Sexual health education could lack alignment with Alaska Native values, resulting in lower engagement and limited relevance for rural Indigenous youth. Parent–child communication about sexual health remains a challenge, with many caregivers feeling unprepared or unsupported in guiding these conversations. At a systemic level, the lack of disaggregation in national and state data will continue to obscure the specific needs of AN youth, reducing visibility and limiting policy reform. Although this study contributes to filling that gap by focusing exclusively on AN youth in both alternative and traditional schools, it also highlights the need for more inclusive, culturally informed strategies. To reduce risk behavior among AN youth in this region, we must consider protective factors as a community (including leaders, schools, and health professionals) to promote holistic change through school connectedness, cultural representation, and wraparound support for SRBs.

What's the Plan – We aim to reduce SRBs by embedding protective factors across every level of youth life using the **Social Ecological Model**:

- **Individual Level**
  1. Culturally tailored curriculum (e.g., *Healthy Native Youth*)
  2. Peer-led sexual health and identity workshops
- **Family Level**
  1. Parent/caregiver communication trainings
  2. Youth mentoring with trusted adults (elders, health aides, teachers)
- **School Level**
  1. Trauma-informed educator training
  2. Alaska Native values woven into wellness policies and lesson plans
- **Community Level**
  1. Youth advisory councils
  2. Partnerships with village clinics and Native corporations
- **Policy Level**
  1. Push for tribal data sovereignty and data disaggregation
  2. Secure sustained funding for rural and culturally responsive sex ed

What's Next – **Target Population:** AN youth in grades 9–12 in traditional and alternative schools in the Lower Kuskokwim Region.

Our Goals (in 12–24 months):

1) Increase **condom use** by 15%
-Focusing on gender disparities

2) Decrease **multiple sexual partners** by 10%
- Focusing on Traditional school females
- Improve YRBS response rates

3) Lower **substance use before sex** by 10%

4) Improve **school connection** and cultural relevance by 20%

Appendix E: Missing Completely at Random Results

Dependent variable	Control variable	Chi-square (χ^2)	*df*	p-value	Interpretation
Condom Use	School type	25.462	1	< .001	violated
	Gender	1.699	1	0.192	met
	BMI	0.744	1	0.388	met
	Afterschool activity	0.210	1	0.647	met
	Grade level	16.709	1	< .001	violated
Multiple Sexual Partners	School type	0.701	1	0.402	met
	Gender	0.441	1	0.507	met
	BMI	0.626	1	0.429	met
	Afterschool activity	0.180	1	0.672	met
	Grade level	0.146	1	0.703	met
Substance Use	School type	29.806	1	< .001	violated
	Gender	0.595	1	0.440	met
	BMI	0.257	1	0.612	met
	Afterschool activity	0.970	1	0.325	met
	Grade level	12.588	1	< .001	violated