SCHOOL-BASED HEALTH CARE AND ADOLESCENT SEXUAL-RISK BEHAVIORS

by

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DEDICATION

This dissertation is dedicated to the people who aim to make a difference in the lives of adolescents. Moreover, it is dedicated to my angels Drs. Noreen Clark, Linda Juszczak, and Gloria Smith who inspired me to persist in this work.

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TABLE OF CONTENTS

LIST OF TABLES

TABLE

LIST OF FIGURES

FIGURE

ABSTRACT

School-based Health Care and Adolescent Sexual-risk Behavior

Chair: Professor Cleopatra Howard Caldwell

School-based health centers (SBHCs) and school-linked health centers (SLHCs), a community-based model of adolescent focused health care, and adolescent sexual-risk behaviors were explored in this dissertation. The psychological, sociological, and biological predictors of adolescent development and the environmental, social and personal determinants of adolescent sexual-risk behavior were the focus of this exploration. This dissertation also considered how policy governing the services offered by SBHCs and SLHCs provide access to sexual health services for sexually active adolescents (SAA). Findings were integrated into a conceptual model: A Biopsychosocial Model of Adolescent Development and Behavior to guide subsequent research and interventions. Data for this dissertation were extracted from two Michigan sources. Data about adolescent health- and sexual- risk behaviors were provided by the Rapid Assessment for Adolescent Preventive Services (RAAPS) survey. Data about the clinical outcomes related to the sexual-risk behaviors of SBHC and SLHC users were drawn from clinic utilization reports. It was hypothesized that the clinic type that provided condoms and/or contraceptives to SAA (SLHCs) would be associated with greater use of condoms and/contraceptives (UOP) and the clinic that did not (SBHCs) would be associated with non-use of condoms and/contraceptives. Analyses revealed that

clinic type was not associated with UOP, however age, gender, race/ethnicity and insurance status were associated with sexual-risk behaviors. This dissertation also examined clinical outcomes of SLHCs and SBHCs. It was hypothesized that SBHCs would have a greater proportion of adolescent users with positive test results for chlamydia, gonorrhea, and pregnancies than SLHCs, because SBHCs in Michigan do not provide condoms or contraceptives to SAA. Analyses indicated that SBHCs had a greater proportion of positive tests for pregnancy, but there were no significant differences in positive tests for chlamydia or gonorrhea. It was hypothesized that gender would be associated with UOP, modified by race/ethnicity and various adolescent stressors. Analyses revealed that gender was associated with UOP. Race/ethnicity and adolescent stress modified the association. The results of this dissertation indicate that strategies to modify adolescent sexual-risk behaviors should be informed by the myriad constructs that influence adolescent development and behaviors, including policy.

CHAPTER I

SCHOOL-BASED HEALTH CENTERS AND THE PLAUSIBLE EFFECT OF POLICY ON ADOLESCENT SEXUAL-RISK BEHAVIORS

Introduction

Adolescents became a population of focus for school-based health centers (SBHCs) for several reasons. There was growing evidence that adolescents were "at-risk" of failing to become successful adults capable of contributing to their own wellbeing, to that of their offspring, and to the larger society. Circumstances beyond the control of some adolescents, such as disadvantaged families, struggling communities, and poorly resourced schools, made it highly unlikely that, without assistance, they would successfully traverse the turbulent adolescent period and emerge as thriving adults (C. Brindis, Park, Ozer, & Irwin, 2002; Dryfoos, 1991; Jessor, 1991). Furthermore, normal adolescent development, by definition, encompasses meaningful adolescent risk behaviors that are subject to a host of social and environmental influences which can either exacerbate risk or confer protection (Jessor, 1991; Jessor, Turbin, & Costa, 1998; D Kirby, 1986; Sales & Irwin Jr, 2009).

One adolescent risk behavior that has significant short- and long-term consequences is being sexually active without the consistent use of protection against unintended pregnancies and sexually transmitted infections (STIs). For the purposes of this dissertation, **sexual-risk behavior** is defined as unprotected sex, i.e., sex without the use of protection against STIs, HIV, and unintended pregnancy by either male or female

adolescents (13-19 years old). Protection minimally includes condoms and may also include other contraceptives such as the pill or a diaphragm. The primary focus of this policy dissertation is on SBHCs and school-linked health centers (SLHCs) aiming to reduce adolescent sexual-risk behaviors. To provide programmatic and policy context I will first provide an overview of SBHCs and SLHCs.

SBHCs were inspired by the recognition that there was a population of under-served, low- income children in need of medical care. Schools appeared to be logical places to locate medical care for enrolled students. SBHCs have provided primary care, as well as preventive and mental health services to school-age children and adolescents since the late 1960s. The first SBHC was opened in Cambridge, MA by then-City Maternal and Child Health Director and pediatrician Philip J. Porter (Brodeur, 2000). Over the last 50 years, the number of SBHCs has grown to approximately 2,000 centers in 46 states and the District of Columbia, Marshall Islands, Puerto Rico and the Virgin Islands, serving about 2 million school-age children and adolescents annually (Lofink et al., 2013). According to the 2010-2011 School-Based Health Alliance Census Report, SBHCs (94%) and SLHCs (4%) may be found in urban (54%), rural (28%) and suburban (18%) communities; they are located in or serve schools with various combinations of the K-12 student population, with 83% serving at least one grade of adolescents.

SBHCs offer comprehensive support for approximately one million underserved, at-risk adolescents. These centers provide physical and mental health care and social services in a youth friendly, confidential environment readily accessible on school grounds; they are staffed by providers trained and sensitized to the biopsychosocial dynamics and needs of adolescents, and services are provided at no or low cost.

Consequently, SBHCs are viewed as a convenient, accessible resource to reduce or mediate myriad behavioral, social, and environmental risks faced by adolescents.

SLHCs represent another related model of adolescent-focused health care. They have established themselves as a viable model of community-based care and services with an emphasis on meeting the physical and mental health care and social service needs of high-risk adolescents, e.g., those who may have dropped out of school or are in foster care or juvenile detention facilities. SLHCs are staffed similarly to SBHCs, however, they are located in the community near the school, and may have a formal or informal relationship with one or more schools (Fothergill & Ballard, 1998). For purposes of this dissertation, a key distinction between SBHCs and SLHCs relates to policy. SLHCs have more autonomy than SBHCs in their operational policies and practices within the parameters of their sponsoring organization. Because they are community-based and not on school property, SLHCs are able to provide the full array of sexual health services, including condoms and contraceptives, allowable under the state's minor consent laws. However, being located in the community reduces the convenience factor for optimal utilization by adolescents enrolled in traditional public schools. SBHCs are located in schools or on school property and are governed by state or local school policy with regard to the breadth of sexual health services allowable on school property. For example, approximately 50% of SBHCs nationwide are prohibited from dispensing contraceptives (Lofink, et al., 2013).

SBHCs and SLHCs were created to improve access to health-promoting and health care services for an underserved population of children and adolescents, and indeed, that has been the case (C. D. Brindis et al., 2003; Fothergill & Ballard, 1998;

Gustafson, 2005; Kisker & Brown, 1996; Klein et al., 2007; J. Santelli, Morreale, Wigton, & Grason, 1996; Wade et al., 2008). The quality of care by rural and urban SBHCs and SLHCs has been well substantiated (Allison et al., 2007; Gibson, Santelli, Minguez, Lord, & Schuyler, 2013) and users are predominantly adolescents who experience health and educational disparities (63% African American and Hispanic/Latino) (Lofink, et al., 2013).

Today, the overarching mission of SBHCs [and SLHCs] is "to provide comprehensive health education, as well as primary medical, reproductive and mental health services to enrolled students" (Gustafson, 2005). Sponsoring organizations of SBHCs and SLHCs include community health centers (33%), hospitals/health systems (26%), and local health departments (13%). These organizations are considered "providers" and the SB/SLHC staff is typically employed by them and governed by their practice policies.

SB/SLHC staffing models are characterized as "primary care" (29%), which includes a nurse practitioner, physician assistant or physician; "primary care and mental health" (33%), which includes a mental health professional, such as a clinical social worker or mental health therapist; and "primary care and mental health plus" (37%), which may include additional providers such as an oral health provider, health educator, social service case manager, and/or a nutritionist. School nurses, who are typically employed and governed by the school district and district policies, may also be co-located in the SBHC. The staffing profile for SBHCs is largely dependent on the needs of the students, local community preferences, and resources.

Initially funded by a patchwork of unstable public and private charitable funds, SB/SLHCs are now more likely to bill and receive some reimbursement through public health financing, including Medicaid (82%), Medicaid managed care (71%), and the State Child Health Insurance Program (63%). Private health insurance is billed by 64% of SBHCs and 40% seek reimbursement from the military insurance program, Tri-Care. In addition, SBHCs are the recipient of federal government grants, such as Section 330 of the Public Health Services Act, Title V Maternal and Child Health Block Grant, and Title X Family Planning; state grants (75%); and city/county grants (32%). Most notably, SBHCs are now recognized in federal financing policies such as the Child Health Insurance Program Reauthorization Act (2009) and the Affordable Care Act (2010), which now secures their position as a safety net provider for underserved populations. Finally, some SB/SLHCs also report revenue from school districts (33%) and philanthropic organizations (40%).

Over time, SB/SLHCs have expanded their core services from the provision of primary medical care and immunizations to include chronic disease management for conditions such as asthma, health promotion and risk reduction health education, mental and social health services such as substance abuse prevention education and intervention counseling, and sexual health services including diagnosis and treatment for sexually transmitted infections (STIs). Some SBHCs (60%) receive financial support from the Centers for Disease Control and Prevention (CDC) to provide school-based HIV education, testing, and counseling in communities where the incidence and prevalence of the virus is high.

In addition to improving access to health care and services, SBHCs are producing significant health and educational outcomes that have yet to be documented in SLHCs. SBHC users practiced more health-promoting behaviors than non-users (Hutchinson, Carton, Broussard, Brown, & Chrestman, 2012; McNall, Lichty, & Mavis, 2010). SBHC users more readily discussed their health concerns (Gibson 2013) and were more likely to use the mental health services offered at the SBHC than at a community health center clinic (Gall, Pagano, Desmond, Perrin, & Murphy, 2000; Juszczak, Melinkovich, & Kaplan, 2003; D. W. Kaplan, Calonge, Guernsey, & Hanrahan, 1998; Walker, Kerns, Lyon, Bruns, & Cosgrove, 2010). They were also more likely to use contraceptives (Soleimanpour, Geierstanger, Kaller, McCarter, & Brindis, 2010) and more likely to decrease school absenteeism and tardiness, to improve their grade point average, and to stay in school (Gall, et al., 2000; McCord, Klein, Foy, & Fothergill, 1993). SBHCs have also been found to improve elements of the school climate and learning environment (Strolin-Goltzman, 2010).

And finally, several studies have shown that SBHCs are an effective strategy for averting medical costs, such as reducing: the inappropriate use of emergency departments and the number of hospitalizations (Guo et al., 2005; D. W. Kaplan, et al., 1998; Key, Washington, & Hulsey, 2002; J. Santelli, Kouzis, & Newcomer, 1996; Webber et al., 2003); Medicaid costs (Adams & Johnson, 2000; Wade & Guo, 2010); and opportunity costs of work loss and premature death associated with untreated medical conditions such as asthma (Tai & Bame, 2011).

While there is substantial published literature about the health outcomes and educational contributions associated with utilization of SBHCs, there is a significant void

of information about SLHC users. More research is needed to determine the outcomes of SLHC users and how they may compare to those of SBHC users because of differences in policies and services. This research will make a contribution by examining the sexual-risk behaviors and related clinical outcomes, such as STIs, associated with these two different types of clinics for sexually active adolescents.

Policy, Services, and Adolescent Sexual-Risk Behaviors

Local communities, including the medical community, parents, and school boards or districts, are influential in the decision to establish a health center based in a school (SBHC). Policies that govern financial and human resources (staffing) and the scope of clinical practice also influence what services are offered to the population of potential users. A sponsoring organization that proposes to establish a SBHC will typically consider and propose an array of services based on epidemiologic and surveillance data, including school data that reveal the prevalent health and social issues in the target population of the select school and community. As expected, services available to elementary school (grades K-5) students will differ from those offered to adolescents in middle or high school (grades 6-12).

The process of determining the scope of services to be delivered to adolescents on school grounds can be complex, controversial, and value-laden, particularly when it comes to the sexual health and behavior of adolescents (C. D. Brindis, 2006; Mulye et al., 2009; Rienzo & Button, 1993; Rienzo, Button, & Wald, 2000). The complexity may stem from the provisions dictated in state and local policy, including those that govern funding, of acceptable activities in schools and on school property, or from the value-based preferences of parents and/or sponsoring organizations. Controversy often

emanates from conflicting perspectives and preferences in policy and/or practices which govern the array of services offered to adolescents and the consents required for the provision of some or all of these services. For example, SBHCs serving adolescents should include the provision of contraceptives for sexually active SBHC users as an important element of a comprehensive assessment and primary care visit (Committee on Adolescence, 2007; Henry-Reid et al., 2010; Klein & Committee on Adolescence, 2005). However nationally, half of all SBHCs responding to the 2010-2011 School-Based Health Alliance survey (n=1087) are prohibited from dispensing contraceptives (Lofink, et al., 2013). When asked on the survey what prohibits the dispensing of contraceptives in the SBHC, 76% responded school district policy; 27% state law or regulation; 24% sponsoring organization policy; and 23% state policy (Lofink, et al., 2013; J. S. Santelli et al., 2003). Depending on the exact wording and provisions of the policy, law, or regulation, the SBHC has been rendered impotent in its ability to respond to the need of adolescents at risk for an unintended pregnancy and/or STI(s) (Fothergill & Feijoo, 2000). Hence, policy determines whether or not adolescents are able to receive the full array of services most suited to their behaviors and needs.

The ways in which national, state, or local policy has supported or inhibited the provision of comprehensive sexual health services for sexually active adolescents compels examination for several reasons. First, over the last 30 years adolescents have been exposed to varying policies that have dictated the breadth of comprehensive sex education, such as abstinence-only or abstinence plus safe sex education. Research has found this variability to have far reaching implications (Lord, 2009; J. Santelli et al., 2006; J. S. Santelli & Melnikas, 2010). The trajectory of policies during this time has

stemmed from the advent of HIV and AIDS in the early 1980s. In response to this infectious disease, the U.S. government encouraged and supported comprehensive sex education that advocated both abstinence from sex outside of marriage and safe sex using protection against the transmission of HIV/AIDS, STIs, and consequently, unintended pregnancies (D. Kirby, 2002; Lord, 2009; J. S. Santelli & Melnikas, 2010). With the change in political leadership in the late 1980s came a more conservative doctrine for sex education that eliminated the safe-sex information and that adopted abstinence-only programming. This policy position prevailed and intensified through the 1990s and well into the middle of the first decade of the 21st Century; it included the requirement that states receiving federal funding adopt abstinence-only sex education (Lindberg, Santelli, & Singh, 2006; Lord, 2009; J. Santelli, et al., 2006; J. S. Santelli & Melnikas, 2010). Several studies have documented the consequences of the policy of abstinence-only sex education for adolescents on the prevalence of STIs, including HIV, sexual-risk behaviors, and rates of teen births (C. D. Brindis, 2006; Lindberg, et al., 2006; J. S. Santelli et al., 2004; J. S. Santelli, Orr, Lindberg, & Diaz, 2009; Stanger-Hall & Hall, 2011). Today, there is ample evidence that adolescents continue to engage in behaviors that put them at sexual risk. The data are compelling.

Recent surveillance data by the CDC (2011) indicate that in 2011 rates of chlamydia in 15-19-year-old females and males increased by 3.5% and 6.1%, respectively from 2010 (3,299.5 cases/100,00 females to 3,416.5 cases/100,000 females; 757.0 cases/100,000 males to 803.0 cases/100,00 males). Also in 2011, 15-19-year-old females had the second highest rate of gonorrhea compared to any other sex or age group; males in this age group experienced a 0.4% increase over rates in 2010. While the

overall rates of diagnosis of HIV remained stable from 2006-2009, they increased for this age group.

CDC reported historic improvements in adolescent birth rates from 2007-2011, with a 25% decline in females aged 15-19 years of age. Caution must be exercised when considering the stability of this improvement, however, because 47% of high school students surveyed in 2011 have had sex at least once, and 40% of currently sexually active students reported they did not use a condom the last time they had sex (CDC, 2012b). Moreover, improvements in adolescent births did not extend to all subgroups of adolescents. Births to non-Hispanic African American and Latino adolescents were more than two times greater than the rate for non-Hispanic White adolescents from 2007-2011(B. E. Hamilton, Matthews, & Ventura, 2013).

Condom use is an important indicator of sexual-risk behavior. Overall, the prevalence of condom use for high school students increased during 1991-2003 and then stabilized during 2003-2009. However, disparities in this indicator exist for subgroups of high school students. For example, the prevalence of condom use among African American male high school students increased during the period of 1991-1999 and then decreased during 1999-2009. Among Hispanic male high school students, the prevalence of condom use increased during 1991-2007 and then decreased during 2007-2009 (Eaton et al., 2011; J. S. Santelli, et al., 2009). During this same period of time, the percentage of students who received HIV/STI prevention education in school decreased from 91% in 1997 to 87% in 2009.

Troubling fluctuations in the rates of adolescent STI, HIV, and unintended pregnancies persist in spite of almost three decades of numerous community- and school-

based programs and the investment of significant resources to modify adolescent risk behaviors. Federal, state, and school district policy determines the content and extent of HIV/STI education and services and teen pregnancy prevention programs in schools. Content ranges from comprehensive sex education that includes abstinence and safe sex to the availability of condoms and other contraceptives. Policies influence when adolescents are educated about health and health risks, what content is included in the curriculum, and the resources available to support the healthy behaviors of adolescents (C. D. Brindis, 2006; C. D. Brindis & Ott, 2002; Eaton, et al., 2011; Lindberg & Maddow-Zimet, 2012; Lord, 2009; J. Santelli, et al., 2006; Stanger-Hall & Hall, 2011). In the case of SBHCs and SLHCs, policies dictate the breadth of services available to sexually active adolescents. Thus, policy becomes an important structural determinant in interventions to reduce sexual-risk behaviors in adolescents; however, the role of policy and its potential effect on adolescent sexual-risk behaviors is largely absent from the literature (Pawson, Greenhalgh, Harvey, & Walshe, 2005). I will address this research gap in this dissertation by examining how SBHC and SLHC policies may collide with supporting and sustaining the use of protection (condoms and/or contraceptives) by sexually active adolescent SB/SLHC users. However, policies that may encourage and support the reduction of adolescent sexual-risk behaviors must be contemplated in a framework that is relevant to the multiple dimensions of adolescent development and behaviors (Jessor, 1991). Therefore, this research will consider policy as one of many potential structural determinants of sexual-risk behaviors, particularly the use of condoms and/or contraceptives, within a framework that is specific to adolescent development. To do so, I will also include the biological, psychological, and sociological aspects of

adolescent development and behaviors as essential determining factors for the use of protection. The result will be a conceptual model that guides the research in this dissertation.

Dissertation Outline

There are five chapters in this dissertation beginning with this introductory chapter, "School-Based Health Centers and the Plausible Effect of Policy on Adolescent Sexual-Risk Behavior".

Chapter II, "School-Based Health Centers and Adolescent Sexual-Risk Behaviors: A Review of the Literature to Improve Adolescent Sexual Health " will examine empirical research on adolescent sexual-risk. The primary aim of this review is to determine the multiple constructs associated with adolescent sexual-risk behaviors. Moreover, to examine the constructs within two frameworks: an ecological frame that considers the environmental, social-interpersonal and personal determinants of adolescent sexual-risk behaviors levels inclusive of policy. The second framework for this review will be the biologial, sociological and psychological dimensions of adolescent development and behaviors inclusive of policy. The second aim of this review is to produce a conceptual model that accurately incorporates the multiple dimensions of adolescent devleopment and sexual-risk behaviors. The conceptual model will be used to guide this research and may have utility for SB/SLHCs in developing interventions, including policy, to modify adolescent sexual-risk behaviors.

Chapter III, "School-Based Health Centers (SBHCs) or School-Linked Health Centers (SLHCs): How Clinic Type Affects Sexual-Risk Outcomes for Adolescent Users in Michigan" will first examine the health- and sexual-risk behaviors of adolescent users

of these two different clinic types. Data for this analysis will be from the Rapid Assessment for Adolescent Preventive Services (RAAPS), a computerized self-administered survey of clinic users. The chapter will then look at the clinical outcomes related to sexual-risk behaviors (rates of chlymidia, gonorrhea, and pregnancy) at the two different types of clinics. I will use a data set of clinical outcomes reported by the SBHCs and SLHCs to the State of Michigan, where SLHCs can provide contraceptives, including condoms, to sexually active adolescents while SBHCs cannot due to prohibitive policy.

Chapter IV, "Race and Stress as Moderators of Sexual-Risk Behavior among Adolescent Users of School-Based Health Centers (SBHCs) in Michigan" will also rely on data from RAAPS, and will explore the use of protection (condoms and/or contraceptives) by gender and how adolescent stress and race moderate that association.

Finally, Chapter V, the Conclusion, will synthesize findings from Chapters II, II, and IV, reiterate prevailing themes, specify research implications for public health programming and policy, and offer recommendations for additonal research.

Conclusion

I anticipate that the findings from this research will inform the fields of public health and adolescent health on a model for interventions to reduce the sexual-risk behaviors of adolescents and improve their overall health. Moreover, the importance of institutional and public policy will be illuminated as a determining variable that can support or derail adolescents' practice of protective sexual behaviors. Of particular significance is that recommendations will be based on the current science about adolescent brain development and its influence on sexual- and health-risk behaviors, as

well as the value of SBHCs as a public health strategy for improving and protecting adolescent health.

CHAPTER II

SCHOOL-BASED HEALTH CENTERS AND ADOLESCENT SEXUAL-RISK BEHAVIORS: A REVIEW OF THE LITERATURE AND DEVELOPMENT OF A CONCEPTUAL MODEL TO IMPROVE ADOLESCENT SEXUAL HEALTH

Introduction

Scope of the Problem

Recent reports of historically low national health indicators suggest that adolescents have reduced their sexual-risk -- either by abstaining from sex and/or by using protection against sexually transmitted infections (STIs) and pregnancy (CDC, 2012a; B. E. Hamilton, Martin, & Ventura, 2012; J. S. Santelli & Melnikas, 2010). Nationally, the Centers for Disease Control and Prevention (CDC) reports that the birth rate of 31.3 per 1,000 women aged 15-19 years decreased by 8% from 2010 to 2011, a record low for this age group. Furthermore, birth rates fell by 11% for 15-17-year-old adolescents and by 7% for 18-19-year-old adolescents during the same time period (B. Hamilton & Ventura, 2012). Improvements in adolescent birth rates in the U.S. did not extend to all populations of adolescents however. For example, CDC reported that births to non-Hispanic African American and Hispanic adolescents were more than two times higher than the rate for non-Hispanic White adolescents from 2007-2011 (B. E. Hamilton, et al., 2013). In addition, 77% of births to women ages 15-19 during 2006-2010 were unintended (Mosher, Jones, & Abma, 2012).

Even though adolescent birth rates have improved, evidence of unprotected sex as a sexual-risk behavior persists. The surveillance data on sexually transmitted infections (STIs) such as chlamydia, gonorrhea, and human immunodeficiency virus (HIV) indicates that adolescents continue to engage in sex without the use of protection such as condoms. CDC reported that in 2011 the gonorrhea rate for all 15-19-year-olds was 399.9 cases per 100,000 and 15-19-year-old females had the 2nd highest rate (556.5cases per 100,000) compared with any other age or sex group (CDC, 2012). The chlamydia infection rates for the same group of females increased 4% over the previous year to 3,416.5 cases per 100,000. For 15-19-year-old males, the rate increased 6.1% over the previous year to 803.0 cases per 100,000 (CDC, 2012a). The implications of STIs in adolescents are far reaching and many teens experience repeat infections. Serious health problems, including infertility, genital cancer, and increased susceptibility to HIV infection, can result from untreated and repeat infections in adolescents (Aral, 2001; Hassan & Creatsas, 2000).

The CDC HIV Surveillance report for 2009-2010 indicates significant racial and ethnic disparity in HIV diagnoses among 13-19-year-old adolescents. African American adolescents were only 15% of the total adolescent population, but they comprised 67% of the newly diagnosed cases of HIV for this age group. Additionally, the largest proportion of females diagnosed during this same period were 13-19-years old (CDC, 2011). Racial, ethnic, and gender disparities prevail across these indicators of adolescents' sexual-risk (Eaton, et al., 2011). These data compel a deeper understanding into adolescents' use and non-use of protection against unintended pregnancies, STIs, and HIV as a sexual-risk

behavior. Sexual-risk behavior is defined as having sex without the use of protection such as condoms and/or contraceptives.

Recent indicators from the 2011 Youth Risk Behavior Surveillance System (YRBSS) suggest that adolescent sexual-risk behaviors are substantial and warrant public health concern and inquiry because of the threat posed to adolescent health. YRBSS 2011 reports that almost half of the high school respondents (47%) had sexual intercourse and 15% had had four or more sexual partners during their life. Among the currently sexually active, almost 40% said that neither they nor their partner used a condom; 13% reported they had not used any method to prevent pregnancy during their last sexual intercourse; and only 13% were ever tested for HIV. These rates have remained fairly stable from 2009-2011 (CDC, 2012b). Furthermore, they exist despite 82% of high schools requiring HIV-prevention education and 71% requiring sexuality education for their high school adolescents during the 2011-2012 school year (Demissie et al., 2013). Regardless of the reach and scope of education about sexual health, these rates of unintended pregnancies and STIs provide substantial clinical evidence that adolescent sexual-risk behaviors remain high.

Policy Context

The improvement in adolescent sexual-risk behaviors cited above, specifically the use of condoms and/or contraceptives, occurred with the advent of the HIV/AIDS epidemic in the U.S. Public health policy and practice aggressively sought to stem the growing threat of HIV infection to adolescents (J. S. Santelli & Melnikas, 2010; J. S. Santelli, et al., 2009). Significant investments were made in educating the American people in general and adolescents in particular about the transmission and prevention of

HIV and AIDS (Lord, 2009). Abstinence from sex and safe sex, defined as the consistent use of condoms, were strategies encouraged by public health officials during the late 1980s and 1990s through school-based HIV/AIDS prevention education programs (Lord, 2009). Changes in adolescent sexual-risk behaviors, such as increases in abstinence and the use of condoms have been well documented as contributors to the improvements in the rates of teen pregnancies, teen births and HIV infection from 1995-2007 (J. S. Santelli, et al., 2004; J. S. Santelli & Melnikas, 2010). This experience suggests that national policy and programmatic interventions can work synergistically to significantly influence and support sexual behavior changes in adolescents (J. S. Santelli & Melnikas, 2010). Comprehensive, evidence-based interventions, including policy, that serve to stimulate, support, and sustain changes in adolescent sexual-risk behaviors are essential structures in adolescents' environments.

However, absent from the literature is the state- or community-level experience of this synergistic interplay to change the sexual-risk behaviors of adolescents. Policy and programming may be viewed as the structural environmental elements that may or may not support the provision of information and services related to sexual health and the use of protection. Of particular significance are those policies and programmatic interventions that are operationalized in schools where adolescents spend the majority of their day. SB/SLHCs represent the convergence of policy and programming in local communities and are an environmental social structure that can influence and support adolescents to reduce their health- and sexual-risk behaviors (Ethier et al., 2011; Hutchinson, et al., 2012; D. Kirby & Coyle, 1997; McNall, et al., 2010; Ricketts & Guernsey, 2006; Soleimanpour, et al., 2010). SBHCs hold particular promise because

they are easily accessible by sexually active adolescents on a daily basis for several hours a day. SLHCs are significant for their focus on meeting the myriad needs of sexually active adolescents, perhaps beyond that of SBHCs because of local policy (Fothergill & Ballard, 1998; Peak & Hauser McKinney, 1996). The effect of policy is an important variable that is frequently absent from the literature on the use of protection by sexually active adolescents.

Purpose of the Literature Review

Disentangling the complex web of factors that influence adolescent sexual-risk behaviors is essential to the development of effective interventions including policies and programs. This literature review will examine the empirical research on the multiple predictors and factors that contribute to adolescent sexual-risk behaviors. The results will define the constructs and levels for a conceptual model that incorporates comprehensively the following components that I posit are critical for changing the sexual-risk behaviors of adolescents: 1) the environmental context including policy; 2) interpersonal social interactions; and 3) individual adolescent biological, psychological, and sociological development. The three components are often considered in an ecological framework for understanding health behavior. Ecological models of health behavior incorporate the environment and policy contexts for health behavior, as well as psychological and sociological influences on behavior (Sallis, Owen, & Fisher, 2008). Furthermore, they integrate the multiple levels of influential factors and recognize interactions across levels. However, I suggest that the critical dimensions of adolescent development, e.g., adolescent brain development, are largely absent from ecological models. Further, adolescent development and behaviors occur simultaneously; therefore,

adolescence is inherently dynamic and potentially stressful. It is conceivable that the interactions across the levels of influence in an ecological model, coupled with adolescents' biological, psychological and sociological development, may require an ecological model that is unique to adolescents.

This review aims to synthesize a conceptual model that reflects the overarching experience of sexually active adolescents, who are essentially evolving in their development, their sexual-risk behaviors, and the potential collision of their development and behaviors with policy. The conceptual model will then guide the subsequent research in this dissertation on SBHCs and SLHCs and the sexual risk behaviors of adolescent users (Chapter III). It will also guide research on gender differences in SBHC users and the use of protection and how the use of protection is modified by race/ethnicity and adolescent stress (Chapter IV). Finally, the model is intended to inform future interventions to reduce sexual-risk behaviors and to increase the use of protection by sexually active adolescents.

Specific Aims

The specific sexual-risk behaviors for this review are limited to the use of condoms and/or contraceptives as protection against STIs, HIV, and unintended pregnancies by high school adolescents. The primary aim is to determine the multiple constructs associated with adolescent sexual-risk behaviors. From this comprehensive review, I will construct a conceptual model that accurately describes the multiple influences of adolescent experience and development, adolescent sexual-risk behaviors, and the impact of policy and programs on adolescent behavior.

Guiding Questions

1. What are the constructs at each ecological level that influence or predict adolescent sexual-risk behavior?
2. How do the constructs and levels interact with each other and affect adolescents' sexual-risk behaviors?
3. Do the policies governing SBHCs and SLHCs support or undermine sexually active adolescents to use protection?

Methods

Literature search methods were employed to identify as many relevant articles as possible. Databases in the social and health sciences, such as MEDLINE, ERIC, and PsycINFO, were searched for articles published from 1990-2014. This time frame was selected for several reasons: 1) to coincide with national policy and programmatic efforts to increase abstinence or safe sex (condom use) by sexually active adolescents to prevent the transmission of HIV; 2) to accommodate the timeline for publishing evaluations on various interventions; and 3) to coincide with the emerging research on adolescent brain development and behavior (Steinberg, 2007; Weinberger, Elveag, & Giedd, 2005).

The following search terms were used to broadly draw on the findings of empirical research: school-based adolescent health programs, school-linked adolescent health programs, school-based adolescent pregnancy prevention, adolescent STI/HIV prevention programs, adolescent sexual behavior, adolescent sexual-risk behavior, adolescent pregnancy prevention, adolescent STI/HIV prevention, adolescent contraceptive use, and adolescent condom use; adolescent brain development, adolescent

risk-taking, adolescent sexual-risk behaviors, adolescent stress/stressors; adolescent racial identity. Articles were included if they met the following criteria:

- U.S.-based and English language to assure consistency with the political sentiments and policy orientation of the U.S.;
- Published in peer-reviewed journals between 1990 and 2014;
- Targeted adolescents between 13 and 19 years of age; and
- Intended to modify adolescent sexual-risk behaviors as a measured outcome for males and/or females.

Results

Predictors and Determinants of Adolescent Sexual-Risk Behaviors

Understanding the predictors of adolescent sexual-risk behavior, and more specifically the use of protection by sexually active adolescents, is important to determine the most appropriate interventions to stimulate, support, and sustain behavior change. There has been substantial empirical research on adolescent sexual-risk behaviors and the use of condoms and/or contraceptives that suggest numerous predictors and correlates; I will call them constructs. These constructs can be grouped into major components and levels of influence on adolescents' sexual behavior. While these components and levels are presented in the literature as though they are independent of each other, I posit that they should be contemplated as interrelated and interactive with each other. This would more accurately reflect the complexities of adolescent development and behaviors, including sexual-risk behaviors such as the use of protection (Sales & Irwin Jr, 2009). The levels and components are Macro-Level Environmental Factors, Proximal-Level Interpersonal Social Factors, and Proximal-Level Adolescent Developmental Factors

(Schulz & Northridge, 2004). I will discuss each level and its components in relation to its influence on adolescent sexual-risk behaviors in the next section of this chapter. Each level and component will ultimately contribute to the conceptual model that will guide the empirical research, presented in Chapters III and IV of this dissertation.

Macro Level - Environmental Factors

Policies.

Adolescents function and interact within a community or neighborhood that may support or contribute to their sexual-risk behaviors (Ruel, 2012). CDC, for example, posits that the higher prevalence of STIs in adolescents may be related to structural barriers to sexually transmitted disease prevention services, such as the lack of insurance or ability to pay, discomfort with adult-oriented facilities and services, and concerns about confidentiality (CDC, 2012a). SBHCs and SLHCs were developed in response to these barriers. They have distinguished themselves from other health care providers that also serve adults to exclusively serve and meet the unique needs of adolescents.

Adolescents are subjected to two sets of policies when seeking physical health care, i.e., sexual health services and mental/behavioral health care including substance abuse services. Policies governing the location for service provision, i.e. school property. Additionally, there are Minor Consent Laws and policies that govern the myriad services provided in the SBHC or SLHC (Guttmacher, 2014). Both sets of policies will vary based on the specific state and/or local school district. The empirical research in Chapters III and IV of this dissertation is specific to the State of Michigan; therefore, I will use Michigan's policies to illustrate the policy environment for adolescents seeking sexual health care and services.

When an adolescent has determined that he/she is in need of health or sexual health care or services, questions arise about the location and cost of care and services, as well as any required authorization(s) needed to pursue and receive such care or services. Minor Consent Laws govern the extent to which minor adolescents themselves govern their right to consent to receipt of sexual health services without the additional consent or knowledge of parents (Guttmacher, 2014). These provisions are particularly significant for the types of services that are sensitive to confidentiality, including parental knowledge, such as sexual health care and services (Jones, Purcell, Singh, & Finer, 2005; Reddy, Fleming, & Swain, 2002) and can either facilitate or impede the ability of a sexually active adolescent to receive condoms and contraceptives.

In Michigan, a minor is defined as a person 17-years of age or younger. Minor Consent Laws in Michigan state that a minor may consent for medical care to diagnose and treat STIs and HIV. Michigan Law is silent on minor consent for health care regarding birth control (condoms and contraceptives); instead, it defers to the federal constitutional "right of privacy" which limits state restrictions on the sale and distribution of contraceptives and stipulates that parents have no constitutional right to be notified that their child is seeking or has obtained contraceptives (Chrysler, 2013). The Minor Consent Laws in Michigan thus support adolescents' rights to obtain and consent to the sexual health care and services required to prevent contraction of STIs, HIV and unintended pregnancies. There are no restrictions in Michigan on adolescents' access to condoms and other contraceptives, except when seeking those services at a SBHC.

Nonetheless, SBHCs are forbidden from providing condoms and contraceptives in Michigan. Unlike the community-based SLHCs, SBHCs operate under the laws and

policies of the state that govern schools and school aid because they are, by definition, located in the school building or on school property. The Michigan State School Aid Act of 1979 (Excerpt) Act 94 of 1979 (Amended 1996) prohibits SBHCs from dispensing, prescribing or distributing contraceptives on school property. SBHCs are limited to providing the physical examination relative to sexual health. Staff can also educate, counsel, and provide a referral to a health center or provider located off school property for condoms and contraceptives. Adolescents are then required, if motivated and resourceful, to navigate the provisions of the referral, i.e., to make the appointment, access a different health center, and engage a new provider. In contrast, SLHCs are able to assess the sexual health needs of presenting adolescents and to respond to those needs with arrangements for the appropriate care and services before the user leaves the SLHC.

Arguably, with Michigan's policy environment, one can hypothesize that sexually active users of SLHCs are more likely to use protection such as condoms and/or contraceptives because they receive those services and supportive guidance at the SLHC immediately. Conversely, it is also reasonable to hypothesize that SBHC users, who have to go to another health center at another time to receive the services and guidance they need might experience different sexual risk behavior. Put another way, users of SLHCs may have potentially different clinical outcomes, i.e., tests for STIs and pregnancies would be better than the clinical outcomes of SBHC users, because SLHC users are more likely to use protection when they receive those services immediately. There doesn't appear to be any evidence in the research literature that these hypotheses have been tested. The research in this dissertation is intended to fill this gap. Moreover, the

investigation will be conducted within the biological, psychological, and sociological dynamics of adolescent development.

Neighborhood and community.

Neighborhood and community environments have implications as macro-level environmental factors that are associated with sexual-risk behaviors among adolescents (R. J. DiClemente, Salazar, & Crosby, 2007). As mentioned earlier, neighborhood factors, particularly those associated with poverty and neighborhood disadvantage, have been associated with lower and inconsistent use of condoms (Bauermeister, Zimmerman, & Caldwell, 2011; R. J. DiClemente, et al., 2007). Living in poverty or in a low socioeconomic status neighborhood have been associated with sexual risk behaviors, including decreased use of protection and increased number of sexual partners (Aral, 2001; Chia-Chen Chen & Thompson, 2007; R. Crosby, Holtgrave, DiClemente, Wingood, & Gayle, 2003; Cubbin, Brindis, Jain, Santelli, & Braveman, 2010; Sionean et al., 2001). These macro-level environmental factors may be considered risk-markers for behaviors that compromise adolescents' sexual health (R W. Blum et al., 2000; Goodman, McEwen, Dolan, Schafer-Kalkhoff, & Adler, 2005).

Adolescents have limited control over the conditions of the neighborhoods in which they live and rely on the adults and broader society to provide safe and healthy environments and social systems. Extant research has demonstrated that collectively, and in some cases independently, such as in racial discrimination, (Brody et al., 2014; R. Clark, Anderson, Clark, & Williams, 1999), these environmental factors manifest as adolescent stressors (Brenner, Zimmerman, Bauermeister, & Caldwell, 2012; Goodman, et al., 2005; Stevens-Watkins, Brown-Wright, & Tyler, 2011) or psychological distress

(R. J. DiClemente et al., 2001; Estrada-Martinez, Caldwell, Bauermeister, & Zimmerman, 2012). Studies have found that adolescents' experience of stress and psychological distress are associated with health- and sexual-risk behaviors (Bolland, 2003; Elkington, Bauermeister, & Zimmerman, 2010; Johnson, Dariotis, & Wang, 2012; Lehrer, Shrier, Gortmaker, & Buka, 2006). Therefore, the combination of environmental factors may indeed result in adolescent stressors that influence their use of protection against STIs, HIV and unintended pregnancies.

Although as mentioned, studies have established that neighborhood and community environments are associated with adolescent stress and sexual-risk behaviors, I could not identify any literature that investigated whether schools, as neighborhood institutions, may be protective of adolescents' sexual health. Furthermore, while SLHCs are community-based, and therefore may be more sensitized to the effect of neighborhood environments and stress on the sexual-risk behaviors of their adolescent users, SBHCs may not be similarly sensitized. SBHC policies that prohibit access to condoms and/or contraceptives may indeed contribute to adolescent stress and indirectly, to sexual-risk behaviors. These gaps warrant further research. The effects of adolescent stressors will be examined on the use of protection among SBHC users in this research. The particular experience of SBHC users will begin to fill a gap in the literature.

Proximal Level - Interpersonal Social Factors

Family peers and schools are significant influencers of adolescents' sexual-risk behavior; each exacts its influence in different ways, shaping the social norms, beliefs, and expectations for adolescent behaviors including sexual-risk behaviors.

Family.

Family has been identified in numerous studies as a significant predictor of adolescents' sexual behavior. There are several pathways through which this variable operates. Adolescents report their mothers as the primary resource for health issues and health care information (Ackard & Neumark-Sztainer, 2001). Parental pride is associated with adolescents' commitment to sexual abstinence (Rosenbaum, 2009; Villarruel, Jemmott, Jemmott, & Ronis, 2004). Parental involvement in the female adolescent's education, for example, may include managing the home environment to support and promote her educational success, and has been found to significantly predict the adolescent's use and type of contraception (Frisco, 2005). Higher parental education is also positively associated with increased contraceptive use among female adolescents (Manlove, Ikramullah, Mincieli, Holcombe, & Danish, 2009). Positive parental attitudes about sexual behavior, greater family support, parental monitoring, and communication were additional pathways that predicted less sexual-risk behavior among adolescents (Chia-Chen Chen & Thompson, 2007; R. J. DiClemente, et al., 2007; Shneyderman & Schwartz, 2013).

Family can also be a source of stress for adolescents. For example Latino and African American adolescents have reported that family is a source of stress for them more frequently than White adolescents (Anda et al., 2000; Chandra & Batada, 2006).

Peers.

As adolescent development progresses, the degree of influence shifts from family to peers and school (Holmbeck & Shapera, 1999; Sales & Irwin Jr, 2009; Williams, Holmbeck, & Greenley, 2002) and may manifest as adolescent stressors. Adolescents'

interpersonal and social relationships with peers are arguably the most significant predictor of sexual behaviors, including associated sexual-risks. Research has substantiated that these relationships influence the initiation of sexual intercourse (L. Hacker, Shih, & Shrier, 2005; D. L. Kaplan, Jones, Olson, & Yunzal-Butler, 2013; D. Kirby, 2002; Nahom et al., 2001; Nkansah-Amankra, Diedhiou, Agbanu, Harrod, & Dhawan, 2011; Ozer, Dolcini, & Harper, 2003), the use of protection (Boyer et al., 2000; Brown, Diclemente, & Park, 1992; Buhi & Goodson, 2007; R. J. DiClemente, et al., 2007; R. J. P. DiClemente et al., 2008; D. Kirby, 2002), and perceptions about the quality of interpersonal sexual relationships (R. J. DiClemente et al., 2002; L. E. Widdice, Cornell, Liang, & Halpern-Felsher, 2006).

Perceived peer norms about sexual behavior and the use of protection are strong predictors of sexual-risk behaviors (R. J. DiClemente, et al., 2007; R. J. P. DiClemente, et al., 2008; Francis & Thorpe, 2010; Nahom, et al., 2001). These predictors extend to the type of sexual behavior as well; for example, adolescents are significantly more likely to engage in oral sex when their best friend does as well (Prinstein, Meade, & Cohen, 2003). Social support from friends is also associated with sexual-risk behaviors (R. J. P. DiClemente, et al., 2008). Essentially, where peer norms are supportive of sexual health behaviors, there will be fewer sexual-risk behaviors (R. J. DiClemente, et al., 2007).

Schools.

Schools are another proximal-level determinant in adolescents' sexual risk-behaviors. Schools are largely the context for peer interactions, peer norms (Coley, Lombardi, Lynch, Mahalik, & Sims, 2013), and other adult relationships. Schools are where adolescents spend the majority of their day for several years and where the

maximum exposure to non-parent influential adults occurs (Vesely et al., 2004). It is also the environment with the greatest concentration of peers, and therefore, can be influential and supportive of adolescent sexual health as a social norm (Basen-Engquist et al., 2001; D Kirby, 2002) or predictive of sexual-risk behaviors (Atkins, Bluebond-Langner, Read, Pittsley, & Hart, 2010; D Kirby, 2002). In a number of published program reviews of school-based health programs, including SBHCs, the findings indicated that greater school involvement and connectedness are associated with fewer sexual-risk behaviors (R. J. DiClemente, et al., 2007; D Kirby, 2002; D. Kirby et al., 2004).

School connectedness, characterized by getting along with teachers and students, feeling safe at school, and feeling a part of school, predicts contraceptive use. Francis and Thorpe (2010) found that adolescents who reported low school connectedness were more likely to use contraception the first time they had sex. However, greater school connectedness and academic achievement also have been associated with less sexual-risk behavior at last sex (R. W. Blum, McNeely, & Nonnemaker, 2002; Bradley & Greene, 2013; R. J. DiClemente, et al., 2007; Francis & Thorpe, 2010; Resnick, Bearman, Blum, & et al., 1997; Shneyderman & Schwartz, 2013).

Schools may also be experienced as a stressor for adolescents. Indeed, academic and behavioral expectations and disciplinary procedures can be substantial sources of adolescent stress (Anda, et al., 2000). Additionally, where schools are under-resourced by virtue of being in a disadvantaged community or neighborhood, there is a higher prevalence of adolescent pregnancies (Atkins, Sulik, Hart, Ayres, & Read, 2012; R. J. DiClemente, et al., 2007).

The evidence on schools as an influential social and environmental construct for adolescent sexual-risk behaviors is noteworthy (Atkins, et al., 2012), including its relevance to social capital (Crosby, et al., 2003). These findings support the rationale for SBHCs as a strategy for reducing sexual-risk behaviors because these clinics are located in schools. SBHCs have the potential to influence social norms for increased use of condoms and contraceptives school-wide, more so than SLHCs. However, this concept has only minimal evidence in the literature. In a randomized controlled study of 20 urban high schools, a school-wide, multi-year program found significant reductions in adolescent sexual-risk behaviors when compared to the control group that received a standard program (Basen-Engquist, et al., 2001; D. Kirby, et al., 2004).

In summary, research substantiates that family, peers, and schools influence the sexual behaviors of adolescents. The direction of that influence can promote and support sexual health, and therefore, can be protective. Conversely, the confluence of family, peers, and school may generate adolescent stress that is associated with the non-use of protection such as condoms and/or contraceptives. This research will contribute to the literature by exploring the relationship between adolescent stress and the use of protection among SBHC users. By studying the experience of SBHC users, the school environment and peers will be incorporated into the analysis.

Equally important will be the analysis on SLHC users and the use of protection. SLHCs may lack the potential to influence the sexual-risk behavior of the broader school-wide population because they are community-based. However, SLHCs may have better outcomes for the use of protection than SBHCs because they are able to provide condoms and/or contraceptives in addition to support and guidance in the use of protection

immediately for sexually active adolescents. The empirical research literature has yet to explore the clinical and behavioral outcomes of SLHC users. This research will contribute substantially to this void.

Proximal Level - Primary Developmental Factors of Adolescents

Adolescent risk-taking and brain development.

Adolescence is a dynamic period of biological, psychological, and sociological changes that can at times be turbulent for adolescents and their family, peers, and community. Adolescent risk-taking behavior is a normative developmental element of adolescence that is exploratory in nature and can support confidence building, "enhance competences and provide reinforcement for taking initiatives" (Blum, et al., 2002; Igra & Irwin Jr, 1996; Williams, et al., 2002). Non-normative risk behaviors, such as sexual-risk behaviors, are concerning due to their timing, extent, and consequences over time (Igra & Irwin Jr, 1996).

For decades, social scientists and researchers have codified the biological, psychological, and sociological domains of adolescent development (Igra & Irwin Jr, 1996; Sales & Irwin Jr, 2009). More recently, with the advent of neurological imaging technology, neuroscientists have illuminated the complexities associated with the adolescent brain. We now know that concurrent with the biological changes associated with puberty, the adolescent brain continues to evolve in its maturation and sophistication, both structurally and functionally, and differs drastically from that of a either a child or an adult (Casey, Getz, & Galvan, 2008; Steinberg, 2010a; Weinberger, et al., 2005). This updated scientific understanding of the adolescent brain infuses new insight of both adolescence and adolescent risk-taking behaviors.

The still-developing areas of the adolescent brain are primarily responsible for sensation-seeking and impulse control, or self-regulation. Certain biological changes that occur during puberty lead to an increase in reward- and sensation- seeking that is amplified in the presence of peers (Gardner & Steinberg, 2005; Steinberg, 2008, 2010b). This neurobiological activity manifests as risk-taking behaviors that increase from childhood to adolescence and then declines in early adulthood (Steinberg, 2007, 2008). Furthermore, the reward and sensation-seeking drive is not dependent on adolescents' perceptions or knowledge about risk or vulnerability. Indeed, adolescents will take risks, especially in the presence of their peers, even though the consequences are well understood (Gardner & Steinberg, 2005; Steinberg, 2007).

A second critical aspect of adolescent brain science is the evolving development of the ability to self-regulate and control impulses. The structure and function associated with this brain activity continues to develop through adolescence (Steinberg, 2007, 2010a). The resulting outcome is a dynamic interplay between stimulated states of sensation- or reward-seeking risky behavior without the benefit of mature impulse control mechanisms.

The behavioral implications of adolescent brain neuroscience are fundamental to this dissertation on adolescent sexual-risk behaviors. The immaturity, not deficiency, of the adolescent brain contributes to a tension between the sensation and reward-seeking areas of the brain, especially in the presence of peers, and the impulse-cognitive control system of the brain that is responsible for self-regulation (Casey, et al., 2008; Steinberg, 2008, 2010a; Weinberger, et al., 2005). Research during the last decade has shown that adolescents perceive risk and estimate vulnerability as well as do adults. The distinction

is in how the adolescent brain reacts to an opportunity for a risky behavior and how this response is influenced by the biological, sociological, and psychological interactions associated with adolescent development (Steinberg, 2008; Weinberger, et al., 2005). This insight to adolescent brain science may explain in part why adolescent health- and sexual-risk behaviors persist in light of multiple years of exposure to school-based health and sex education.

In addition, as the adolescent brain struggles to reconcile sensation-seeking behaviors with impulse control and other biological developments, adolescents are negotiating family, peer, school, and community expectations and opportunities (Casey, et al., 2008; Johnson, et al., 2012; Steinberg, 2008, 2010a; Williams, et al., 2002). This complex combination often proves to be a stimulating and stress-filled period for adolescents that may result in maladaptive behaviors, such as being sexually active without the use of condoms or contraceptives to protect against STIs and unintended pregnancies (L. Blum, , & Blum, 2009; Jessor, 1991).

Adolescent brain science and the behavioral realities of the immature adolescent brain may shed light on the types of strategies that are necessary to change adolescent sexual-risk behaviors and sustain those changes over time. Adolescent brain science may also suggest that interventions to change sexual-risk behaviors might be more effective if they occur in the presence of adolescents' peers. Thus, an updated conceptual framework might be considered, one that integrates this knowledge about adolescent brain development with objectives to modify the social norms within the school environment.

The implications of adolescent brain science in determining appropriate policies that are conducive to altering adolescent behaviors, including health- and sexual-risk

behavior, are not without controversy. The fact that the adolescent brain differs structurally and functionally from that of a child or adult is indisputable (Steinberg, 2009). However, this developmental neuroscience also suggests that the adolescent brain is more proficient at select tasks and behaviors than others, and that this variability is based on the timing of puberty as opposed to chronological age. For example, adolescents may be neurobiologically immature to face the death penalty, but mature enough to make autonomous abortion decisions; each situation requires different mechanisms from the adolescent (Steinberg, 2009). The adolescent's competence is task specific and not generalized across all behaviors. Furthermore, some of the structural and functional changes of the adolescent brain are sensitive to contextual and environmental influences, making brain maturation somewhat variable (Evans, 2004; Evans & English, 2002; Steinberg, 2009).

The research and literature on adolescent brain science as a result of the advances in modern technology is relatively new. As such, it is an evolving science that could have great potential in shaping future interventions to reduce the sexual-risk behaviors among adolescents. There is evidence that the research is acknowledging the environment within which adolescent brain development occurs (Evans & English, 2002; Steinberg, 2009). However, variations in development and behavior associated with adolescents' race, ethnicity, or gender are not evident in the current research. These are significant constructs that should be incorporated in the future research on adolescent brain development.

SBHCs offer an environment where adolescents can seek information, guidance, and services that are sensitive to adolescents' developmental trajectory, adolescent risk-

taking, and sexual-risk behaviors. Additionally, by virtue of being located in the school building, SBHCs have great potential for affecting school-wide behavioral changes relative to health- and sexual-risk behaviors. This may be, however, where policy collides with the current science on adolescent development and behavior. Sexually active adolescents may be more compliant with using condoms and contraceptives when these are directly provided by SBHCs. This research will test this hypothesis for SBHCs and SLHCs.

This research will also explore additional individual predictors of adolescent sexual-risk behaviors; each predictor, however, should be contemplated as malleable in the dynamic environment of the developing adolescent brain.

Age.

Age is a significant variable when considering sexual-risk behaviors of adolescents. First, it is important to understand that adolescence extends over a 10-year period, from about 11 years of age and with the onset of puberty, until approximately 19-20 years of age, when sexual and physical maturity has been completed. Consequently, this period of the life course consists of three stages: early adolescence, age 11-13; middle adolescence, age 14-17; and late adolescence, 18-20 years of age (http://medical-dictionary.thefreedictionary.com/adolescence). These stages enable a more accurate understanding of adolescent capacities, development, and behaviors, both in research and in practice. For example, in a nationally representative sample of adolescents to examine the co-occurrence of health-risk behaviors, younger (early) adolescents (age 12-13) were less likely to engage in multiple health-risk behaviors than older (middle) adolescents (age 14-17) (Brener & Collins, 1998). There is similar variability in the type of sexual-

risk behaviors as well (B. Stanton et al., 1993). Numerous studies conclude that comprehensive sexual education (abstinence plus safe sex education) is most effective at delaying the initiation of sexual activity and promoting use of contraception when taught in middle school and during or before early adolescence (before age 14) (D. L. Kaplan, et al., 2013; Mueller, Gavin, & Kulkarni, 2008). Studies have also found that as adolescents advance in grade level or age, they are more likely to have had sex and to inconsistently use condoms (Bauermeister, et al., 2011; Nahom, et al., 2001), while early adolescent females (aged 13-14) had more sexual partners, resulting in greater sexual-risk (D. L. Kaplan, et al., 2013; Mahalik et al., 2013). In sum, the type and extent of sexual-risk behavior varies through different stages of adolescence, which suggests that *stage* of adolescence be contemplated when developing programming and policies aimed at reducing sexual-risk behaviors.

The pace of adolescents' biological, psychological, and sociological development also varies as does adolescent brain development. Research indicates that the sensation- and reward-seeking behaviors are correlated with puberty, rather than with chronological age (Steinberg, 2008). The literature on age as a predictor for adolescent sexual-risk behaviors does not account for pubertal maturation and overall variability in adolescents' developmental trajectory. Age will be a control variable in this research; however, the findings may be limited in the absence of variables that better reflect pubertal maturity.

Gender.

Gender is a multi-dimensional social construct that is shaped by one's self-identity, culture and social experiences. Moreover, the gendered experience is influenced by society's predispositions about the biological differences between females and males

and the values and behaviors associated or ascribed to those differences. A thorough examination of the social, environmental and political complexities associated with gender is beyond the scope of this dissertation. However, gender is another significant variable predictive of adolescent sexual-risk behaviors, with males and females differing in multiple aspects of sexual behaviors in general and sexual-risk behaviors in particular.

Nahom and colleagues (2001) found gender differences in intentions to engage in sexual activity. Sexually experienced girls were significantly less likely to intend to have sex in the next year than males and felt significantly more pressure to engage in sexual activity than males (Nahom, et al., 2001). When compared to females, males were found to initiate sex at a younger age, report unprotected sex with multiple partners, and drink alcohol before sexual intercourse (Nkansah-Amankra, et al., 2011).

In a study about the potential risks and benefits of having sex and using a condom, responses of 9th-grade sexually inexperienced adolescents varied by gender (L. E. Widdice, et al., 2006). Female adolescents were concerned about risks to the relationship, their social status, and sexually transmitted diseases, whereas male adolescents were concerned about getting caught. Females were more likely to report improving the relationship as a benefit of having sex, while males were more likely to report fun, pleasure, and increased social status as benefits. Another gender-specific longitudinal study of adolescent health- and sexual-risk behaviors over time found that early adolescent females were more likely than males to have a greater number of lifetime sexual partners (increased sexual-risk) even though male adolescents reported more health-risk behaviors (Mahalik, et al., 2013).

In a study that concluded with recommendations for gender-specific programming, more female adolescents than males reported non-use of condoms during sex; however, the prevalence of other sexual risks (multiple sex partners, injection drug use, and sex under the influence of alcohol) was more common in males (Niyonsenga & Hlaing, 2007). Another study also found rates of condom use were greater for male adolescents than female (Fortenberry et al., 2010).

Additional gender-specific differences have been found in adolescents across a number of variables. Sexual health knowledge in poor schools was greater for adolescent females than males (Atkins, et al., 2012). Adolescent females were more likely than males to discuss birth control, although there were no gender differences in the overall likelihood of talking about sexual health (Merzel et al., 2004).

Motivations for having sex also show gender-specific differences. Female adolescents reportedly engaged in sex because they love their boyfriend, sex feels good, or it satisfied their sexual desires; male adolescents reported the same reasons as their female counterparts, but also reported that having sex would strengthen the couple's relationship, make them feel more accepted/loved, would make them more popular, and because friends are having sex (L. Hacker, et al., 2005; Nahom, et al., 2001; Ozer, et al., 2003). Those findings among male adolescents provides a plausible explanation for why adolescent males initiate sexual activity at an earlier age than females (Nahom, et al., 2001).

The existing research suggests that programming and interventions to avert adolescent sexual-risk behaviors may need to be gender-based. For example, programming may consider the specific differences between females and males for

initiating sexual activity and for the use or non-use of protection against STIs/HIV and unintended pregnancy. However, the available research on gender differences does not appear to incorporate either the effects of differences in adolescent development or the effects of environmental influences. Furthermore, there appears to be a gap in the literature with regard to gender differences and the interaction of gender and adolescent stressors in influencing potential sexual-risk behaviors.

In this dissertation, I will explore gender as a control variable in the analysis on clinic type (SBHCs versus SLHCs), the use of protection against STIs/HIV and unintended pregnancy, and clinical outcomes such as STIs. Gender will also be explored as a predictor variable in the use of protection and in the interaction with race and adolescent stressors in SBHC users. Thus, I will contribute to the literature on two variations of gender differences in the use of protection by SBHC and SLHC users.

Race and ethnicity.

Racial and ethnic disparities prevail in adolescent sexual-risk behaviors and their subsequent consequences. Of significance when contemplating race and ethnicity is that these demographic factors are descriptive and not predictive or causal (R W. Blum, et al., 2000). An area of strategic investigation is to determine which sexual behaviors constitute sexual-risk for different groups of adolescents. Among a racially and ethnically diverse group of sexually experienced urban adolescents, African American and Hispanic students were significantly more likely to report *early sex* (<14 years) than White and Asian-Pacific Islanders, and consequently significantly more likely to engage in other high-risk sexual behaviors such as dating violence and forced sex (D. L. Kaplan, et al., 2013). The relatively young age of this group of adolescents should not be

conflated with their *inability to accurately predict or perceive their risks* associated with sexual behaviors. Stanton and colleagues found that when intentions to have sex were measured longitudinally among African American sexually inexperienced and experienced young adolescents (9-15 years), their intentions and behaviors were stable (B. F. Stanton et al., 1996). This finding held true for the perceptions of their peers' sexual behaviors as well. Thus, *intention* may be an important predictor of potentially risky sexual behaviors in this population of adolescents. However, B. Stanton et al. (1993) found that a cluster of problem behaviors for early adolescents is not necessarily predictive. In that study of two groups of African Americans, the initiation of sexual intercourse occurred during early adolescence (<15 years), which is considered a predictor of sexual-risk; median = 12 years (range 10-14) and 11 years, respectively. For this very same group, however, other risk behaviors, such as truancy or illicit drug use that would be considered indicative of problem behaviors, were very low.

A study that aimed to determine the *sexual behaviors relative to sexually transmitted infections* among African American, Hispanic, and White female adolescents found that the specific sexual behaviors varied within the moderate-risk class for each group. For African American females, the moderate-risk class was characterized by low rates of oral and anal sex and higher rates of condom use. For Hispanics, the same class was characterized by monogamy, higher rates of single-partner sexual activity, and low rates of condom use. The moderate-risk class for females had higher rates of vaginal, oral, and anal sex; early sexual debut, and fewer risky partners (Pflieger, Cook, Niccolai, & Connell, 2013). This type of analysis is useful in targeting programmatic interventions and messages that might be most effective for the population.

Race and ethnicity are often used as a proxy measure for socioeconomic status (SES) because traditional public health surveillance does not explicitly capture details specific to SES (J. S. Santelli, Lowry, Brener, & Robin, 2000). Caution is advised, however, in the use of race and ethnicity as a consistent reliable proxy that predicts behavioral differences. When considering the sexual-risk behaviors for sexually transmitted diseases, *race and SES* did not account for significant differences between White and African American female high school adolescents (J. S. Santelli, et al., 2000; Sionean & Zimmerman, 1999). In fact, perceived peer norms, condom self-efficacy, and condom negotiation were associated with condom use regardless of race and SES (Sionean & Zimmerman, 1999). In another study of STDs, however, the rates of gonorrhea were associated with low SES among African American adolescent females regardless of the level of sexual-risk behaviors (Sionean, et al., 2001). These findings substantiate the necessity for caution. SES may be a marker for the environmental context and race/ethnicity a marker for culture, discrimination, or SES. For example, in a study designed to look at pregnancy risk among sexually active African American, Hispanic, and White female adolescents, much of the *difference in pregnancy risk* was attributable to higher rates of sexual activity in African Americans and to poorer contraceptive use in Hispanic females when compared to their White peers; contraceptive use varied by school neighborhoods independent of race/ethnicity. The findings suggest that neighborhood disparity in adolescent pregnancy rates is not a result of neighborhood demographics (Waddell, Orr, Sackoff, & Santelli, 2010).

Indeed, a nationally representative sample of racially and ethnically diverse adolescents (7^{th}-12^{th} grade) was studied to determine the unique and combined

contributions of race and ethnicity, income, and family structure to health-behavior risks including sexual intercourse. The findings suggest that, collectively, those *socio-demographic variables* offered very little (7-10% of variance) explanation of adolescent risk behaviors (R W. Blum, et al., 2000).

Race and ethnicity have been well studied with regard to disparities in adolescent sexual behaviors and sexual-risk behaviors. It has been suggested that race is a risk marker as opposed to a risk factor for adolescent sexual-risk behaviors (Goodman, et al., 2005). Less evident is the adolescent experience of racial discrimination and sexual-risk behaviors, given that race is actually a social construct as opposed to a biological one (R. Clark, et al., 1999; Rivas-Drake et al., 2014).

Race/ethnicity as a social and psychological experience.

As adolescents evolve biologically, psychologically, and sociologically, they are developing a sense of self and how they will self-identify within their respective family, social, and community environments. Sexual orientation is one such developmental exploration and outcome (Pathela & Schillinger, 2010). Racial identity is another developmental process for adolescents, characterized by how one views oneself in the context of group membership and the significance and meaning attached to that group membership (Chavous et al., 2003; Stock, Gibbons, Walsh, & Gerrard, 2011). The development of racial identity may be influenced by one's cultural background and/or one's specific experiences from membership in a racial or ethnic group (Rivas-Drake, et al., 2014).

African Americans and Latinos are among the ethnic groups that experience discrimination and/or prejudice because of their racial identity, an experience that adds

additional complexity to adolescent development. The personal experience of racism, racial discrimination, and/or racial prejudice has been documented in the literature as having numerous biopsychosocial effects with health and behavioral consequences (Brody, et al., 2014; Caldwell, Kohn-Wood, Schmeelk-Cone, Chavous, & Zimmerman, 2004; Caldwell, Sellers, Bernat, & Zimmerman, 2004; R. Clark, et al., 1999; Rivas-Drake, et al., 2014). Enumeration of all documented consequences exceeds the scope of this dissertation; however, those pertaining to adolescent health- and sexual-risk behaviors are central to this research.

Race-related stress is one of the well-substantiated consequences of racism and/or racial discrimination (R. Clark, et al., 1999). In a study of urban high school students (N=201) African American males reported higher race-related stress than African American females, and a higher number of sexual partners when controlling for gender and age at sexual debut; race-related stress significantly predicted this particular sexual-risk behavior (Stevens-Watkins, et al., 2011).

Racial identity has been found to have a moderating or buffering effect against the health effects of discrimination or racism (R. Clark, et al., 1999; Stock, et al., 2011), alcohol use and violent behavior in adolescents/young adults (Caldwell, Kohn-Wood, et al., 2004; Caldwell, Sellers, et al., 2004), substance use vulnerability in older adolescents (Stock, et al., 2011), adolescent academic achievement (Chavous, et al., 2003), and psychosocial health and academic outcomes in adolescents (Rivas-Drake, et al., 2014). These findings elevate the significance of the healthy development of adolescent racial identity as a protective factor to oppose the negative health and behavioral consequences associated with experiencing racism, racial discrimination, and/or prejudice.

The research strongly suggests that adolescent racial identity and race-related stress are significant variables associated with sexual-risk behaviors. Additional research to identify the experience that results in adolescent stress would support development of the most appropriate interventions to reduce sexual-risk behaviors. Furthermore, the differing effect of adolescent stress and race between male and females adolescents is absent from the research literature. This research will investigate the moderating effects of race and adolescent stressors on the use of protection by male and female SBHC users.

Proximal Level-Psychological/Cognitive

In considering adolescent sexual-risk behaviors from a developmental perspective, the literature supports recognition of psychological and cognitive factors that also predict behavior. In a 2007 systematic review of adolescent sexual behaviors and intention, Buhi and Goodson (2007) found that intention to engage in sexual behavior, perception that engaging in sexual behavior was the norm among peers, and parental monitoring/supervision (specifically, time home alone) were stable predictors across 69 studies published between 1996-2005 (Buhi & Goodson, 2007). This review captured the interplay of the complex factors associated with adolescents' sexual behavior by reflecting the adolescent's individual intent and the influence of the social environment, including peers and parents.

For African American and Spanish-dominant Latino adolescents, intent to either have sex or to use protection or birth control during sex are stable predictors of their actual sexual-risk behavior (B. F. Stanton, et al., 1996; Villarruel, et al., 2004). Adolescents' perceptions about the sexual behavior of their peers and expectations of their parents were also predictive of their condom use.

Feelings of hopelessness were found to be associated with male and female adolescents having sex and trying to get pregnant (females) or to impregnate someone (males) (Bolland, 2003). Lehrer and colleagues also found that moderate and high depressive symptoms among male and female middle and high school adolescents predicted sexual risk behaviors (Lehrer, et al., 2006). In this national sample, male students with high levels of depressive symptoms, as measured by a modified 19-item Center for Epidemiologic Studies-Depression Scale, predicted the non-use of condoms and birth control and the use of substances at last sex. Moderate depressive symptoms in girls were also associated with substance use at last sex; however, high depressive symptoms were not associated with their sexual-risk behaviors.

Additional studies have substantiated depression and psychological distress as predictors of adolescent sexual-risk behaviors (R. J. DiClemente, et al., 2007; R. J. DiClemente, et al., 2001; Elkington, et al., 2010) and have suggested that teen attitudes about pregnancy and the use of protection are associated with safe sex (Shneyderman & Schwartz, 2013). And finally, having sex, age at first intercourse, having two or more lifetime sexual partners, using drugs or alcohol before having sex, having two or more partners in the last 90 days, not using a condom and/or contraception were all associated with less life satisfaction in adolescents (Valois, Zullig, Huebner, Kammermann, & Drane, 2002).

The research in psychological/cognitive factors as related to health- or sexual-risk behavior in adolescents appears to be incomplete as it does not include adolescent age, race, environmental context, or development among the constructs of inquiry.

Adolescent stress.

In addition to the rapid brain development that struggles to reconcile sensation-seeking behaviors with impulse control, as discussed earlier, adolescents are negotiating family, peer, school, and community expectations and opportunities (Casey, et al., 2008; Steinberg, 2008, 2010a; Williams, et al., 2002). This complex combination often proves to be a stimulating and stress-filled period for adolescents that results in adaptive and maladaptive behaviors (L. Blum, , & Blum, 2009). "Adolescent stress can be viewed as the interaction between the individual's involuntary, biologically determined response set and the voluntary, environmentally, and psychologically determined response set" (Sales & Irwin Jr, 2009). DiClemente and colleagues (2009) posit that stress is not inherently problematic until it overwhelms the adolescent's coping mechanisms (adaptation to a stressor) or in the absence of support; then it becomes a maladaptive response or health risk. Research indicates that adolescents describe stress in terms of physical and emotional outcomes (Chandra & Batada, 2006) and that racial discrimination is a dominant stressor in their lives and over time (Brody, et al., 2014; Copeland-Linder, Lambert, Chen, & Ialongo, 2011; Estrada-Martinez, et al., 2012). Other adolescent stressors reported in a qualitative study of inner city African Americans include family stress, peer stress, romantic relationship stress, school-related stress, and neighborhood stress (Anda, et al., 2000; Chandra & Batada, 2006). Several studies have substantiated these factors as adolescent stressors in the literature (Anda, et al., 2000; Copeland-Linder, et al., 2011; Tandon, Dariotis, Tucker, & Sonenstein, 2013). Neighborhood disadvantage and financial-related stressors including elements of poverty have also been documented

in the literature as having health consequences (Estrada-Martinez, et al., 2012; Goodman, et al., 2005).

Adolescent stress and race-related stress are manifest in internalized behaviors that compromise physical and mental health, such as psychological distress and depressive symptoms (Goodman, et al., 2005), substance use (Elkington, et al., 2010; Estrada-Martinez, et al., 2012; Tandon, et al., 2013), subjective weathering (a social psychological component of aging) (Foster, Hagan, & Brooks-Gunn, 2008), somatic complaints (Reynolds, O'Koon, Papademetriou, Szczygiel, & Grant, 2001), and increased allostatic load (hormonal mediators of stress) (Brenner, et al., 2012; Brody, et al., 2014).

Adolescent responses to stressors and race-related stress also manifest in externalized behaviors such as violence and aggression (Caldwell, Kohn-Wood, et al., 2004; Estrada-Martinez, et al., 2012; Tandon, et al., 2013) and delinquency (McGee, Davis, Brisbane, Collins, & et al., 2001). Several of these studies identified gender-specific associations. Females were more likely than males to demonstrate internalizing behaviors such as depressive symptoms when faced with stressful experiences. Males were more likely than females to demonstrate externalizing behaviors like violence and aggression when faced with stressful experiences.

Research indicates that adolescents take more risks when they experience stress (Johnson, et al., 2012). Moreover, race-related stress (Stevens-Watkins, et al., 2011), and psychological distress (R. J. DiClemente, et al., 2001) have been found to significantly increase adolescent sexual-risk behaviors, such as the number of sexual partners and unprotected sex. The literature suggests that life experiences that result in stress for adolescents differ by race and gender. However, the literature is incomplete

without recognizing the interaction of adolescent stress on male and female adolescents of different racial and ethnic groups and its effect on their use of protection. This research will contribute to the literature by exploring how adolescent stressors and race modify the use of protection by male and female adolescent SBHC users.

Discussion

This literature review of the empirical research on adolescent health- and sexual-risk behaviors revealed several predictive or influential constructs of significance. The constructs evolved within an ecological framework that is multi-level and sensitive to adolescent development and behaviors. As such, the constructs are interactive and multi-dimensional. For example, adolescents' race as a social construct at the proximal/interpersonal level interacts with neighborhood discrimination at the macro/environmental level and may be experienced as adolescent stress. Race-related stress is associated with sexual-risk behaviors. However, adolescent males experience race-related stress differently from adolescent females, thus making gender an additional construct to consider in the behavioral response to race-related stress. Based on the findings from this literature review, it is easier to envision the experiences of sexually active adolescents, living in an impoverished neighborhood and attending a school with a SBHC. They learn through social media that the SBHC is a helpful place with supportive staff and that they can go there any time. After a physical exam, they receive treatment for an STI, but are told they will have to go to another health provider or to the pharmacy for condoms and/or contraceptives. The SBHC can provide diagnosis and treatment for the STI but is prohibited from providing the services that would prevent contraction of another one. It thus becomes easier for sexually active adolescents to have unprotected

sex and to get treated for STIs at the SBHC than it may be for them to navigate the community to find another provider and to secure the health resources they need. The literature on adolescent brain science suggests that this multi-step, longer-duration process may or may not be plausible tasks for some adolescents to master.

SBHCs are well-established programs that have shown some indications of improving the health and sexual health of adolescents. Located in schools, an influential social system for adolescents, which allows them access to the peers of adolescents, another influential social system, SBHCs have the potential to stimulate and sustain changes in the sexual-risk behaviors of adolescents. However, I posit that, in light of the research on the predictors and determinants of adolescent sexual-risk behaviors, as presented earlier in this chapter, a modified model for changing adolescent behaviors is warranted. Likewise, a modified conceptual model for research on adolescent health and sexual health behavior is warranted and presented in Figure 2.1.

Model

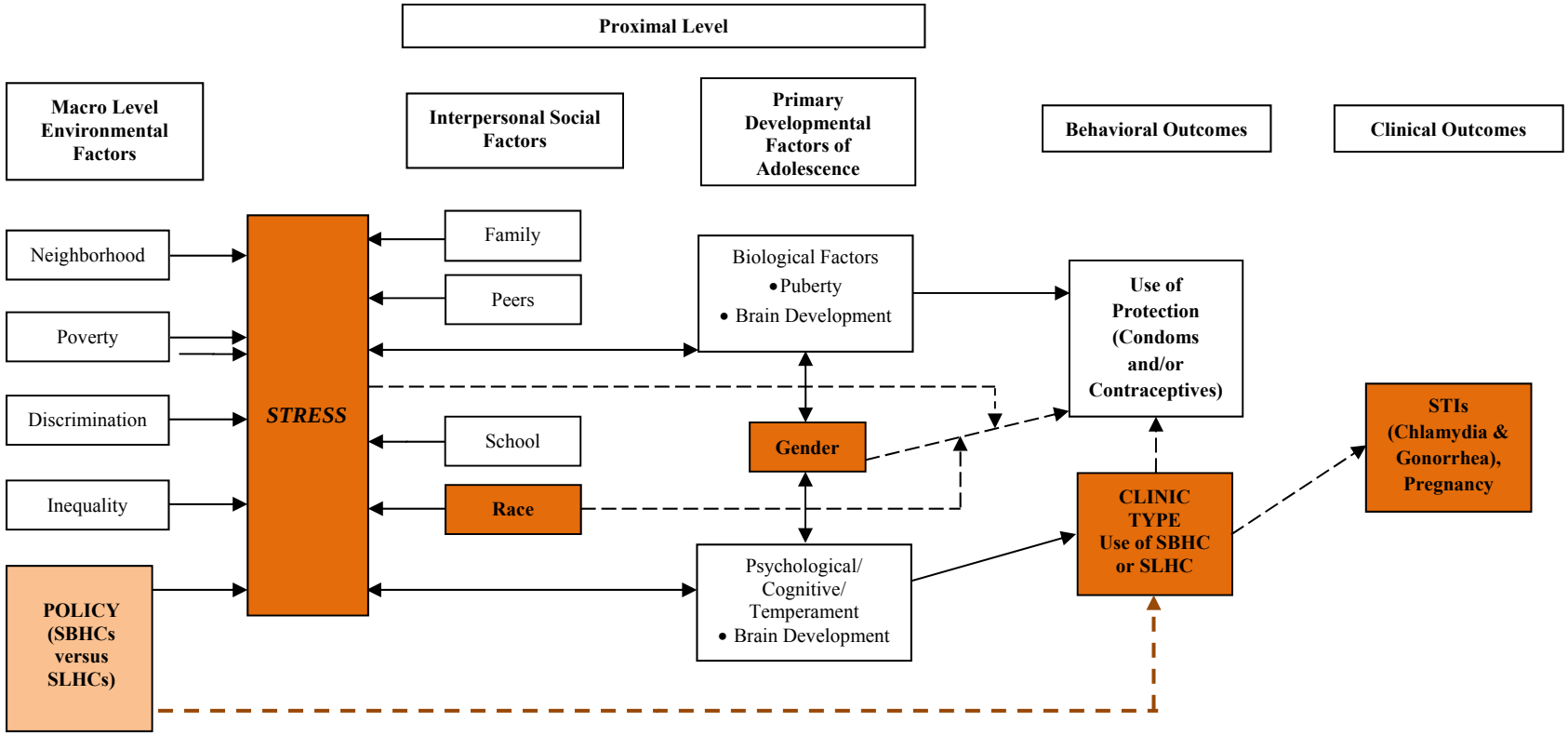
A Biopsychosocial Model of Adolescent Development and Behaviors

In its basic form, the Biopsychosocial Model (BPSM) has been adapted and utilized by several adolescent specialists, scientists, and researchers (L. Blum, , & Blum, 2009; Briones, Wilcox, Mateus, & Boudjenah, 2006; Medicine & Council, 2011; J. S. Santelli & Melnikas, 2010; Williams, et al., 2002) to capture and explore the complexities of the adolescent period of human development and its resulting normative (adaptive) and non-normative (maladaptive) behaviors. I have adapted this model to align with findings from the literaure review. The research in this dissertation will be

guided by the conceptual model reflected in Figure 2.1: A Biopsychosocial Model of Adolescent Development and Behaviors.

Figure 2.1:

A Biopsychosocial Model of Adolescent Development and Behaviors
(Adapted from Holmbeck & Shapera, 1999 and Blum & Blum, 2009)



Shaded Boxes and Broken Lines = Associations Under Investigation
Chapter III = Main effect of CLINIC TYPE on use of protection and clinical outcomes.
Chapter IV = Main effect of GENDER on use of protection and modified by adolescent stress and race/ethnicity.

Macro-Environmental Level

The predictors and determinants are grouped into constructs and the ecological levels of influence on adolescent development and behavior. The Macro-Environmental Level Factors are Neighborhood, Poverty, Discrimination, Inequality, and Policy. These distal environmental constructs are largely beyond the control of adolescents; however, adolescent development and behaviors are influenced by them. Policy, for example, will be analyzed for its influence on the clinical outcomes of two types of clinics that serve adolescents at risk for unintended pregnancies and STIs. These constructs interact with each other and with those on the Proximal Level and may be experienced as stressful for the developing adoelscent .

Proximal Level

The Proximal Level Interpersonal Social Factors are family, peers, race, and school; each has been documented in the literature as influential or predictive of adolescent sexual-risk behaviors. These factors are sociologically determined and to varying degrees interact with each other and with the Macro-Level constructs. This dynamic may also be experienced as stressful for the developing adolescent.

The Proximal-Level Primary Development Factors are biological and psychological in nature; they occur at the individual level of development and are influenced by the Interpersonal and Environmental constructs. This level includes biological factors such as puberty, age, sex (gender) and psychological factors such as the cognitive and temperament development of adolescents. A most important component that integrates biology and psychology is the current understanding of the neuroscience on adolescent brain development. I posit that this factor is a substantive determinant in

adolescent sexual-risk behaviors that is still evolving in the literature on adolescent behaviors including health- and sexual-risk behaviors.

The constructs of the Macro- and Proximal-Levels capture the multiple interacting biological, psychological, and sociological elements of normal adolescent development that result in outcomes that are behavioral, moderated by race/ethnicity, and influenced by the social context of school and peers. The model includes constructs that have been empirically established, as well as those that are understudied, such as adolescent health- and sexual-risk behaviors in the context of SBHCs, SLHCs and policy. Furthermore, the model recognizes that adolescent behaviors are based on the interplay of numerous enviornmental, social, and developmental constructs. For example, the primary outcome variables explored in this research are sexual-risk behaviors operationalized by being sexually active and not using protection (Use of Protection). As indicated throughout this chapter, sexual-risk behavior is influenced by predictors or determinants of biological, psychological, and sociological constructs; this model reflects those relationships and ultimately is appliedin the research investigating clincical outcomes of two different types of clinics that portend to meet the complex needs of sexually active adolescents.

Summary

Adolescence and the behaviors of this developmental period of life are highly complex and multifaceted. Health research, programming, and policies must incorporate this complexity to better meet the unique needs and experiences of adolescents. At the macro level, the literature supports that environmental constructs affect adolescents' use of condoms and/or contraceptives. However, there is little research on policy, such as that which controls the provision of condoms and contraceptives in SBHCs, as an

environmental construct. At the proximal level, family, peers, and schools have all been substantiated as determinants or predictors of adolescents' use of condoms and/or contraceptives in the empirical literature. However, there is an absence of research that assesses the association between policies and clinical outcomes, i.e., policies that restrict SBHCs from providing direct access to condoms and/or contraceptives, and clinical outcomes of SBHCs such as rates of STIs and unintended pregnancies. This information is critical, since SBHCs represent the intersection of school and peers and is the arena which recent adolescent brain development research suggests may have great potential for school-wide influence on adolescent sexual-risk behaviors. Half of SBHCs (49.8%) nationwide are presently prohibited from dispensing condoms and/or contraceptives due to similarly restrictive policies (Lofink, et al., 2013). Meanwhile, SLHCs, an important alternative that may be better able to respond to the needs of sexually active adolescents by providing condoms and/or contraceptives, may not have the equivalent power to influence school-wide adolescent behaviors.

And finally, at the individual developmental level, there are numerous factors that interact with and affect adolescent behavior; however, the literature explores these factors as independent of one another. For example, race and adolescent stress may interact and affect the use of protection by adolescent male and female users of SBHCs.

This research will use the Biopsychosocial Model of Adolescent Development and Behaviors to test some of these hypotheses about the sexual-risk behaviors and clinical outcomes of the users of SBHCs and SLHCs. The outcome of this research will be a significant contribution to the literature and to the public health policy debate about

effective program elements, including policy, in interventions to reduce sexual-risk behaviors contributing to adolescent STIs, HIV, and unintended pregnancies.

CHAPTER III

SCHOOL-BASED HEALTH CENTERS (SBHCS) OR SCHOOL-LINKED HEALTH CENTERS (SLHCS): HOW CLINIC TYPE AFFECTS SEXUAL-RISK OUTCOMES FOR ADOLESCENT USERS IN MICHIGAN

Introduction

School-Based Health Centers (SBHCs) have demonstrated their ability to successfully improve access to quality health care and to reach adolescents, who by virtue of any number of circumstances, are considered to be at-risk for poor physical, mental, or social health (Allison, et al., 2007; Berti, Zylbert, & Rolnitzky, 2001; Cubbin, et al., 2010; Dougherty, 1993; Elster A, 2003; Ford, Bearman, & Moody, 1999; Fothergill & Ballard, 1998; Hutchinson, et al., 2012; Wade, et al., 2008; Walter et al., 1996). Studies of adolescent users reveal that they are willing to use SBHCs for services that are sensitive to confidentiality, such as mental health care (Adelman, Barker, & Nelson, 1993; Juszczak, et al., 2003; Scudder, Papa, & Brey, 2007) and reproductive or sexual health care (Coyne-Beasley, Ford, Waller, Adimora, & Resnick, 2003; Denny et al., 2012; Ethier, et al., 2011; D. Kirby, Waszak, & Ziegler, 1991; Soleimanpour, et al., 2010). Thus, SBHCs are particularly strategic for this population.

Over time, SBHCs have expanded their core services from the provision of primary medical care and immunizations to include chronic disease management (such as asthma), health promoting and risk reduction health education, mental and social health services (such as substance abuse prevention education), intervention counseling, and health screenings for infectious diseases including sexually transmitted infections. Some

SBHCs (60%), supported by the Centers for Disease Control and Prevention (CDC), have become essential providers of adolescent testing and counseling services for HIV in high prevalence communities (Lofink, et al., 2013).

In addition to improving access to health care and services, use of SBHCs is associated with health and educational outcomes of significance. SBHC users were found to practice more health promoting behaviors (Hutchinson, et al., 2012; McNall, et al., 2010), to discuss more readily their health concerns (Gibson 2013), and to be more likely to use the mental health services offered than were users of a community-based clinic (Gall, et al., 2000; Juszczak, et al., 2003; D. W. Kaplan, et al., 1998; Walker, et al., 2010). Additionally, SBHC users were also reportedly more likely to use contraceptives (Ricketts & Guernsey, 2006; Soleimanpour, et al., 2010), to reduce their school absenteeism and tardiness, to improve their grade point averages, and to stay in school than community-based clinic users (Gall, et al., 2000; McCord, et al., 1993). Strolin-Goltzman (2010) found that SBHCs improved elements of the school climate and learning environment as well. An extensive overview of SBHCs is provided in Chapter I of this dissertation.

School-Linked Health Centers (SLHCs) represent an alternative community-based, as opposed to school-based, approach to improving adolescent access to mental and physical health promoting care and services. SLHCs operate with formal or informal agreements with one or more schools, and typically serve adolescents who are considered high-risk by virtue of being homeless, runaway, teen parents; and/or in foster care, shelters, treatment facilities, or detention centers (Fothergill & Ballard, 1998). Like SBHCs, SLHCs are staffed to provide the full complement of comprehensive physical,

mental, and social health services needed by their users, including sensitive services such as sexual health services. However, because SLHCs are community-based, they are not constrained by the provisions of local school district policies. For example, SLHCs may provide condoms and contraceptives to sexually active adolescents whereas SBHCs cannot. SBHCs must abide by the policies set forth by the local school district as well as other governing or regulatory bodies (Fothergill & Ballard, 1998; Peak & Hauser McKinney, 1996).

The focus of this research chapter is to identify whether and how differences in these two clinic types, SBHCs and SLHCs, may affect clinical outcomes as related to sexual-risk behaviors among adolescent users. Adolescent sexual-risk behavior is presently a particularly salient policy issue in the state of Michigan, where there are 65 SBHCs and 12 SLHCs. Adolescents came into focus as a target population for SBHCs for several reasons. There was growing evidence that adolescents were "at-risk" of failing to become successful adults capable of contributing to their own well-being and that of their offspring as well as the larger society (Dryfoos, 1991). Circumstances beyond the control of adolescents, such as disadvantaged families, struggling communities and poorly resourced schools, made it highly unlikely that they would successfully traverse the turbulent adolescent period and emerge as thriving adults (C. Brindis, et al., 2002; Dryfoos, 1991; Jessor, 1991). Furthermore, normal adolescent development by definition encompasses meaningful adolescent risk behaviors that are subject to a host of social and environmental influences that can either exacerbate risk or be protective (Jessor, 1991; Jessor, et al., 1998). SBHCs offered a comprehensive remedy for numerous underserved at-risk adolescents by offering physical and mental

health care and social services in a youth-friendly environment that is accessible on school grounds, staffed by providers trained and sensitized to the biopsychosocial dynamics and needs of adolescents, confidential, and at low or no cost to the at-risk population. Consequently, SBHCs were viewed as a strategy for reducing or mediating the diverse behavioral, social, or environmental risks faced by adolescents and preventing or reducing the resulting risk behaviors.

Schools are an influential social environment of peers and non-parent adults for adolescents, a fact of particular significance in light of the neuroscience on adolescent brain development, as discussed in Chapter II of this dissertation. The findings based on extensive research in this area suggest that: 1) the adolescent brain continues to mature in function and structure until early adulthood; and 2) the areas of the brain responsible for sensation/reward seeking and impulse control/self-regulation continue to mature through adolescence (Steinberg, 2008, 2010a; Steinberg & Morris, 2001). This second finding makes adolescents particularly vulnerable to social interactions with peers and the school environment, a relationship that is conceptually reflected in Figure 2.1. Schools, and by extension and experience, SBHCs represent a strategic venue to stimulate knowledge and behavior change among adolescents (D. Kirby & Coyle, 1997).

Approximately 70% of the morbidities and mortalities among adolescents can be attributed to their behaviors (CDC, 2012b). CDC employs the Youth Risk Behavior Surveillance System (YRBSS) to monitor adolescent behaviors that pose health- risks such as alcohol, tobacco, and other drug use, unhealthy diets, and those that contribute to unintentional injuries carrying a weapon (CDC, 2012b). SB/SLHCs may use the YRBSS

to identify and prioritize adolescent behaviors that trend over time and pose significant risks to adolescent health.

One of the adolescent behaviors having significant short- and long-term consequences is being sexually active without the consistent use of protection against unintended pregnancies and sexually transmitted infections (STIs), including human immunodeficiency virus (HIV). Recent reports on historically low national teen fertility rates suggest that adolescents have reduced their sexual-risk by either abstaining from sex and/or using protection against STIs, HIV and pregnancy (CDC, 2012a; B. E. Hamilton, et al., 2012; J. S. Santelli, et al., 2004; J. S. Santelli & Melnikas, 2010). Michigan has also experienced some improvements in adolescent pregnancies and births, with rates decreasing by 55% between 1990 and 2007 (Michigan Department of Community Health and Michigan Department of Education, 2010). These are positive indicators of favorable changes in adolescent sexual-risk behaviors.

Nevertheless, Michigan's rates for chlamydia and gonorrhea in adolescents aged 15-19 years exceed the national rates and increased by 8% and 4%, respectively, between 2006 and 2007. Adolescents aged 15-19 years comprise 7% of the population in Michigan; yet in 2007, the latest year for which data are available, they contributed 42% of chlamydia and 34% of gonorrhea cases. These are the highest rates for any age group, which suggests that Michigan's youth continue to engage in sexually risky behaviors. If not diagnosed and treated, these high rates of sexually transmitted bacterial infections promise continued disease spread and threaten the long-term health and fertility of Michigan's sexually active adolescents (Michigan Department of Community Health and Michigan Department of Education, 2010).

Michigan's HIV data further substantiate adolescents' sexual-risk: almost 80% of HIV diagnoses in females aged 13-19 years (at time of diagnosis) originated in heterosexual contact. Between 2003 and 2007, the rate of new HIV diagnoses grew an average 24% for this age group. Racial disparities prevail throughout all of the clinical data on sexual-risk outcomes in adolescents in Michigan and nationally.

The sexual-risk behaviors of Michigan's adolescents provide insight into the STI and HIV rates. According to Michigan's 2009 Youth Risk Behavior Survey of high school students (grades 9-12), 46% of all respondents and 65% of 12th graders had sexual intercourse. Thirty-four percent of all respondents had sex in the last three months and 39% of them did not use a condom (Michigan Department of Community Health and Michigan Department of Education, 2010). These and other behaviors such as the number of sexual partners, age at first sexual intercourse, and the use of alcohol or other drugs before sex render adolescents a population at significant sexual-risk.

The imperative for continued exploration into the antecedents of sexual-risk behaviors in adolescents is clear. How, for example, are adolescents' behaviors associated with the type and location of available services, (SBHCs and SLHCs)? And what policies govern the delivery of services to this vulnerable population? This research will add to the body of literature by aligning policy and service delivery for adolescents with clinic type outcomes like chlamydia, gonorrhea and pregnancies from SBHCs and SLHCs in Michigan. This will enable more effective structuring of prevention and intervention strategies as well as public policy to avert or mediate adolescent sexual-risk behaviors and their potential consequences.

SBHCs and SLHCs and Their Influence on Sexual-Risk Behaviors

The research on SBHCs and SLHCs and adolescent use of protection against STIs and unintended pregnancy shows mixed results, largely due to limitations related to program design, transience of student population, school and student dynamics, and difficulty of obtaining parental consents (Bennett & Assefi, 2005; Zabin, Hirsch, Smith, Streett, & Hardy, 1986). An evaluative study of a three-year SBHC pregnancy prevention program for urban teenagers found that, in the two intervention schools, knowledge about contraceptive use increased and the use of any contraceptives also increased significantly compared to the two matched control schools without an intervention (Zabin, et al., 1986). Another evaluation study of six SBHCs found variable effects on the use of contraceptives when provided by the SBHC; only one of the three sites that provided contraceptives demonstrated a statistically significant increased likelihood of contraceptive use over the comparison school (D. Kirby, et al., 1991). Adolescent developmental processes, age, gender, race may all be factors in the success of programs that seemingly apply generic interventions to improve adolescent sexual health. Furthermore evaluative studies might consider refining study approaches to go beyond program outcomes to assess the multiple dimensions of adolescent behavior that affect the outcomes.

In two published reviews of school-based pregnancy and STI/HIV prevention programs, the findings were encouraging. In the first review, researchers found that, out of nineteen randomized controlled trials of school-based teen pregnancy prevention programs, four of the five abstinence-plus [safe sex] programs that evaluated contraceptive knowledge showed improvements at follow-up when compared to the

control group that received abstinence-only programs (Bennett & Assefi, 2005). This review also reported that five out of ten of the abstinence-plus programs measuring contraceptive use found improvements in use rates among the intervention group compared to the abstinence-only control groups (Bennett & Assefi, 2005). These trials, however, were not without limitations, such as reliability of self-report and variability in program designs and generic programming that doesn't account for the various influences on adolescent behaviors.

The second review synthesized thirty-five evaluations of school-based programs (not limited to SBHCs) intended to reduce adolescent sexual-risk behaviors (D. Kirby & Coyle, 1997). Four of the eight studies of programs designed to increase utilization of condoms and other combinations of contraceptives such as condoms plus birth control pills, found improvements. Four out of ten studies of programs to increase contraceptive use in general found positive outcomes. Another study in this review found that the presence of an SBHC was associated with lower contraceptive use; however, because no baseline data were available, results were questionable. This questionable outcome reflects the difficulties associated with evaluating programmatic results and the impacts of SBHC interventions on reducing sexual-risk behaviors. One variable that appeared to influence programmatic effects was the presence of and strength of an educational component in conjunction with the availability of condoms and/or contraceptives in SBHCs and school-based sexual-risk reduction programs (D Kirby, 2002; D. Kirby & Coyle, 1997).

A 2001 study evaluated the effect of a school-wide two-year comprehensive HIV/STD and pregnancy prevention program targeting ninth- and tenth-grade students.

This experimental, designed intervention relied on constructs of the social cognitive theory, social influences models, and models of school change. Therefore it reflected the critical elements of the Biopsychosocial Model for Adolescent Development and Behaviors in Figure 2.1. The experimental intervention uniquely focused on the significant role of peers, family, and the school and community environments to change adolescent sexual-risk behaviors while sustaining safe sex behaviors, such as abstinence and the use of protection against STI/HIV and unintended pregnancies as appropriate. Program impacts on the entire student body, regardless of exposure to the entire program, were assessed two and three school years after initiation of the program. Researchers found that, when compared to the non-intervention schools, this school-wide program was associated with increasing condom use among sexually active adolescents, as well as with decreased episodes of unprotected sex during last sex in the intervention site at 2- and 3-year follow-up assessments (Basen-Engquist, et al., 2001).

Evidence of SBHCs' Influence on Use of Protection

Research on the influence of SBHCs in reducing adolescent sexual-risk behaviors and use of protection (condoms and/or contraceptives) is promising. Studies have found SBHC users: were more likely to have used condoms at first intercourse and a hormonal contraceptive at last sex if their school had a SBHC (Ethier, et al., 2011; Minguez, Santelli, Gibson, Orr, & Wheeler, 2011); used birth control other than condoms; used condoms with other birth control; and used condoms in the past month (Soleimanpour, et al., 2010). These adolescent behaviors have implications for reducing the incidence of STIs/HIV and unintended pregnancies. It is noteworthy that these favorable results were from SBHCs that provided condoms and contraceptives on site. Direct access to

contraceptives and condoms (protection) in the SBHC by SBHC users is a significant policy distinction that may have implications for adolescents' use of protection against STIs and unintended pregnancies. This research will test this hypothesis.

The potential for SBHCs and SLHCs to affect adolescent sexual-risk behaviors by offering condoms and contraceptives in the context of a comprehensive program for protection against STIs, HIV, and unintended pregnancies has been well substantiated (Basen-Engquist, et al., 2001; Minguez, et al., 2011; Zimmer-Gembeck, Doyle, & Daniels, 2001). However, nationally, half of all SBHCs (49.8%) report that they are prohibited from dispensing contraceptives due to restrictive policies imposed by the school district (76%), state law or regulation (27%), sponsoring organization (24%), or state policy (23%) (Lofink, et al., 2013). The policy opportunities and restrictions in the provision of school-based health care and services are more often than not implied, and are rarely examined in the research. Moreover, research that explores how policy interacts with the propensities of adolescent behaviors resulting from the potential immaturity of the adolescent brain (Steinberg, 2009) is even more elusive.

Researchers in a 2001 study investigated the outcomes of a new policy to dispense hormonal contraceptives in SBHCs (Zimmer-Gembeck, et al., 2001). The SBHC clinicians reported that SBHC users were not filling prescriptions for hormonal contraceptives. Results indicated that when contraceptives are available at the SBHC, sexually active female users selected hormonal methods sooner after an initial SBHC visit and more consistently than prior to the initiation of the dispensing policy. A similar retrospective study based on reviews of SBHC medical charts found that a policy change from a voucher system for the receipt of contraceptives to a direct delivery system of

contraceptives improved receipt of requested contraceptives by sexually active SBHC users (Sidebottom, Birnbaum, & Nafstad, 2003). Neither of these studies was able to measure the use of contraceptives once received by the adolescent SBHC user nor whether the condoms were used to protect against STIs and HIV.

Following is a description of the policy context for the receipt of sexual health care and related services for adolescents in Michigan.

Policies as Antecedents to Adolescent Sexual Health or Sexual-Risk

School-Based Sex Education-Related Policies

Fundamental to achieving any behavior change is knowledge and information about the specific behavior. In Michigan, as is the case in most states, school-based sex education that provides information and knowledge about sexual behaviors and associated risks is dictated by a number of state and school district policies. These policies, some of which are state statutes, determine the content of what is taught in public schools and at what grade level.

Michigan state law requires school districts to teach students about "HIV/AIDS and other dangerous communicable diseases" at least once a year in elementary, middle school or junior high school, and high school. However, school districts have the flexibility to choose to teach sex education. Sex education is not required in Michigan.

Minor Consent Laws for Sexual Health Care in Michigan

When an adolescent has determined that he/she is in need of sexual health care or services, questions arise about the location and cost of care and services, as well as required authorization(s) to pursue and receive such care or services. Minor Consent Laws govern the extent to which minor adolescents have the right to consent for the

receipt of sexual health services without the consent or knowledge of parents (Guttmacher, 2014). These provisions are particularly significant for the types of services that are sensitive to confidentiality, including parental knowledge, such as sexual health care and services (Jones, et al., 2005; Reddy, et al., 2002).

In Michigan, a minor is defined as a person 17 years of age or younger. Minor Consent Laws in Michigan state that a minor may consent for medical care to diagnose and treat STIs and HIV. Michigan Law is silent on minor consent for health care regarding birth control and defers to the Federal Constitutional "right of privacy" which limits state restrictions on sale and distribution of contraceptives and stipulates that parents have no constitutional right to be notified that their child is seeking or has obtained contraceptives (Chrysler, 2013).`

The Minor Consent Laws in Michigan support adolescents' rights to obtain and consent for the sexual health care and services required to prevent contraction of STIs, HIV and unintended pregnancies. There are no restrictions on adolescents' access to condoms and other contraceptives in Michigan, except when seeking those services at a SBHC. SBHCs in Michigan are prohibited from providing condoms and contraceptives on school property.

Service Policies for Sexually Active SBHC and SLHC Users in Michigan

Adolescents in Michigan can choose to obtain sexual health care and services at any health care facility. Adolescents can receive sexual health services inclusive of condoms and contraceptives at local health departments, private physician offices, community health centers, and Planned Parenthood offices. As previously described in this chapter, SBHCs and SLHCs have distinguished themselves from other health care

providers that also serve adults to exclusively serve and meet the unique needs of adolescents. SLHCs, however, provide the full range of sexual health services for sexually active adolescents inclusive of condoms and contraceptives. SBHCs are forbidden from providing condoms and contraceptives on school property.

Unlike the community-based SLHCs, SBHCs are governed by the laws and policies of the state that influence schools and school aid because they are, by definition, located in the school building or on school property. The Michigan State School Aid Act of 1979 (Excerpt) Act 94 of 1979 (Amended 1996) prohibits SBHCs from dispensing, prescribing or distributing contraceptives on school property and therefore deprives sexually active adolescents of their right to obtain the sexual health services that protect them from unintended pregnancies and STIs.

SBHCs are limited to providing the physical examination relative to sexual health. Staff can educate, counsel, and provide a referral to a health center or provider located off school property for condoms and contraceptives. Adolescents are then required, if motivated and resourceful, to navigate the provisions of the referral, i.e., to make the appointment, access a different health center, and engage a new provider. This is a less than ideal situation for many adolescents as it presents numerous obstacles to obtaining services when one considers the complexities of the adolescent brain and related behaviors. Assuring completion of SBHC referrals often requires extensive facilitation from the SBHC staff, e.g., assistance with making appointments and reminding SBHC users about appointments (K. A. Hacker, Weintraub, Fried, & Ashba, 1997). In contrast, SLHCs are able to assess the sexual health needs of adolescents and to respond with arrangements for the appropriate care and services before the user leaves the SLHC.

The extant research has not investigated the comparative effect of these two clinic types, SBHCs and SLHCs, which serve adolescents on the use of protection (condoms and contraceptives) nor on their clinical outcomes (i.e., positive test results for STIs and pregnancies). The proposed research will contribute to this gap in the literature by investigating questions related to clinic type by exploring three associated pathways to sexual-risk behaviors of adolescent SBHC and SLHC users. First the health-risk behaviors will be explored, such as use of tobacco or alcohol or self-harm contemplation among SBHC and SLHC users. This will allow for determining if there are significant differences in the health-risks of the users of each clinic type. Sexual-risk behaviors of adolescent SBHC and SLHC users will be examined in the context of policies governing their access to sexual health care and other health services provided by each type of clinic. Finally, clinical outcomes as measured by positive test results for chlamydia, gonorrhea, and pregnancy will be considered indicative of the use of protection by SBHC and SLHC users with differential access to protection. Conceptually, this research will investigate the behavioral and clinical outcomes of adolescent users of two types of clinics that differ by location, policies and allowable services.

Research Aims and Hypotheses

The specific aims of this study are, first, to determine whether SBHC and SLHC adolescent users (13-18 years) in Michigan differ in their health- risk behaviors, including sexual-risk behaviors. The second aim of this study is to assess the associations between the type of clinic (SBHCs or SLHCs) used by adolescents 13-18-year-olds in Michigan and behaviors that result in sexual-risk as measured by clinic outcomes. The research hypotheses to be tested are:

1. Adolescent SLHC users will have significantly higher health-risk behaviors score (HRB-Score) than adolescent SBHC users.
2. SLHCs will have significantly higher odds than SBHCs of (a) being sexually active and (b) using protection.
3. SBHCs will have a greater proportion of adolescent users with positive (a) chlamydia and (b) gonorrhea test results than SLHCs.
4. SBHCs will have a greater proportion of female adolescent users with positive pregnancy test results than SLHCs.

Data Sources

Secondary analyses of two different datasets will enable the ability of testing these study hypotheses: The Rapid Assessment for Adolescent Preventive Services (RAAPS) and Child and Adolescent Health Centers (CAHC) Utilization Dataset.

The RAAPS is a 21-item clinic-based electronic risk screening system to specifically identify health-risk behaviors, including sexual risk behaviors and stress factors of adolescent users of SBHCs and SLHCs (Salerno, Marshall, & Picken, 2012). The system supports the confidential disclosure of the behaviors and factors that contribute to 70% of the morbidities and mortalities experienced by adolescents, not unlike the CDC Youth Risk Behavior Surveillance System (YRBSS). However, unlike YRBSS, RAAPS results are integrated into the adolescent's clinical record for immediate action and subsequent follow-up by clinicians who are trained to use motivational interviewing techniques to explore and respond to the risk responses. Sample questions from the RAAPS survey explore nutritional intake, physical activity, bullying, safety, drug use, sexual activity, and the use of protection. Questions are formatted to elicit a

yes/no response. This computerized annual assessment of SBHC and SLHC users is self-administered in 5-7 minutes. These results (N=14,682) will be analyzed by clinic type, SBHCs (N=30) versus SLHCs (N=6).

Scope of RAAPS Dataset

Three years (2010-2012) of the RAAPS system data obtained at state funded SBHCs and SLHCs will be used for this study. At the individual level of measurement, the RAAPS database provides the demographic data (age, gender, race/ethnicity, and insurance status) and measures of health- and sexual-risk behaviors for Hypotheses 1-2. The specific questions and full descriptions of the variables are described in the Method section of this chapter.

Validity and Reliability of RAAPS Survey

Validity and reliability of the RAAPS survey instrument were assessed in a study by (Salerno, et al., 2012). Face validity was established via the use of two focus groups of adolescents (n = 21) and one focus group of health care professionals (n = 7). The adolescent groups were asked to give their perceptions of the content and the meaning of the 21 RAAPS items. The health care professionals were then asked to give their opinions on the adolescents' feedback and to offer their perceptions of the instrument. Revisions were made to the instrument to assure better comprehension of the questions by adolescents.

Content validity of RAAPS items was assessed by a group of adolescent users and health care professional across the state of Michigan. A sub-set of experts (n = 10) was asked to rate each question of RAAPS on content validity index (CVI) by a scale of 1 to 4, with higher scores indicating greater relevance in the assessment of adolescent risk

behaviors. A CVI score of .80 or more is considered good content validity (Waltz, Strickland, & Lenz, 1991). CVI scores for the 21 questions ranged from .825 to 1.0, indicating good content validity.

Inter-rater reliability of RAAPS was computed by grouping the reviewer ratings as 1 or 2 = 0 and 3 or 4 = 1, and testing for concordance between raters. Reliability coefficients of .61 to .80 indicated good agreement between raters, and coefficients above that range indicated near perfect agreement (Waltz, et al., 1991). Reliability of RAAPS for the 21 items ranged from .90 to 1.0, indicating near perfect agreement between raters.

The second dataset used in the present study is the Child and Adolescent Health Centers (CAHC) Utilization Dataset. This dataset is used to measure clinical outcomes. CAHCs are SBHCs and SLHCs funded by the State of Michigan Department of Community Health (MDCH). As a condition of funding, CAHC staff are required to document the provision of clinic services in utilization reports submitted quarterly to MDCH. The reports provide an aggregate snapshot of services and activities for each SBHC and SLHC at the clinic level, but not at the individual-user level. For example, using this dataset, I will be able to determine the number and results of chlamydia, gonorrhea, and pregnancy tests from SBHCs and SLHCs for 2010-2012; however, I cannot match the results to individual SBHC and SLHC users. This dataset will be analyzed to test Hypotheses 3-4 outcomes by clinic type.

In summary, the RAAPS and CAHC Utilization datasets are both unique and complementary. The RAAPS dataset will provide the aggregate demographics and health- and sexual- risk behaviors of the SBHC and SLHC users to test Hypotheses 1-2. It will support the ability to characterize the adolescent users of each clinic type. The

CAHC Utilization dataset will provide the clinical outcomes indicative of sexual-risk behaviors (chlamydia, gonorrhea, and pregnancy test results) for the SBHCs and SLHCs. I will use it to test Hypotheses 3-4 about outcomes for each clinic type.

Method

Research Design

A quantitative correlational research design was used for the present cross sectional study. The objective of quantitative correlational designs is to examine potential relationships among variables (Bernard, 2006; Cooper & Schindler, 2005; Creswell, 2005; Neuman, 2006). This type of design was chosen for this study in order to investigate possible associations between the independent variables of clinic type (SBHC or SLHC) with the dependent variables representing sexual-risk behavior: pregnancy test results and STI test results.

The intent of this study is not to make predictions about outcomes. The purpose is to show the extent of the relationship between the independent and dependent variables representing sexual risk behavior, pregnancy test results, and STI test results. Therefore, an explanatory correlation design is appropriate.

Population and Sample

The population of this study includes Michigan state-funded SBHCs (n=30) and SLHCs (n=6) in public high schools that used the RAAPS System for the years of 2010-2012 inclusive. The unit of analyses will be individual student users for each clinic type. Table 3.1 provides a description of the users in the RAAPS database. There are 13,312 RAAPS surveys for SBHC users (90.7%) and 1,370 for the SLHC users (9.3%). The age of the adolescents included in the sample ranged from 13 to 18 years (M = 15.32, SD =

1.54). The majority of the adolescents utilized SBHCs (SBHC; 90.7%). The adolescent users were evenly distributed across gender, 54.3% were female and 45.7% were male. The majority of the adolescents in the sample were classified as either White (44.5%) or African American (40.7%). More than half of the adolescents (54.1%) had public insurance and 31.2% had private insurance.

Table 3.1 Descriptive Results of Key Study Variables

Variable	Database	Type	Levels	*N*	%	*M*	*SD*
User Data							
Clinic Users by Type	RAAPS	Nominal					
			SBHC	13312	90.7	---	---
			SLHC	1370	9.3	---	---
Gender	RAAPS	Nominal					
			Male (Ref)	6706	45.7	---	---
			Female	7976	54.3	---	---
Race/Ethnicity	RAAPS	Nominal					
			White (Ref)	6527	44.5	---	---
			African American	5979	40.7	---	---
			Hispanic	859	5.9	---	---
			Other	1317	9.0	---	---
Insurance Status	RAAPS	Nominal					
			Public (Ref)	7941	54.1	---	---
			Private	4584	31.2	---	---
			Uninsured	1605	10.9	---	---
			Unknown/Other	552	3.8	---	---
Behavioral Data							
Sexually Active Adolescent (SAA)	RAAPS	Nominal					
			Yes	5927	40.4	---	---
			No	8755	59.6	---	---
SAA & Use of Protection (UOP)	RAAPS	Nominal					
			Yes	4116	69.4	---	---
			No	1649	27.8	---	---
			Not Applicable	162	2.7	---	---
Clinical Data							
Chlamydia Test Positive Outcome	Utilization Data	Nominal					
			Yes	867	14.8	---	---
			No	5010	85.2	---	---
			Not Applicable	5877	100.0	---	---
Gonorrhea Test Positive Outcome	Utilization Data	Nominal					
			Yes	179	3.3	---	---
			No	5238	96.7	---	---
			Not Applicable	5417	100.0	---	---

Table 3.1 (cont'd)

Variable	Database	Type	Levels	*N*	%	*M*	*SD*
Positive Pregnancy Test	Utilization Data	Nominal					
			Yes	588	12.5	---	---
			No	4120	87.5	---	---
			Not Applicable	4708	100.0	---	---

Note. *M* = Mean; *SD* = Standard Deviation; *Mdn* = Median

Definition and Measures of Key Study Variables

Clinic type.

The **independent variable** for all tests of hypotheses in this study was Clinic Type, with two independent classifications of (a) SBHC and (b) SLHC. The Clinic Type variable is a nominal variable and will be dichotomously coded as SBHC = 0, SLHC = 1. SBHC was the reference category for all inferential analyses and derived from the RAAPS database.

Gender.

The gender variable is dichotomous and will be coded as male = 0, female = 1. Male was the reference category for all inferential analyses. Gender was included as a **control variable** in the regression analyses addressing Hypotheses 1-2 and was derived from the RAAPS database.

Race/Ethnicity.

The Race/Ethnicity variable is nominal and was classified into three dummy coded classifications of (a) African American[1], (b) Hispanic and (c) Other. Each adolescent user was coded in each of the dummy coded categories with a 1 representing his/her race/ethnicity and 0 on the remaining race/ethnicity variables. Adolescents

[1] The term "African American" is intended to include all Black populations even though there are ethnic variations within the population.

classified as White were coded as 0 in all three dummy coded classifications, thus making the Race/Ethnicity of White the reference category for the Race/Ethnicity variable. The three dummy coded race/ethnicity variables were included as **control variables** in the regression analyses addressing Hypotheses 1-2. Race/ethnicity was derived from the RAAPS database.

Insurance status.

The Insurance Status variable is nominal and was classified into three dummy coded classifications of (a) Private, (b) Uninsured, and (c) Unknown/Other. Each adolescent user was coded in each of the dummy coded categories with a 1 representing his/her insurance status and 0 on the remaining insurance status. Adolescents classified as Public Insurance were coded as 0 in all three dummy coded classifications, thus making the Insurance Status of Public Insurance, for example Medicaid, the reference category for the Insurance Status variable. The three dummy coded insurance status variables were included as **control variables** in the regression analyses addressing Hypotheses 1-2 and will be derived from the RAAPS dataset.

Age.

The age variable was derived from the RAAPS dataset. The variable was used as a **control variable** for Hypotheses 1-2. Age is a continuous variable.

Health-risk behavior score.

The Health-Risk Behavior Score variable was derived from several RAAPS survey questions. Each of which refers to a particular adolescent health-risk behavior with responses of yes or no. Examples of questions regarding health-risk behaviors were "In the past 3 months have you smoked cigarettes or any other form of tobacco (cigars,

black and mild, hookah, other) or chewed/used smokeless tobacco?" and "Have you ever carried a weapon (gun, knife, club, other) to protect yourself?" Several questions were reverse scored so that each of the 12 questions were coded as 1 = yes, 0 = no, with the value of 1 indicating the presence of a health- risk behavior. (For a complete set of questions, see Appendix.) The values of the responses for each of the health- risk behavior questions were summed to derive a Health-Risk Behavior Score. The possible range of the Health-Risk Behavior Score variable is 0 to 12, with higher scores indicative of greater health-risk behavior. Health-Risk Behavior (HRB) Score was assumed to be a continuous variable and was used as the **dependent variable** for the multiple linear regression.

Sexually active adolescent (SAA).

The Sexually Active Adolescent variable was derived from RAAPS survey question 14, "Have you ever had any type of sex (vaginal, anal, or oral)?" Responses were coded as yes = 1 and no = 0. Sexually Active Adolescent was used as the **dependent variable** for the logistic regression of Hypothesis 2a. The variable was also used as the inclusion criteria sorting variable to obtain records for Hypothesis 2b.

Use of protection (UOP).

The Use of Protection variable was derived from a single item from the RAAPS survey question 16, "If you have had sex, do you always use a method to prevent sexually transmitted infections and pregnancy (condoms, female barriers, other)?" Responses were coded as yes = 1 and no = 0. Use of Protection was used as the **dependent variable** for the logistic regression of Hypothesis 2b.

Chlamydia test result.

The chlamydia test outcome variable was obtained from the CAHC Utilization Data. The number of positive chlamydia tests was directly obtained from the CAHC Utilization dataset. It was possible that a chlamydia test could be classified with a "not applicable" interpreted as not available. The number of not applicable outcomes was not measured separately but was included with the negative outcomes. The number of negative and not applicable chlamydia tests was computed as the total number of chlamydia tests less the number of positive chlamydia tests. The chlamydia test result was dichotomously coded as 1 = positive, 0 = negative or not applicable. Chlamydia Test Result was the **dependent variable** for Hypothesis 3a.

Gonorrhea test result.

The gonorrhea test outcome variable was obtained from the CAHC Utilization Data. The number of positive gonorrhea tests was directly obtained from the CAHC Utilization dataset. It was possible that a gonorrhea test could be classified with a "not applicable" interpreted as not available. The number of not applicable outcomes was not measured separately but was included with the negative outcomes. The number of negative and not applicable gonorrhea tests was computed as the total number of gonorrhea tests less the number of positive gonorrhea tests. Gonorrhea Test Result was dichotomously coded as 1 = positive, 0 = negative or not applicable. Gonorrhea Test Result was the **dependent variable** for Hypothesis 3b.

Pregnancy test result.

The pregnancy test outcome variable was obtained from the CAHC Utilization Data. The number of positive pregnancy tests was directly obtained from the CAHC

Utilization Dataset. It was possible that a pregnancy test could be classified with a "not applicable" outcome that was interpreted as not available. The number of "not applicable" outcomes was measured separately but was included with the negative outcomes. The number of negative and "not applicable" pregnancy tests was computed as the total number of pregnancy tests less the number of positive pregnancy tests. Pregnancy Test Result was dichotomously coded as 1 = positive, 0 = negative or not-applicable. Pregnancy Test Outcome was the **dependent variable** for Hypothesis 4.

Data Analysis

SPSS v.22 was used to perform all descriptive and inferential analyses. All inferential tests were set at a 95% level of significance. Prior to hypothesis testing, descriptive measures including frequencies and percentages of the variables of study will be presented in a tabular format. The analyses used for hypothesis testing included multiple linear regression (Hypothesis 1), multiple logistic regression (Hypotheses 2) and chi-square tests of independence (Hypotheses 3a, 3b, and 4).

Prior to performing the linear and logistic regression analyses, Pearson's product moment correlations was performed to investigate bivariate relationships between the independent and control variables of study to determine that variable pairs were not too highly correlated (a correlation coefficient of .90 or greater; (Tabachnick & Fidell, 2007).

Assumptions

Statistical analyses of the study included multiple linear regressions for Hypothesis 1, multiple logistic regressions for Hypotheses 2, and chi-square tests of independence for Hypotheses 3and 4. The dataset was investigated for the inferential analysis assumptions of independence of observations and adequate cell count (for the

chi-square tests), absence of outliers, normality, linearity, homoscedasticity, as well as the absence of multicollinearity (for the regression analyses) as relates to the dependent variables of Health- Risk Behavior Score, Sexually Active Adolescent (SAA), and Use of Protection (UOP).

Outliers in a dataset have the potential to distort results of an inferential analysis. A check of box plots for the Health-Risk Behaviors variable was performed to visually inspect for outliers. Nineteen outliers were found on the Health-Risk Behaviors variable. The variable was standardized to check for the presence of extreme outliers (z-score of +/- 3.3). Nine of the outliers were classified as extreme. The tests used in this study were robust to the presence of outliers if the other assumptions are met. Additionally, the number of outliers was minimal (< 1%). A check of the mean value ($M = 2.22$) and 5% trimmed mean value ($M = 2.06$) of the Health-Risk Behaviors variable construct did not indicate a large difference in values. It was therefore determined that all records would be retained for analysis and that the outlier assumption was not violated.

Normality for the scores of the Health-Risk Behaviors variable was investigated with SPSS Explore. The Kolmogorov-Smirnov test (K-S) for normality indicated that the variable was not normally distributed ($p < .01$). However, the K-S test is sensitive to larger sample sizes, with significant findings returned when sample sizes are larger ($n > 50$; Pallant, 2007) (Pallant, 2007). A visual check of the histogram and the Normal Q-Q plot for the Health-Risk Behaviors variable indicated a right skew. As noted for the outlier assumption, a comparison of the median and mean values for the Health-Risk Behaviors variable indicated that both of the measures of central tendency were similar in

value. This further confirmed that outliers and non-normality were not adversely affecting the data. Therefore, the assumption of normality was not violated.

Internal consistency reliability of the Health Risk Score construct with the data collected from study participants was assessed via the use of the Cronbach's alpha coefficient ($\alpha = .639$). A Cronbach's alpha coefficient of .70 or greater is a standard that is considered acceptable for internal consistency reliability of the data with the instrumentation (Pallant, 2007). However, the .70 cut-off is used most often for constructs developed from Likert scales. Moreover, the literature on Cronbach's alpha coefficient cut-offs indicate that a value under the .70 does not necessarily indicate that a construct is not reliable. Nunally (1978) stated "what a satisfactory level of reliability is depends on how a measure is being used" (Nunnally, 1978). Clark and Watson (1995) also state that an exact Cronbach's alpha cutoff is difficult to pin down, and studies have reported alpha values as low as .60 to be indicators of a measure's reliability (L. A. Clark & Watson, 1995).

It is also noted that the items comprising the Health Risk Score are not inter-related per se. The items are measured as an index, a sum of the number of health risks. Cronbach's alpha values on index items are often lower in value than for scale items (Hulin et al., 2001). Therefore, the Cronbach's α value of .639 for the Health Risk score construct was not considered prohibitively low considering the limitations, and therefore the construct was retained for inferential analysis.

Assumptions of linearity between study variables and homoscedasticity were checked with scatter plots of the data. The assumptions of linearity and homoscedasticity were not violated. Multicollinearity diagnostics for the independent variables used in the

multiple regression and logistic regressions were performed using SPSS. No violations were noted, and the assumption of an absence of multicollinearity was met.

Assumptions for the chi-square tests include independence of observations and the criterion that at least 80 percent of cells in the contingency table had an expected count of five or more observations. These assumptions were met.

Multiple linear regression was used to address **Hypothesis 1**. The dependent variable was Health-Risk Behavior Score. The independent variable was Clinic Type. Control variables included (g) Gender, (h) Age, (i) Race/Ethnicity = African American, (j) Race/Ethnicity = Hispanic, (k) Race/Ethnicity = Other, (l) Insurance Status = Private, (m) Insurance Status = Uninsured, and (n) Insurance Status = Unknown/Other. The model specification for **Hypothesis 1** is as follows:

$$Y_{\text{HRB-Score}} = \beta_0 + \beta_{1\text{Clinic Type}} + \beta_{2\text{age}} + \beta_{3\text{gender}} + \beta_{4\text{race = AA +}} + \beta_{5\text{race = Hispanic}} + \beta_{6\text{race = Other}} + \beta_{7\text{insurance status = Private}} + \beta_{8\text{insurance status = Uninsured}} + \beta_{9\text{insurance status = Unknown/other}} + \varepsilon$$

Logistic regression was used to address **Hypothesis 2a**. The dependent variable was Sexually Active Adolescent (SAA). The independent variable was Clinic Type. Control variables included (g) Gender, (h) Age, (i) Race/Ethnicity = African American, (j) Race/Ethnicity = Hispanic, (k) Race/Ethnicity = Other, (l) Insurance Status = Private, (m) Insurance Status = Uninsured, and (n) Insurance Status = Unknown/Other. The model specification for **Hypothesis 2a** is as follows:

$$(\text{logit})Y_{\text{SAA}} = \beta_0 + \beta_{1\text{ClinicType}} + \beta_{2\text{age}} + \beta_{3\text{gender}} + \beta_{4\text{race = AA+}} + \beta_{5\text{race = Hispanic}} + \beta_{6\text{race = Other}} + \beta_{7\text{insurance status = Private}} + \beta_{8\text{insurance status = Uninsured}} + \beta_{9\text{insurance status = Unknown/other}} + \varepsilon$$

Logistic regression was used to address **Hypothesis 2b**. The dependent variable was Use of Protection (UOP). Only records classified as SAA were used in the analysis.

The independent variable was Clinic Type. Control variables included (g) Gender, (h) Age, (i) Race/Ethnicity = African American, (j) Race/Ethnicity = Hispanic, (k) Race/Ethnicity = Other, (l) Insurance Status = Private, (m) Insurance Status = Uninsured, and (n) Insurance Status = Unknown/Other. The model specification for **Hypothesis 2b** is as follows:

$$(\text{logit})Y_{UOP} = \beta_0 + \beta_{1\text{Clinic Type}} + \beta_{2\text{age}} + \beta_{3\text{gender}} + \beta_{4\text{race = AA +}} + \beta_{5\text{race = Hispanic}} + \beta_{6\text{race = Other}} + \beta_{7\text{insurance status = Private}} + \beta_{8\text{insurance status = Uninsured}} + \beta_{9\text{insurance status = Unknown/other}} + \varepsilon$$

A chi-square test of independence was used to test **Hypothesis 3a**. The independent variable was Clinic Type. The dependent variable was Chlamydia Test Outcome. The model specification was the standard chi-square test of independence model:

$$\chi_c^2 = \sum \frac{(O_i - E_i)^2}{E_i}$$

A chi-square test of independence was used to test **Hypothesis 3b**. The independent variable will be Clinic Type. The dependent variable will be Gonorrhea Test Outcome. The model specification is the standard chi-square test of independence model:

$$\chi_c^2 = \sum \frac{(O_i - E_i)^2}{E_i}$$

A chi-square test of independence was used to test **Hypothesis 4**. The independent variable for will be Clinic Type. The dependent variable will be Pregnancy Test Outcome. The model specification is the standard chi-square test of independence model:

$$\chi_c^2 = \sum \frac{(O_i - E_i)^2}{E_i}$$

Study Power

An *a priori* power analysis was performed to determine the required sample size for this study. GPOWER 3.0.10 software (Faul, Erdfelder, Lang, & Buchner, 2007) was used in this determination. The analysis was performed for a Pearson's product moment correlation, a logistic regression, a multiple linear regression, and a chi-square test of independence. The alpha level was set to .05, with a power of .80. Power is (1-β), where β is the chance of Type II error (i.e., one accepts the null hypothesis when it is, in fact, false). At a power of .80, one has an 80% chance of observing significance that was truly in the data.

The sample size needed for a Pearson's correlation with a medium effect size of *r* = .30 (Cohen, 1988), two-tailed test, was 84 records.

The sample size needed for a logistic regression to detect an odds ratio of 1.5 with the conditional probability that Y=1 given X=1 of .50, was 308 records.

A power analysis was also performed for multiple regression with 9 predictor variables, an alpha level of .05, power of .80, and a medium effect size of *f* = .15. The results indicated that a sample of 114 participants (records) was required to achieve power at 80%.

A power analysis was performed for a chi-square test of independence, with an alpha level of .05, power of .80, and a difference between the two independent groups of 10%. The results indicated that a sample of 398 records was required to achieve power at 80%.

The overall results of the power analyses indicated sufficient samples sizes for each statistical test required for this study (N = 14,682).

Results

The results of this study are divided into two sections (a) description of the study population and, (b) tests of hypotheses. The chapter concludes with a summary of the results.

The purpose of this quantitative correlational study was to assess the associations between the type of clinic (SBHCs or SLHCs) used by adolescents 13-18-years-old in Michigan and behaviors that result in sexual-risk as measured by clinic outcomes.

Sixty percent of the adolescents were not sexually active. The majority of adolescents who were sexually active (40%) used protection (69.4%). Eighty-five percent of the adolescents (85.2%) tested negative for chlamydia. The majority of the adolescents tested for gonorrhea were negative (96.7%). Eighty-eight percent of the adolescents tested for pregnancy had negative results.

Demographics, Behavioral and Clinical Results by Clinic Type

SBHCs.

A total of $N = 13,312$ adolescents used SBHCs in Michigan between the years of 2010 – 2012. Table 3.2 presents the frequency counts and percentages of the nominal variables, and the measures of central tendency for the continuous variables of the study. The age of SBHC users included in the sample ranged from 13 to 18 years ($M = 15.31$, $SD = 1.54$). SBHC users were evenly distributed across gender, 54.1% were female and 45.9% were male. The majority of the SBHC users in the sample were classified as either African American (44.4%) or White (40.2%). More than half of the adolescents (54.8%)

had public insurance and 30.4% had private insurance. Sixty percent of SBHC users were not sexually active. The majority of SBHC users who were sexually active (41%) used protection (69.4%). Fourteen percent of the adolescents (14.4%) tested for chlamydia were positive. A small percentage of the adolescents (3.4%) tested positive for gonorrhea. Fourteen percent of the adolescents (14.3%) tested for pregnancy had positive results.

SLHCs.

A total of $N = 1{,}370$ adolescents used SLHCs in Michigan between the years of 2010 – 2012. Table 3.2 presents the frequency counts and percentages of the nominal variables, and the measures of central tendency for the continuous variables of the study. The age of the SLHC users included in the sample ranged from 13 to 18 years ($M = 15.50$, $SD = 1.51$). SLHC users were evenly distributed across gender, 56.1% were female and 43.9% were male. A large majority of the SLHC users in the sample were classified as White (85.8%). Fewer than half of the adolescents (47.4%) had public insurance and 38.9% had private insurance. Sixty-one percent of SLHC users were not sexually active. The majority of adolescents who were sexually active (39.3%) used protection (69.5%). Sixteen percent of SLHC users (15.5%) tested for chlamydia were positive. A small percentage of the users (3.1%) tested positive for gonorrhea. Eleven percent of the adolescents (10.9%) tested for pregnancy had positive results.

Table 3.2
Demographic, Behavioral, and Clinical Variables by Clinic Type

			SBHC (*N* = 13312)			SLHC (*N* = 1370)			Total (*N*=14682)		
Variable	Database	Levels	*N*	%	*M(SD)*	*N*	%	*M(SD)*	*N*	%	*M(SD)*
User Data											
Age of Adolescent Users	RAAPS	---	---	---	15.31(1.54)	---	---	15.50(1.51)	---	---	15.32(1.54)
Gender	RAAPS										
		Male (Ref)	6104	45.9	---	602	43.9	---	6706	45.7	---
		Female	7208	54.1	---	768	56.1	---	7976	54.3	---
Race/Ethnicity	RAAPS										
		White (Ref)	5352	40.2	---	1175	85.8	---	6527	44.5	---
		African American	5914	44.4	---	65	4.7	---	5979	40.7	---
		Hispanic	820	6.2	---	39	2.8	---	859	5.9	---
		Other	1226	9.2	---	91	6.6	---	1317	9.0	---
Insurance Status	RAAPS										
		Public (Ref)	7292	54.8	---	649	47.4	---	7941	54.1	---
		Private	4051	30.4	---	533	38.9	---	4584	31.2	---
		Uninsured	1494	11.2	---	111	8.1	---	1605	10.9	---
		Unknown/Other	475	3.6	---	77	5.6	---	552	3.8	---
Behavioral Data											
Health-Risk Score	RAAPS	---	---	---	2.22(1.76)	---	---	2.18(1.81)	---	---	2.22(1.77)
Sexually Active Adolescent (SAA)	RAAPS										
		Yes	5389	40.5	---	538	39.3	---	5927	40.4	---
		No	7923	59.5	---	832	60.7	---	8755	59.6	---

Note. *M* = Mean; *SD* = Standard Deviation; *Mdn* = Median

Table 3.2 (cont'd)

Variable	Database	Levels	SBHC (*N* = 13312) *N*	%	*M(SD)*	SLHC (*N* = 1370) *N*	%	*M(SD)*	Total (*N*=14682) *N*	%	*M(SD)*
SAA & Use of Protection (UOP)	RAAPS										
		Yes	3742	69.4	---	374	69.5	---	4116	69.4	---
		No	1507	28.0	---	142	26.4	---	1649	27.8	---
		Not Applicable	140	2.6	---	22	4.1	---	162	2.7	---
Clinical Data											
Chlamydia Test Positive Outcome	Utilization										
		Yes	594	14.4	---	273	15.5	---	867	14.8	---
		No	3524	85.6	---	1486	84.5	---	5010	85.2	---
		Total Tests	4118	100.0	---	1759	100.0	---	5877	100.0	---
Gonorrhea Test Positive Outcome	Utilization										
		Yes	135	3.4	---	44	3.1	---	179	3.3	---
		No	3878	96.6	---	1360	96.9	---	5238	96.7	---
		Total Tests	4013	100.0	---	1404	100.0	---	5417	100.0	---
Positive Pregnancy Test	Utilization										
		Yes	312	14.4	---	276	10.9	---	588	12.5	---
		No	1873	85.7	---	2247	89.1	---	4120	87.5	---
		Total Tests	2185	100.0	---	2523	100.0	---	4708	100.0	---

Note. M = Mean; *SD* = Standard Deviation; *Mdn* = Median

Correlational Analysis

Prior to hypothesis testing, a series of bivariate correlational analyses were investigated between the 14 variables of (a) Clinic Type, (b) Gender, (c), Age, (d) Race/Ethnicity = African American, (e) Race/Ethnicity = Hispanic, (f) Race/Ethnicity = White, (g) Race/Ethnicity = Other, (h) Insurance Status = Private, (i) Insurance Status = Public, (j) Insurance Status = Uninsured, (k) Insurance Status = Unknown/Other (l) Health-Risk Score, (m) SAA, and (n) UOP. Table 3.3 presents the correlation coefficients for the bivariate associations.

Correlations of .10 to .29 are considered weak, .30 to .49 moderate, and .50 to 1.0 strong (Pallant, 2007). The correlation results returned many weak yet significant correlations. Significance on the weak correlations was most likely due to the large size of the dataset. Larger datasets will return significant findings on smaller effects (Tabachnick & Fidell, 2007). Only moderate to strong correlations are reported in the body of this chapter, in order to preserve parsimony in reporting of the findings.

Age was significantly correlated with SAA ($r = .446$, $p < .0005$). The direct relationship indicated that the presence of sexual activity was associated with increases in age of the adolescent users.

HRB score was significantly correlated with SAA ($r = .399$, $p < .0005$). The direct relationship indicated that adolescents who were sexually active were associated with higher HRB scores than those who were not sexually active.

Table 3.3
Correlations for Bivariate Relationships of Variables Utilized for Inferential Analysis

	Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1.	Age														
2.	Gender	.051**													
3.	African American	-.020*	-.017*												
4.	Hispanic	.019*	-.010	-.207**											
5.	White	.023**	.011	-.742**	-.223**										
6.	Other ethnicity	-.020*	.018*	-.260**	-.078**	-.281**									
7.	Private insurance	.003	-.023**	-.237**	-.094**	.278**	.002								
8.	Public insurance	-.039**	.017*	.233**	.035**	-.234**	-.022**	-.731**							
9.	Uninsured	.064**	.008	-.022**	.088**	-.029**	.018*	-.236**	-.380**						
10.	Unknown/Other insurance	-.011	-.003	.005	-.005	-.015	.022**	-.133**	-.215**	-.069**					
11.	Clinic Type	.036**	.011	-.235**	-.041**	.267**	-.026**	.053**	-.043**	-.029**	.031**				
12.	Health-Risk Behavior Score	.206**	.071**	.006	.005	-.007	-.002	-.097**	.068**	.020*	.027**	-.007			
13.	Sexually Active (SAA)	.446**	.060**	.092**	.005	-.077**	-.028**	-.111**	.080**	.027**	.015	-.007	.399**		
14.	Use of Protection (UOP)	-.024*	-.141**	-.003	-.015	.018	-.013	.051**	-.026*	-.014	-.023	-.020	-.197**	.080**	

* $p < .05$; **$p < .001$

Hypothesis Testing

Hypothesis 1: Health Risk Behavior.

Adolescent SLHC users will have a significantly higher Health-Risk Behavior (HRB) Score than adolescent SBHC users.

A multiple linear regression was used to address Hypothesis 1. The dependent variable was HRB Score. A total of eight control variables were included Gender; Age; Race/Ethnicity coded into three dummy variable groups of (a) African American, (b) Hispanic, and (c) Other; and Insurance Status coded into three dummy variable groups of (a) Private, (b) Uninsured, and (c) Unknown/Other. Results of the regression are presented in Table 3.4 and include the unstandardized model coefficients (B) and associated standard errors (SE B), standardized regression coefficients (β), and t-statistics and significance values for the predictor variables.

The model indicated that at least one predictor was significantly different from zero [F (9, 10643) = 70.37, $p < .0005$], with R^2 of .056 (.055 adjusted). The adjusted R-square value of .055 indicates that approximately 5.5% of the variability in the dependent variable of HRB Score was predicted by nine independent variables in the model. Age was a significant predictor of HRB Score [$B = 0.24$; t (10,643) = 21.61, $p <.0005$]. The squared semi-partial correlation coefficient of the Age variable indicated that 4% of the variance in the outcome of HRB Score was uniquely predicted by the Age variable. The size and magnitude of the relationship between Age and HRB Score indicated that for each one year increase in Age, the score for the HRB Score increased by a factor of 0.2.

Gender was a significant predictor of HRB Score [$B = 0.21$; t (10,643) = 6.16, $p <.0005$]. The squared semi-partial correlation coefficient of the gender variable indicated

that less than 1% of the variance in the outcome of HRB Score was uniquely predicted by the adolescent's gender. The reference category for gender was male. Therefore, the size and magnitude of the relationship between the variables of Gender and HRB Score indicated that the HRB Score was approximately 0.2 points greater for females compared to males.

Race/Ethnicity was a significant predictor for the outcome of HRB Score [B = -0.08; t (10,643) = -1.99, p = .046]. The squared semi-partial correlation coefficient of the race/ethnicity variable indicated that less than 1% of the variance in the outcome of HRB Score was uniquely predicted by the race/ethnicity. The reference category for Race/Ethnicity was White. Therefore, the size and magnitude of the relationship between the variables of Race/Ethnicity = African American and HRB Score indicated that the HRB Score decreased by approximately 0.08 points for adolescents who were African American when compared to adolescents who were White.

Insurance Status = Private was a significant predictor for the outcome of HRB Score [B = -0.39; t (10,643) = -10.04, p <.0005]. The squared semi-partial correlation coefficient of the insurance status variable indicated that approximately 1% of the variance in the outcome of HRB Score was uniquely predicted by the insurance status variable. The reference category for insurance status was Public. Therefore, the size and magnitude of the relationship between the variables of Insurance Status = Private and HRB Score indicated that the HRB Score decreased by approximately 0.39 points for adolescents with private insurance when compared to adolescents with public insurance.

Conclusion as relates to Hypothesis 1: Health Risk Behavior.

The independent variable, Clinic Type, was not a significant predictor of HRB Score, when controlling for predictors of gender, race/ethnicity, and insurance status. Therefore, do not reject Null Hypothesis 1. There is not sufficient evidence to indicate that adolescent SLHC users have significantly higher HRB Scores than adolescent SBHC users.

Table 3.4
Multiple Regression Results for Health Risk Behavior Score Regressed on the Independent and Control Variables of the Study

Variable	B	*SE* B	*β*	*t*	Sig.
Age	0.235	0.011	0.204	21.611	<.0005
Gender (Female)	0.206	0.033	0.058	6.160	<.0005
Race/Ethnicity					
African American	-0.078	0.039	-0.022	-1.992	.046
Hispanic	-0.091	0.075	-0.012	-1.223	.221
Other	-0.038	0.062	-0.006	-0.615	.539
Insurance Status					
Private	-0.393	0.039	-0.103	-10.035	<.0005
Uninsured	-0.092	0.056	-0.016	-1.652	.099
Unknown/Other	0.145	0.089	0.016	1.632	.103
Clinic Type (SLHC)	-0.098	0.060	-0.016	-1.639	.101
Constant	-1.321	0.170	---	---	---
Model Summary	$F = 70.37$, sig <.0005 $N = 10{,}653$ $R^2 = .056$ Adjusted $R^2 = .055$				

Note. Sig. = Significance.

Hypothesis 2a: **Sexually Active Adolescents.**

SLHCs will have significantly higher odds than SBHCs of being **sexually active** and using protection.

A multiple logistic regression was performed to address Hypothesis 2. The dependent variable was Sexually Active Adolescent (SAA), which was coded as 1 = yes and 0 = no. The independent variable was Clinic Type, which was coded as 1 = SLHC and 0 = SBHC. A total of eight control variables were included: Gender; Age; Race/Ethnicity, coded into three dummy variable groups of (a) African American, (b) Hispanic, and (c) Other; and Insurance Status, coded into three dummy variable groups of (a) Private, (b) Uninsured, and (c) Unknown/Other.

A total of 14,682 cases were included in the model; 8,755 cases were classified as not sexually active and were coded as 0; 5,927 cases were classified as sexually active adolescents (SAA) and were coded as 1. Table 3.5 presents the findings of the logistic regression analysis.

The Omnibus Tests of Model Coefficients gives an indication of how well the model performs over and above results that would be obtained for a model with no predictors entered (an intercept-only model). The test was statistically significant χ^2 (9) = 3,506.53, p = <.0005, indicating that the predictors, as a set, reliably differentiated between adolescents who were classified as sexually active and adolescents who were not. The logistic regression model's goodness-of-fit was also assessed using the Hosmer and Lemeshow (H-L) Test, χ^2 (8) = 91.64, p <.0005. For the H-L test, a p-value greater than .05 indicates the data fits well with the model. However, as with any frequentist test of significance, large sample sizes will result in tests of significant findings even on the

smallest differences or effects (Paul, Pennell, & Lemeshow, 2013). Therefore, the discrepancy between the findings of the Omnibus test (good fit) and H-L test (not a good fit) could be due to the large sample size.

Variability of the model was assessed using two statistics, Cox and Snell R-Square (R^2 = .212) and Nagelkerke R-Square (R^2 = .287). These two tests indicated that between 21% and 29% of the variability in the dependent variable was explained by the predictors of the model. Percentage accuracy in classification (PAC) of the correct outcome category of sexually active adolescents (SAA) for the nine predictor model was 71.3%, with an improvement over the base model constant only (no predictors) percentage correct of 59.6%.

Wald statistics indicated that five of the predictors contributed significantly to the model. Age was also a statistically significant predictor of the SAA outcome [OR = 2.03, 95% CI OR = (1.98, 2.09); p <.0005]. The size of the odds ratio indicated that the odds of an adolescent user being sexually active increase 2 times for each one-year increase in age. Gender was significant [OR = 1.22, 95% CI OR = (1.13, 1.31); p <.0005]. The odds ratio for the gender variable indicated that females were 22% more likely to be sexually active than males. Race/ethnicity was statistically significant [OR = 1.53, 95% CI OR = (1.40, 1.67); p <.0005]. The odds ratio indicated that adolescents who were African American are 53% more likely to be sexually active when compared to White adolescents. The Insurance Status group of Private Insurance was statistically significant [OR = 0.58, 95% CI OR = (0.53, 0.63); p <.0005]. The odds ratio indicated that adolescents who have Private insurance were 42% less likely to be sexually active when compared to adolescents who had Public insurance. The Insurance Status group of

Uninsured was also statistically significant [OR = 0.83, 95% CI OR = (0.73, 0.93); p = .002]. The odds ratio indicated that adolescents who were Uninsured were 17% less likely to be sexually active when compared to adolescents who had Public insurance.

Conclusion as relates to Hypothesis 2a: Sexually Active Adolescents.

Although five of the control variables were significant predictors of the outcome of SAA, the independent variable, Clinic Type, was not statistically significant for the SAA outcome, and therefore, did not reject Null hypothesis 2a. There is not sufficient evidence to indicate that SLHCs will have significantly higher odds than SBHCs of users being **sexually active.**

Table 3.5 Logistic Regression Analysis of Outcome on SAA as a Function of Independent & Control Variables of Study (N =14,682)

Variable	B	*SE* B	Wald χ^2	Sig.	Odds Ratio	95% CI for Odds Ratio	
						Lower	Upper
Age	0.708	0.014	2508.38	<.0005	2.031	1.975	2.088
Gender (Female)	0.195	0.038	25.86	<.0005	1.216	1.128	1.311
Race/Ethnicity							
African American	0.424	0.045	88.81	<.0005	1.527	1.399	1.668
Hispanic	0.091	0.084	1.15	.283	1.095	0.928	1.292
Other	0.020	0.072	0.08	.785	1.020	0.886	1.174
Insurance Status							
Private	-0.546	0.046	142.74	<.0005	0.579	0.530	0.633
Uninsured	-0.192	0.063	9.32	.002	0.826	0.730	0.934
Unknown/Other	0.064	0.101	0.405	.525	1.067	0.874	1.301
Clinic Type (SLHC)	0.007	0.068	0.01	.914	1.007	0.881	1.151
Constant	-11.262	0.224	2521.08	---	---	---	---

Note. Sig. = Significance; CI = Confidence Interval

Hypothesis 2b: Use of Protection.

SLHCs will have significantly higher odds than SBHCs of SAA always **using protection** against STIs and unintended pregnancy.

A multiple logistic regression was performed to address Hypothesis 3. The dependent variable was Use of Protection (UOP), which was coded as 1 = yes and 0 = no. The independent variable was Clinic Type, which was coded as 1 = SLHC and 0 = SBHC. A total of eight control variables were included: Gender; Age; Race/Ethnicity, coded into three dummy variable groups of (a) African American, (b) Hispanic, and (c) Other; and Insurance Status, coded into three dummy variable groups of (a) Private, (b) Uninsured, and (c) Unknown/Other.

Of the 5,765 SAA cases included in the model, 4,116 adolescents were using protection (UOP) and were coded as 1, while 1,649 adolescents were not using protection (UOP) and were coded as 0. Table 3.6 presents the findings of the logistic regression analysis.

The Omnibus Tests of Model Coefficients gives an indication of how well the model performs over and above results that would be obtained for a model with no predictors entered (an intercept-only model). The test was statistically significant χ^2 (9) = 185.44, p = <.0005, indicating that the predictors, as a set, reliably differentiated between those classified as sexually active and those who were not. The logistic regression model's goodness-of-fit was also assessed using the Hosmer and Lemeshow Test, χ^2 (8) = 8.80, p = .359. For this test, a p-value greater than .05 indicates the data fit well with the model. Therefore, sufficient goodness-of-fit was indicated for this model.

Variability of the model was assessed using two statistics, Cox and Snell R-Square (R^2 = .032) and Nagelkerke R-Square (R^2 = .045). These two tests indicated that between 3% and 5% of the variability in the dependent variable was explained by the predictors of the model. Percentage accuracy in classification (PAC) of the correct outcome category of Use of Protection (UOP) for the nine-predictor model was 71.4%, with improvement over the base model constant only (no predictors, all cases not using protection) percentage correct of 28.6%.

Wald statistics indicated that four of the predictors contributed significantly to the model. The variable of Age was statistically significant for the outcome of UOP [OR = 0.90, 95% CI OR = (0.86, 0.94); p <.0005]. The odds ratio indicated that for each one-year increase in age, an adolescent is 10% less likely to use protection. Gender was significant [OR = 0.49, 95% CI OR = (0.44, 0.56); p <.0005]. The odds ratio for the gender variable indicated that females were 51% less likely to use protection when compared to male adolescents. The race/ethnicity group of Hispanic was statistically significant [OR = 0.75, 95% CI OR = (0.58, 0.96); p = .022]. The odds ratio indicated that Hispanic adolescents were 25% less likely to use protection when compared to adolescents in the race/ethnicity reference group of White. The Insurance Status group of Private was statistically significant [OR = 1.37, 95% CI OR = (1.18, 1.59); p <.0005]. The magnitude of the odds ratio indicated that adolescents who had Private insurance are 37% more likely to use protection when compared to adolescents who had Public insurance (reference group).

Conclusion as relates to Hypothesis 2b: Use of Protection.

Although four of the control variables were significant predictors of the outcome of UOP, the independent variable, Clinic Type, was not statistically significant for the UOP outcome. Therefore, did not reject Null Hypothesis 3. There is not sufficient evidence to indicate that SLHCs have significantly higher odds than SBHCs of SAA always using protection.

Table 3.6
Logistic Regression Analysis of Outcome on UOP as a Function of Independent & Control Variables of Study (N =5,765)

Variable	B	*SE* B	Wald χ^2	Sig.	Odds Ratio	95% CI for Odds Ratio	
						Lower	Upper
Age	-0.109	0.024	21.34	<.0005	0.896	0.856	0.939
Gender (Female)	-0.706	0.063	126.40	<.0005	0.494	0.437	0.558
Race/Ethnicity							
African American	-0.083	0.071	1.39	.239	0.920	0.801	1.057
Hispanic	-0.292	0.127	5.26	.022	0.747	0.582	0.958
Other	-0.075	0.116	0.42	.515	0.928	0.740	1.163
Insurance Status							
Private	0.313	0.077	16.55	<.0005	1.367	1.176	1.589
Uninsured	0.003	0.093	0.00	.976	1.003	0.836	1.203
Unknown/Other	-0.152	0.145	1.10	.295	0.859	0.646	1.142
Clinic Type (SLHC)	0.059	0.110	0.29	.592	1.061	0.855	1.315
Constant	2.411	0.392	37.73	---	---	---	---

Note. Sig. = Significance; CI = Confidence Interval

Hypothesis 3a: Chlamydia Test Outcome.

SBHCs will have a greater proportion of adolescent users with positive chlamydia test results than SLHCs.

A chi-squared test of independence was performed to address Hypothesis 3a. Only adolescents who were tested for chlamydia were included in the analysis (N = 5,877). The independent variable was Clinic Type, which was classified into two categories (a) SBHC, and (b) SLHC. The dependent variable was Chlamydia Test Outcome, which was classified into two categories (a) Negative and (b) Positive. Chi-square tests of independence included adjusted standardized residuals for each cell in the cross-tabulation table. The adjusted standardized residual is a z-score, a measurement of standard deviation from the expected count of a cell in the chi-square contingency table. Therefore, adjusted standardized residuals of the absolute value of 3 or greater were considered to be contributing a significant amount to the chi-square value (Agresti, 2002). Table 3.7 presents the cross-tabulation of results of the chi-square analysis. Results were not statistically significant [χ^2 (1) = 1.18; p = .278].

Conclusion as relates to Hypothesis 3a: Chlamydia Test Outcome.

Results of the chi square test of independence were not statistically significant, therefore, did not reject Null Hypothesis 3a. There is not sufficient evidence to indicate that SBHCs have a statistically significantly greater proportion of adolescent users with positive chlamydia test results than SLHCs.

Table 3.7
Cross-Tabulation of Clinic Type vs. Chlamydia Test Results

	Test Results		
Clinic Type	Positive	Negative	Total
SBHC (frequency)	594	3524	4118
Expected Count	607.5	3510.5	---
% within clinic total	14.4	85.6	---
% Total	10.1	60.0	70.1
Adj. std. residual	-1.1	1.1	---
SLHC (frequency)	273	1486	1759
Expected Count	259.5	1499.5	---
% within clinic total	15.5	84.5	---
% Total	4.6	25.3	29.9
Adj. std. residual	1.1	-1.1	---
Total (frequency)	867	5010	5877
Expected Count	---	---	---
% Total	14.8	85.2	100.0

X^2 (1) = 1.18, p = .278

Note. Adj. std. residual = Adjusted Standardized Residual.

Hypothesis 3b: Gonorrhea Test Outcome.

SBHCs will have a greater proportion of adolescent users with positive gonorrhea test results than SLHCs.

A chi-squared test of independence was performed to address Hypothesis 3b. Only adolescents who were tested for gonorrhea were included in the analysis (N = 5,417). The independent variable was Clinic Type, which was classified into two categories (a) SBHC, and (b) SLHC. The dependent variable was Gonorrhea Test Outcome, which was classified into two categories (a) Negative and (b) Positive. Table 3.8 presents the cross-tabulation of results of the chi-square analysis. Results were not statistically significant [χ^2 (1) = 0.17; p = .678].

Conclusion as relates to Hypothesis 3b: Gonorrhea Test Outcome.

Results of the chi square test of independence were not statistically significant, therefore did not reject Null Hypothesis 3b. SBHCs did not have a statistically significantly greater proportion of adolescent users with positive gonorrhea test results than SLHCs.

Table 3.8
Cross-Tabulation of Clinic Type vs. Gonorrhea Test Results

	Test Results		
Clinic Type	Positive	Negative	Total
SBHC (frequency)	135	3878	4013
Expected Count	132.6	3880.4	---
% within clinic total	3.4	96.6	---
% Total	2.5	71.6	74.1
Adj. std. residual	0.4	-0.4	---
SLHC (frequency)	44	1360	1404
Expected Count	46.4	1357.6	---
% within clinic total	3.1	96.9	---
% Total	0.8	25.1	25.9
Adj std. residual	-0.4	0.4	---
Total (frequency)	179	5238	5417
Expected Count	---	---	---
% Total	3.3	96.7	100.0

X^2 (1) = 0.17, p = .678

Note. Adj. std. residual = Adjusted Standardized Residual

Hypothesis 4: Pregnancy Test Outcome.

SBHCs will have a greater proportion of female adolescent users with positive pregnancy test results than SLHCs.

A chi-squared test of independence was performed to address Hypothesis 4. Only female adolescents who were tested for pregnancy were included in the analysis (N = 4,708). The independent variable was Clinic Type, which was classified into two

categories (a) SBHC, and (b) SLHC. The dependent variable was Pregnancy Test Outcome, which was classified into two categories (a) Negative and (b) Positive. Table 3.9 presents the cross-tabulation of results of the chi-square analysis. Results were statistically significant [χ^2 (1) = 11.95; p = .001]. The proportion of adolescents who tested positive for pregnancy at SBHCs (14.3%) was greater than the expected proportion (12.5%; Adj. std. residual = 3.5). The proportion of the adolescents who tested positive for pregnancy at SLHCs (10.9%) was less than the expected proportion (12.5%; Adj. std. residual = -3.5).

Table 3.9
Cross-Tabulation of Clinic Type vs. Pregnancy Test Results

	Test Results		
Clinic Type	Positive	Negative	Total
SBHC (frequency)	312	1873	2185
Expected Count	272.9	1912.1	---
% within clinic total	14.3	85.7	---
% Total	6.6	39.8	46.4
Adj. std. residual	3.5	-3.5	---
SLHC (frequency)	276	2247	2523
Expected Count	315.1	2207.9	---
% within clinic total	10.9	89.1	---
% Total	5.9	47.7	53.6
Adj. std. residual	-3.5	3.5	---
Total (frequency)	588	4120	4708
Expected Count	---	---	---
% Total	12.5	87.5	100.0

X^2 (1) = 11.95, p = .001

Note. Adj. std. residual = Adjusted Standardized Residual.

Conclusion as relates to Hypothesis 4: Pregnancy Test Outcomes.

Results of the chi-square test of independence indicated that a lesser than expected proportion of female adolescent users of SLHCs tested positive for pregnancy,

and a greater proportion of female adolescent users of SBHCs than expected tested positive for pregnancy. Therefore, Null Hypothesis 4 was rejected. SBHCs had a statistically significantly greater proportion of female adolescent users with positive pregnancy test results than SLHCs.

Results Summary

Significant results were found for the multiple linear regressions. However, the independent variable, Clinic Type (SBHC or SLHC), was not a significant predictor of the Health-Risk Behavior Scores (HRB Scores) as measured by the RAAPS dataset. Therefore, **Research Hypothesis 1** was not supported. Significant results were found for both of the logistic regressions. However, the independent variable, Clinic Type (SBHC or SLHC), was not a significant predictor of adolescent users being sexually active (SAA) or their use of protection against STIs or pregnancy (UOP) outcomes as measured by the RAAPS dataset. Therefore, **Research Hypotheses 2a** and **2b** were not supported.

For **Research Hypothesis 3a**, a statistically significantly greater proportion of adolescent users with positive chlamydia test results were not found for SBHCs when compared to SLHCs as measured by the CAHC Utilization Data. Therefore, Hypothesis **3a** was not supported. For **Research Hypothesis 3b**, SBHCs did not have a statistically significantly greater proportion of adolescent users with positive gonorrhea test results than SLHCs as measured by the CAHC utilization data. Therefore, **Hypothesis 3b** was not supported. For **Research Hypothesis 4**, SBHCs had a statistically significantly greater proportion of female adolescent users with positive pregnancy test results than SLHCs as measured by the CAHC Utilization Data. Therefore, **Hypothesis 4** was supported.

Discussion

I approached this study through several pathways to investigate how the policy to forbid the provision of condoms and contraceptives on school property including SBHCs is associated with the use of protection (condom and contraceptives) by adolescent SBHC users. The intention was to contrast outcomes of the SBHCs with those of the community-based SLHCs where adolescent users can receive sexual health services inclusive of immediate condoms and contraceptives to protect against STIs and unintended pregnancy. First, I examined the adolescent users of the two types of clinics to assess demographic similarities and differences between the two populations, e.g., age, gender, race/ethnicity, and insurance status. I also analyzed the health- and sexual-risk behaviors of the two populations of users to consider the potential that SLHC users were more high-risk than SBHC users as suggested by the literature (Fothergill & Ballard, 1998).

Profiles and Health-Risk Behaviors of Users

The results indicate that SBHC users and SLHC users were demographically more similar than they were different. Table 3.2 provides a comparison of SBHC and SLHC users. Conclusively, adolescent users of SBHCs and SLHCs were similar in age, gender, and income level as measured by insurance status, i.e., private or public insurance. Race/ethnicity was the only significant difference with SBHCs serving a predominantly White and African American adolescent population and SLHCs serving a majority White adolescent population.

SBHC and SLHC users were similar on all of the behavioral indicators measured by RAAPS. Both groups of users had the same level of health-risk behaviors as indicated

by the Health-Risk Behavior Score. SBHC and SLHC users were also comparable in sexual-risk behaviors as measured by having had any type of sex and consistent use of condoms or contraceptives. Research on SLHC users is not available in the literature to be able to compare empirical findings from this study. However the sexual-risk behaviors of SBHC and SLHC users in this study are comparable to adolescents that responded to the 2011 state of Michigan YRBSS where 41% reported having had sex and 61% reported using condoms the last time they had sex (Michigan Department of Education, 2011).

From this comparative analysis, I conclude that the adolescent users of SBHCs and SLHCs in Michigan differ from one another only by race and ethnicity. They are comparable on all other demographics. Moreover, they are equally engaged in health- and sexual-risk behaviors. Of most concern is that 30% of sexually active adolescent users of SBHCs and SLHCs do not consistently use protection against STIs and unintended pregnancy.

Health- and Sexual-Risk Behaviors of Clinic Users

The second pathway of investigation was to test a number of hypotheses to determine the relationships between clinic type (SBHC or SLHC) and the health- and sexual-risk behaviors of adolescent users. Health-risk behaviors were characterized as a health-risk behavior score (HRB). Sexual-risk behaviors were characterized as being sexually active (having any type of sex) and inconsistent use of protection against STIs and unintended pregnancy. SLHCs are community-based and serve a broader population of at-risk adolescents such as those who have dropped out of school, are in foster care or state custody, or are emancipated (Fothergill & Ballard, 1998). Therefore, I hypothesized

that SLHC users would have higher HRB scores than SBHC users, but found no support for this hypothesis. Furthermore, I hypothesized that SLHCs would have greater odds of adolescent users being sexually active and found no support for that hypothesis either. Finally, I hypothesized that SLHCs would have significantly higher odds than SBHCs of sexually active adolescents using protection against STIs and pregnancy because condoms and contraceptives are dispensed at SLHCs during the clinic visit. There was no apparent support for this hypothesis as well. Essentially there was no discernible difference among the health- or sexual-risk behaviors of the users of SBHCs and SLHCs. One plausible explanation for this finding is that SBHC and SLHC users were developmentally comparable. The mean age for SBHC users was 15.31years and for SLHC users it was 15.50 years. While puberty and not chronological age predicts adolescent brain development (Steinberg, 2009, 2010b) it is reasonable to suspect that these users are developmentally comparable and, therefore, behavioral differences were undetectable. Additionally, the RAAPS surveys are self-administered at the beginning of the clinic visit and prior to being seen by clinical providers. Consequently SLHC clinic providers may have provided condoms and/or contraception to sexually active SLHC users during the clinic visit and after the surveys were completed. Changes in sexual-risk behaviors may be apparent on subsequent RAAPS surveys.

Another possibility is that the SBHCs have not emphasized a school-wide approach to influencing school-wide normative behaviors for using condoms or contraceptives among sexually active adolescents. This strategy would require SBHC providers to consistently stretch beyond clinic walls and adopt a population health commitment to improving the sexual health of all adolescents. And finally, in the

absence of policies that support and sustain changes in sexual-risk behaviors such that sexually active adolescents can receive condoms and contraceptives directly from SBHCs the potential benefits of this model of adolescent health care may not be fully optimized.

While clinic type did not predict adolescents' health- risk or sexual- risk behaviors there were a number of statistically significant predictors in the various regression (linear and logistic) models that are informative. Age, gender, race/ethnicity, and insurance status were control variables that were predictive of health- or sexual-risk behaviors.

Sociodemographics and Health- and Sexual-Risk Behaviors

Age was a statistically significant predictor of adolescents' health-risk behavior score indicative of the number of co-occurring health-risk behaviors as age increases. Likewise, the odds of being sexually active increased two times for each one-year increase in adolescents' age; at the same time, the likelihood of using protection against STIs and unintended pregnancy decreased by 10%. Age had a moderately significant correlation with adolescents having any kind of sex. These findings are consistent with the literature that has found increasing presence of multiple health-risk behaviors with age (Brener & Collins, 1998; Kulbok & Cox, 2002; Mahalik, et al., 2013) and increasing sexual-risk behaviors with age (Bauermeister, et al., 2011; Fortenberry, et al., 2010; Mahalik, et al., 2013; Nahom, et al., 2001). The mean age of this study population was 15.32 years; neuroscientists and behavioral scientists have found that the structure and function of the adolescent brain evolves through a course of sensation-seeking events that manifest as risk-taking behaviors (Steinberg, 2007, 2008). This dynamic continues, without the benefit of mature impulse control mechanisms, until the adolescent reaches

young adulthood at about 19-20 years of age. It is plausible that this study population of middle adolescents was in the midst of the tension between sensation-seeking and impulse control (Jessor, 1991).

Gender was found to be a statistically significant predictor of the health- and sexual-risk behaviors of this study. When compared to males, females had a greater health-risk behavior were more likely to be sexually active and less likely of using protection against STIs and unintended pregnancy. The literature supports the finding that gender is a significant predictor of health- and sexual-risks; however, variations exist between male and female based on the specific health- or sexual-risk behavior (Bolland, 2003; Brener & Collins, 1998; Mahalik, et al., 2013). For example, Mahalik and colleagues (2013) found that early adolescent females were more likely than their male counterparts to smoke, while males were more likely to engage in more risk behaviors than their female counterparts. Another study indicated that female SBHC users were more likely than male SBHC users to use contraceptives and therefore, to reduce their sexual-risk behaviors (Ethier, et al., 2011). These findings suggest that gender differences in adolescent health- and sexual-risk behaviors require additional exploration for risk-reduction programming to be effective (L. Hacker, et al., 2005; Niyonsenga & Hlaing, 2007; Ozer, et al., 2003).

This study found **race and ethnicity** to be a statistically significant predictor of adolescents' health- and sexual-risk behaviors. The health-risk behavior score was lower for African American adolescent users when compared to White adolescents. However, African American adolescents were more likely to be sexually active than White adolescents. Hispanic adolescent users were found to be less likely to use protection

against STIs and unintended pregnancy than White adolescents. This is a provocative paradox to consider. Race and ethnicity have been well studied with regard to disparities in adolescent health- and sexual-risk behaviors. Sexual-risk behaviors have been found to exist in the absence of other health-risk behaviors in African American adolescents (B. Stanton, et al., 1993). Sexual-risk behaviors in Hispanic adolescents have consistently been found to be attributable to not using condoms or contraceptives (Nkansah-Amankra, et al., 2011; Waddell, et al., 2010). Further, it has been suggested that race and ethnicity are risk markers as opposed to risk factors for adolescent sexual-risk behaviors (Goodman, et al., 2005) and that when taken together with income and family structure explain only a small amount (7-10%) of adolescent health-risk behaviors (R W. Blum, et al., 2000; J. S. Santelli, et al., 2000). This is suggestive of the potential value in tailoring interventions for specific adolescent populations as opposed to relying on a single approach to be effective for each racial and ethnic group (Jayakody et al., 2011). Additionally, consideration should be given to the likelihood that race and ethnicity reflect other social variables such as neighborhood context.

Insurance status functioned as an income indicator of the adolescent's family. It was a consistent statistically significant predictor of adolescents' health-risk behavior scores and sexual-risk behaviors. SBHC and SLHC users with private insurance had a lower health-risk behavior score, were less likely to be sexually active, and were more likely to use protection against STIs and unintended pregnancy than clinic users with public insurance such as Medicaid. The literature on the relationship between adolescent risk-taking and/or sexual-risk behaviors and low socioeconomic status is inconclusive. There is some evidence that establishes an association of income inequality, poverty, and

low socioeconomic status with adolescent risk-taking behaviors, including those associated with sexual-risks (R. Crosby, et al., 2003; Males, 2009; Sionean, et al., 2001). Similarly, there is research that questions this association as discussed previously (R W. Blum, et al., 2000; Cubbin, et al., 2010).

SBHC and SLHC Clinical Outcomes

Findings from the adolescent users of each clinic type were supplemented by the third and final investigative pathway to determine whether the policy restrictions imposed on SBHCs were associated with adverse behaviorally related clinical outcomes for adolescents. STIs and pregnancy occur in the absence of the use of protection by sexually active adolescents. SBHC and SLHC test results for chlamydia, gonorrhea, and pregnancy are objective clinical outcomes of adolescent sexual-risk behaviors (Han, Rogers, Nurani, Rubin, & Blank, 2011; Salerno, Darling-Fisher, Hawkins, & Fraker, 2013). I hypothesized that SBHCs would have a greater proportion of positive test results for STIs (chlamydia and gonorrhea) and pregnancy than SLHCs because sexually active SBHC users departed from the clinic visit without condoms or contraceptives. SBHC users in Michigan were referred to other community-based sites with varying outcomes for referral completions (K. A. Hacker, et al., 1997). The hypotheses about chlamydia and gonorrhea were not supported. The percentages of positive test results for each clinic type were equivalent for chlamydia and likewise for gonorrhea. This corroborates the earlier findings that adolescent users of the two clinic types are comparable in their sexual-risk behaviors.

In contrast, the hypothesis that the proportion of positive pregnancy results would be greater for SBHCs than for SLHCs was supported. SBHCS had a statistically

significant greater proportion of female adolescents who tested positive for pregnancy than SLHCs. SBHCs that are prohibited from providing condoms and/or contraceptives for sexually active users are not optimizing the opportunity to reduce the sexual-risk behaviors of their female users. This missed risk-reduction opportunity can be mediated by the provision of condoms and contraceptives in SBHCs (Ethier, et al., 2011; Minguez, et al., 2011; Ricketts & Guernsey, 2006; Sidebottom, et al., 2003; Zimmer-Gembeck, et al., 2001)

Limitations

This study was not without its limitations. First, the RAAPS dataset relied on adolescents' self-reported responses about sensitive behavioral issues. While numerous safeguards have been employed to maximize the reliability of the RAAPS system, e.g., it is a validated survey instrument electronically administered in accordance with adolescent preferences, some respondents might be sensitive to adult preferences for certain responses.

Another potential limitation was that sexual-risk was determined based on the responses to only two questions from the RAAPS survey. The RAAPS system was modeled after the school-based Youth Risk Behavior Surveillance System (YRBSS) that has been collecting data from adolescents since 1990. The YRBSS uses multiple questions to assess sexual-risk behaviors, including but not limited to age at first sexual intercourse and the number of sexual partners. In contrast, the RAAPS system was developed to be a rapid (5-7 minutes) yet highly reliable assessment for SBHCs and similar clinic environments; its most direct questions regarding sexual- risks were selected based on recommendations for adolescent risk screening from the CDC.

Nonetheless, analysis of additional RAAPS questions regarding health-risk behaviors such as use of drugs or alcohol might have provided insight into additional dimensions of sexual-risks among adolescent SBHC and SLHC users. This is an area for further research.

The RAAPS dataset and the CAHC Utilization dataset are derived from unique populations of SBHC and SLHC users. A matched dataset would have enabled the examination of clinical outcomes for each clinic type by RAAPS survey respondent. While it was not possible to create a matched dataset to support this study, future research should consider the value of a matched dataset of SBHC and SLHC users. Furthermore, it should be noted that STI tests were conducted only when requested by SAA as opposed to universal screening for STIs of all SAA. This presents a limitation of study findings due to only testing SAA who acknowledged their sexual-risk behaviors and risk status. Universal STI screening has identified infections among SAA who were unaware of or did not acknowledge their sexual- risk status (Salerno, et al., 2013). Future research into this issue could inform adolescent sexual health care policy.

Finally, this study included a sample of adolescents attending public schools with SBHCs or SLHCs associated with, but not limited to, public schools in Michigan. Therefore, the results may not be generalizable to a national adolescent population or to adolescents attending non-public schools.

Even in light of these limitations, this study has contributed to the literature by exploring how policies might influence the sexual-risk behaviors of adolescents in Michigan. Study findings will have implications for policymakers in Michigan and perhaps nationwide.

Concluding Implications for Policy

In Michigan, adolescents have the option of seeking sexual health services at SBHCs or SLHCs. Evidence from the present study supports a conclusion that both clinic types are serving at-risk adolescents. SBHCs have the greater opportunity to provide a school-wide perspective that incorporates the maximum potential for arresting adolescent sexual-risk behaviors. Current evidence on school-based risk-reduction strategies that integrate all of the theoretical constructs influencing adolescent behaviors, whether adaptive or maladaptive (See Figure 2.1), hold the most promise. SBHCs have the potential to influence adolescents' sexual-risk behaviors through their peers, school climate, and the presence of other adults in the school environment. Such a model has demonstrated success when it comprehensively meets the sexual-health needs of all adolescents and avoids fragmentation of services (Basen-Engquist, et al., 2001). However, policy must be supportive of sexually active adolescents' intent to practice safe sex; policy changes are needed that will improve access to the health information, support and services adolescents are entitled to through Michigan's Minor Consent Laws. Under Michigan's Minor Consent Laws sexually active adolescents should have full access to sexual health services that encourages and supports their ability to protect themselves against STIs, HIV and unintended pregnancies. Currently adolescents can be diagnosed and treated for STIs at SBHCs but cannot receive condoms to prevent the next STI from being contracted. Receipt of the full scope of sexual health care and services, including condoms and other contraceptives, should be as accessible as attending public schools in the U.S. Policies that undermine adolescents' uncomplicated access to vital sexual health services should be redressed. Research indicates that intent to initiate the sexual debut

and to use condoms or contraceptives is a strong predictor of adolescents' sexual behaviors (Buhi & Goodson, 2007; B. F. Stanton, et al., 1996). Policies should be supportive of sexually active adolescents' intent to be safe in their sexual behaviors.

CHAPTER IV

RACE AND STRESS AS MODERATORS OF SEXUAL-RISK BEHAVIOR AMONG MALE AND FEMALE ADOLESCENT USERS OF SCHOOL-BASED HEALTH CENTERS IN MICHIGAN

Introduction

Background

Recent reports of historically low national indicators suggest that adolescents have reduced their sexual-risk either by abstaining from sex and/or by using protection against sexually transmitted infections (STIs) and pregnancy (CDC, 2012a; B. E. Hamilton, et al., 2012; J. S. Santelli & Melnikas, 2010). Nationally, the Centers for Disease Control and Health Promotion (CDC) reports that the birth rate of 31.3 per 1,000 women aged 15-19 years decreased by 8% from 2010 to 2011, a record low for this age group. Furthermore, birthrates fell by 11% for 15-17-year-old adolescents and by 7% for 18-19-year-old adolescents during the same time period (B. Hamilton & Ventura, 2012). The state of Michigan also experienced this notable downward trend in adolescent births (J. S. Santelli, et al., 2004; J. S. Santelli & Melnikas, 2010). Adolescent births to 15-19 year olds declined by 10% from 33.5 per 1000 in 2007 to 30.1 per 1000 in 2010 in Michigan (B. Hamilton & Ventura, 2012). Michigan also reported a 55% decline in adolescent pregnancies between 1990 and 2007 (Michigan Department of Community Health and Michigan Department of Education, 2010).

Improvements in adolescent birth rates in the U.S. and Michigan did not extend to all populations of adolescents, however; racial and ethnic disparities persist in spite of

overall improvements. For example, CDC reported that births to non-Hispanic African American and Hispanic adolescents were more than two times higher than the rate for non-Hispanic White adolescents from 2007-2011 (B. E. Hamilton, et al., 2013). Michigan experienced similar racial and ethnic disparities in adolescent births from 2007-2011, when the birth rate among adolescents (15-19 years) was 19.8 births per 1,000 for non-Hispanic Whites, 55.5 births per 1,000 for non-Hispanic African Americans, and 45.3 births per 1,000 for Hispanics (B. E. Hamilton, et al., 2013). These rates indicate a disparity between racial and ethnic groups that is more than twofold for Hispanic adolescents and almost threefold for non-Hispanic African American adolescents compared to their non-Hispanic White peers in Michigan.

Arguably, one could posit that the reported number of adolescent births reflects the intent of adolescent females to give birth; however, CDC also reported that 77% of births to women ages 15-19 during 2006-2010 were unintended (Mosher, et al., 2012). These data warrant an examination of the sexual-risk behaviors that result in unintended pregnancies among adolescents in general and in communities of color. Additional evidence of such behaviors among adolescents is also reflected in the surveillance data on STIs such as chlamydia, gonorrhea, and human immunodeficiency virus (HIV).

CDC reported that in 2011 the gonorrhea rate for all 15-19-year-olds was 399.9 cases/100,000 and 15-19-year-old females had the 2nd highest rate (556.5cases/100,000) compared with any other age or gender group (CDC, 2012). The chlamydia infection rates for the same group of females increased 4% over the previous year to 3,416 cases/100,000. For 15-19-year-old males, the rate increased 6.1% over the previous year to 803.0 cases/100,000 (CDC, 2012a). The CDC HIV Surveillance report for 2009-

2010 indicates significant race and ethnic disparity in HIV diagnoses among 13-19-year-old adolescents. African American adolescents were only 15% of the total adolescent population, but they comprised 67% of the newly diagnosed cases of HIV for this age group. Additionally, the largest proportion of females diagnosed during this same period were 13-19-years old (CDC, 2011).

Michigan's rates for chlamydia and gonorrhea in adolescents aged 15-19 years exceeded the national rates and increased by 8% and 2%, respectively, between 2006 and 2007 . Adolescents of this age group represent 7% of the population in however, they contributed to 42% of chlamydia and 34% of gonorrhea cases in 2007, the latest year for which data are available (Michigan Department of Community Health and Michigan Department of Education, 2010). This is the highest rate for any age group, suggesting that Michigan's youth continue to engage in sexually risky behaviors. Females are disproportionately represented in these rates (Michigan Department of Community Health and Michigan Department of Education, 2010).

Adolescents' sexual-risk-taking is further substantiated in Michigan's HIV data for 2009 (Michigan Department of Community Health and Michigan Department of Education, 2010). Similar to national reports, the largest proportion of females diagnosed with HIV were diagnosed at 13-19 years of age and almost 80% of these were reportedly infected by heterosexual contact.

Even though adolescent birth rates have improved both nationally and in Michigan, sexual-risk behaviors among adolescents persist. Racial, ethnic, and gender disparities prevail across these indicators of adolescents' sexual-risk (Eaton, et al., 2011). The implications of STIs in adolescents are far reaching. Many of them experience

repeat infections. Serious health problems, including infertility and increased susceptibility to HIV infection, can result from untreated and repeat infections in adolescents (Aral, 2001). These data compel a deeper understanding into the sexual behaviors that place adolescents in general and those of specific gender, racial and ethnic groups, at disproportionate risk for STIs and unintended pregnancy.

The Current Study

This study will investigate male and female differences in the use of protection against STIs and unintended pregnancies by male and female adolescent SBHC users in Michigan and how those differences may be modified by race and ethnicity. This study will be grounded in the Biopsychosocial Model of Adolescent Development and Behaviors, a conceptual model that includes the role of adolescent stress as a construct in the use of protection. The model accounts for the recent neuro-scientific evidence on adolescent brain development, which suggests that the immature structure and function of the adolescent brain may contribute to risk-taking behaviors (R. W. Blum, et al., 2002; Bradshaw, Goldweber, Fishbein, & Greenberg, 2012; Steinberg, 2007, 2008, 2010a; Williams, et al., 2002). Furthermore the Biopsychosocial Model of Adolescent Development and Behaviors incorporates biological constructs such as puberty and gender and sociological constructs such as peers, family, schools and race, all of which interact to influence adolescent development and behaviors. The approach to this research is distinctive because it explicitly recognizes the multiple constructs that have been established empirically as influential in adolescent behaviors in general, and risk-taking behaviors in particular (L. Blum & Blum, 2009; R. W. Blum, et al., 2002; R. J. P. DiClemente, et al., 2008). Peers and schools are two of those constructs (Vesely, et al.,

2004). The study population of sexually active adolescent SBHC users will naturally integrate the influence of peers and schools.

Sexual-Risk Behaviors

The 2011 Youth Risk Behavior Surveillance System (YRBSS) reports indicated that high school students continue to engage in behaviors that threaten their well-being: 33% texted or emailed while driving; 39% consumed alcohol; 22% had five or more drinks of alcohol in a row; and 17% carried a weapon during the 30 days before the survey (CDC, 2012b). Among the behaviors with lifelong implications, and the focus of this research, are sexual-risk behaviors. YRBSS 2011 reports that almost half of the high school respondents (47%) had sexual intercourse. Among the currently sexually active, almost 40% said that neither they nor their partner used a condom and 13% reported they had not used any method to prevent pregnancy during their last sexual intercourse. These rates remained fairly stable from 2009-2011 (CDC, 2012b). Furthermore, they exist despite 82% and 71% of high schools requiring HIV prevention and sexuality education, respectively, for their high school adolescents during the 2011-2012 school year (Demissie, et al., 2013).

The 2011 YRBSS results on the sexual behaviors of Michigan's high school adolescents are comparable to or better than the results for the U.S. but are still of public health concern. For example, 41% of high school respondents reported ever having sexual intercourse, and among the currently sexually active, 39% did not use a condom and 14% did not use any method to prevent pregnancy during their last sexual intercourse (CDC, 2012b). Yet, almost 89% of respondents reported that they had been taught about AIDS or HIV infection in high school (CDC, 2012b). All of these rates have remained

relatively unchanged in Michigan from 1997 to 2011 and racial, ethnic, and gender disparities persist (Michigan Department of Education, 2011). Regardless of the reach and scope of education about sexual health, these rates of unintended pregnancies and STIs provide substantial clinical evidence that adolescent sexual-risk behaviors remain intractable.

CDC posits that the higher prevalence of STIs in adolescents may be related to barriers to sexually transmitted disease prevention services, such as the lack of insurance or ability to pay, discomfort with adult-oriented facilities and services, and concerns about confidentiality (CDC, 2012a). These are the specific barriers that school-based health centers (SBHCs) are designed to eliminate for adolescents. The literature suggests that sexually active adolescent users of SBHCs may have minimal barriers to the use of protection against STIs and unintended pregnancy. SBHCs have demonstrated their ability to successfully improve access to quality health care and to reach adolescents, who by virtue of any number of circumstances, are considered to be at-risk for poor physical, mental, or social health (Allison, et al., 2007; Berti, et al., 2001; Cubbin, et al., 2010; Dougherty, 1993; Elster A, 2003; Ford, et al., 1999; Fothergill & Ballard, 1998; Hutchinson, et al., 2012; Wade, et al., 2008; Walter, et al., 1996).

Studies of SBHC adolescent users reveal that they are willing to use SBHCs for services that are sensitive to confidentiality, such as mental health care (Adelman, et al., 1993; Juszczak, et al., 2003; Scudder, et al., 2007) and reproductive or sexual health care, including contraceptive receipt and/or use (Coyne-Beasley, et al., 2003; Denny, et al., 2012; Ethier, et al., 2011; Galavotti & Lovick, 1989; D. Kirby, et al., 1991; Soleimanpour, et al., 2010). Thus, SBHCs are particularly strategic for this population.

In Michigan, however, barriers to the receipt of condoms and contraceptives persist for sexually active adolescent SBHC users. SBHCs are prohibited from dispensing condoms and contraceptives on school property or risk a financial penalty of five percent of state school aid (Michigan Compiled Laws Complete Through PA 72 of 2014, 1996). This represents a case where state policy does not support an effective response to adolescents' needs.

Policy implications of current study.

The public health impact of adolescent sexual-risk behaviors, specifically STIs, HIV, and unintended pregnancies are staggering. Of equal concern are the unrelenting disparities between racial and ethnic groups and male and female adolescents over time and without regard to the receipt of prevention education. Collectively, there is an imperative for unpacking sexual-risk behaviors in adolescents to understand how these behaviors are associated with gender, race and adolescent stress. Better understanding of these behaviors will enable prevention and intervention strategies, including public policy, to be structured more effectively to avert or mediate adolescent sexual-risk behaviors and their potential consequences. One such strategy is the provision of condoms and contraceptives for sexually active SBHC users in Michigan.

Predictors of the Use of Protection

This study will build on the findings from Chapter III to investigate the association between the use of protection by sexually active male and female adolescent SBHC users in Michigan and the modifying value of race, ethnicity, and stress. For purposes of this study, the dependent variable is the use of protection, which is defined as always using a method to prevent STIs and pregnancy such as condoms or any other

contraceptive. A review of the literature on the independent variable of gender, and modifying variables of race and adolescent stress as it relates to using protection against STIs and pregnancy is presented next.

Gender

Gender is a significant variable predictive of adolescent sexual-risk behaviors, with males and females differing in multiple aspects of sexual behaviors in general and sexual-risk behaviors in particular. Gender differences reported in published studies reveal that female adolescents engaged in sex because they love their boyfriend, sex feels good, or it satisfied their sexual desires, whereas male adolescents report the same reasons as their female counterparts but also report that having sex would strengthen the couple's relationship, make them feel more accepted/loved, help them to be more popular, and because their friends are having sex (L. Hacker, et al., 2005; Ozer, et al., 2003). These findings among male adolescents provide a plausible explanation for why adolescent males initiate sexual activity at an earlier age than females; males may be sensitive to how they are perceived by their peers. (Nahom, et al., 2001; Nkansah-Amankra, et al., 2011).

Nahom and colleagues (2001) found gender differences in intentions to engage in sexual activity but not in the use of condoms. Sexually experienced females were significantly less likely to intend to have sex in the next year than males, but felt significantly more pressure to engage in sexual activity than males. Sexual activity among their peers was a dominant perception for both males and females. Perceptions of condom use among friends has been found to be a strong predictor of intent to use

condoms among both male adolescents (Brown, et al., 1992) and female adolescents (Boyer, et al., 2000).

In a study about the potential risks and benefits of having sex and using a condom, responses of 9th-grade sexually inexperienced adolescents varied by gender (L. E. Widdice, et al., 2006). Females were concerned about risks to the relationship, their social status, and sexually transmitted diseases, whereas males were concerned about getting caught by someone of authority. Females were more likely to report that a benefit of having sex would be improvement of the relationship, while males were more likely to report that the benefits of having sex were fun, pleasure, and increased social status. The risks reportedly associated with condom use were condom malfunction and decreased pleasure, while a benefit of not using a condom was increased pleasure (L. Widdice, Cornell, Wendra Liang, & Halpern-Felsher, 2005; L. E. Widdice, et al., 2006).

Self-efficacy in the use of condoms and contraceptives has emerged as a theme that is predicted by gender. Adolescents who reported higher condom self-efficacy were more likely to state intent to use condoms, although males had lower levels of intent than females (Baele, Dusseldorp, & Maes, 2001; Shneyderman & Schwartz, 2013). Adolescent females were more likely than males to discuss birth control, although there were no gender differences in the overall likelihood of talking about sexual health (Merzel, et al., 2004). For African American females condom self-efficacy was positively related to condom use (Sionean & Zimmerman, 1999).

Studies about condom use among male and female adolescents vary in their findings. For example, adolescent females were more likely than males to use condoms at the initiation of sex when they received education about abstinence and safe sex than

abstinence only (Lindberg & Maddow-Zimet, 2012). In another study that concluded with recommendations for gender-specific programming, more female adolescents reported nonuse of condoms during sex than males; however, the prevalence of other sexual risks (protected and unprotected sex with multiple sex partners, injection drug use, and sex under the influence of alcohol) was more common in males (Niyonsenga & Hlaing, 2007; Nkansah-Amankra, et al., 2011). Other researchers have found the opposite, with males more likely to use birth control at the initiation of sex than females (Mueller, et al., 2008) and increased rates of condom use for male than female adolescents when adjusted over as they aged over three-to-four years (Fortenberry, et al., 2010). These discrepancies reveal the complexity of isolating one variable such as gender as predictive without incorporating other possible contributors to adolescents' use of protection. Race and stress will be included as additional variables in this research.

Gender-specific differences have been found in adolescents across a number of variables. There may also be an interaction of gender and race that will be investigated in this study. For example, Leech and Dias (2012) found that obese White female adolescents were less likely to use condoms than their non-obese White peers; this finding did not hold true for African American female adolescents. Furthermore, it is difficult to disentangle the intersection of gender and race to determine the predictive value of each relative to the use of protection against STIs and unintended pregnancy (Cole, 2009). For example, being an African American female adolescent in relationship with older sexual partners is significantly associated with intent to use condoms and condom non-use (Bauermeister, Zimmerman, Gee, Caldwell, & Xue, 2009; Boyer, et al., 2000; R. J. DiClemente, et al., 2002). On the other hand, African American male

adolescents report more race-related stress and a higher number of sexual partners (increasing sexual risk) than African American female adolescents (Stevens-Watkins, et al., 2011). The interplay of gender and race are both complex and significant (McCall, 2005). This research will make a contribution to the literature by exploring gender and the use of protection and its association with race and adolescent stress.

The study of Michigan SBHC adolescent users in Chapter III found that females were 22% more likely than males to be sexually active and 51% less likely than males to use protection against STIs and unintended pregnancies. However, these findings were in a policy environment that prohibits the dispensing of condoms and contraceptives on school property. In other studies where SBHCs were able to provide on-site access to condoms and contraceptives, females reported increased use of condoms and/or contraceptives (Ethier, et al., 2011; Galavotti & Lovick, 1989; Minguez, et al., 2011; Sidebottom, et al., 2003; Zimmer-Gembeck, et al., 2001). These findings reinforce the significant role of schools and SBHCs in influencing adolescent health and sexual-risk behaviors (Atkins, et al., 2012). Furthermore, the case can be made for policies to support the availability of condoms and contraceptives in SBHCs for sexually active adolescents.

In this chapter, I will examine gender as an independent predictor variable in the use of protection (condoms and/or contraceptives) against STIs/HIV and unintended pregnancy by SBHC users in Michigan. However, this research goes beyond gender to explore the modifying effect of race, ethnicity, and adolescent stress

Race and Ethnicity

Racial and ethnic disparities prevail in adolescent sexual-risk behaviors and its subsequent consequences. Of significance when contemplating race and ethnicity is that these demographic factors are descriptive and not predictive or causal (R W. Blum, et al., 2000).

Race and SES.

Race and ethnicity are often used as proxy measures for socioeconomic status (SES) because traditional public health surveillance does not explicitly capture details specific to SES (J. S. Santelli, et al., 2000). Caution is advised, however, in the use of race and ethnicity as a consistent reliable proxy that predicts behavioral differences. When considering the sexual-risk behaviors for sexually transmitted diseases (including the non-use of protection), race and SES did not account for significant differences between White and African American[2] female high school adolescents (J. S. Santelli, et al., 2000; Sionean & Zimmerman, 1999). Instead, perceived peer norms, condom self-efficacy, and condom negotiation were associated with condom use regardless of race and SES (R. A. Crosby et al., 2000; Sionean & Zimmerman, 1999). In another study that examined sexual-risk behaviors over the time period of 1991-2007, when teen pregnancies and births first declined and then began to increase during the last two years, condom and contraceptive use among high school adolescents were a key determinant in the decline (J. S. Santelli, et al., 2009). African American and Hispanic adolescents had the greatest increase in condom and contraceptive use early in the study period that then declined toward the end. In another study of STDs, however, the rates of gonorrhea

[2] The term "African American" is intended to include all Black populations even though there are ethnic variations within the population.

were associated with low SES among African American adolescent females regardless of the level of sexual-risk behaviors (Sionean, et al., 2001).

These findings substantiate the necessity for caution. SES may be a marker for the environmental context and race/ethnicity a marker for culture, discrimination, or SES (Sionean, et al., 2001). For example, in a study designed to look at the pregnancy risk among sexually active African American, Hispanic, and White female adolescents, much of the difference in pregnancy risk was attributable to higher rates of sexual activity in African Americans and to poorer contraceptive use in Hispanic females when compared to their counterparts; contraceptive use varied by school neighborhoods independent of race/ethnicity. These findings suggest that neighborhood disparity in adolescent pregnancy rates is not a result of neighborhood demographics (Waddell, et al., 2010).

Further evidence of race/ethnicity as a SES marker can be found in studies that looked at condom use and sexual-risk. Neighborhood disadvantage has been found to be associated with the non-use of condoms in African American adolescents (Bauermeister, et al., 2011) and indeed having to work a greater number of hours is associated with less condom use among African American adolescents (Bauermeister, et al., 2009). Additionally, a nationally representative sample of racially and ethnically diverse adolescents (7^{th}-12^{th} grade) was studied to determine the unique and combined contributions of race and ethnicity, income, and family structure to health-behavior risks including sexual intercourse. The findings of that study suggested that, collectively, those sociodemographic variables offered very little (7-10% of variance) explanation of adolescent risk behaviors (R W. Blum, et al., 2000).

Nonetheless, racial and ethnic differences are important in considering the appropriateness of theoretical constructs used to analyze sexual-risk behaviors; an example follows. Primary Socialization Theory (PST) was used in a recent study to predict substance use and sexual-risk behaviors in African American and White adolescents. PST posits that adolescent behavior is learned from the social context, including family, school, and peers as constructs. The researchers found statistically significant differences between the two racial groups. The collective three constructs of PST did not predict risk-taking behaviors of African-American adolescents; however, it did predict lifetime marijuana use and the initiation of sexual intercourse in White adolescents. This finding suggests the limited theoretical value across racial groups (Francis & Thorpe, 2010).

As the previous discussion indicates, race and ethnicity have been well studied with regard to disparities in adolescent sexual behaviors and sexual-risk behaviors. It has been suggested that race is a risk marker, rather than a risk factor, for adolescent sexual-risk behaviors (Goodman, et al., 2005). Less evident is the adolescent experience of racial discrimination and sexual-risk behaviors, given that race is actually a social construct as opposed to a biological one (R. Clark, et al., 1999; Rivas-Drake, et al., 2014). The social and psychological experience of race is unique for adolescents from communities of color, particularly African Americans and Latinos, compared to their adult counterparts and is thus integral to this dissertation on adolescent sexual-risk behaviors.

Race/ethnicity as a social and psychological experience.

Adolescence is a period of rapid and interactive development of the biological, cognitive psychological, and sociological dimensions within both the macro-environments of society and community and the meso-interpersonal social environments of family, peers, and school (Steinberg & Morris, 2001; Williams, et al., 2002). The scientific underpinnings of this dynamic are discussed in the next section of this chapter on adolescent stress. As adolescents evolve through this period, they are developing a sense of self and how they will self-identify within their respective family, social, and community environments. Sexual orientation is one such developmental exploration and outcome (Pathela & Schillinger, 2010). Racial identity is another developmental process, characterized by how one views oneself in the context of group membership and by the significance and meaning attached to that group membership (Chavous, et al., 2003; Stock, et al., 2011). The development of racial identity may be influenced by one's cultural background and/or one's specific experiences from membership in a racial or ethnic group (Rivas-Drake, et al., 2014). African Americans and Latinos are among the groups that experience discrimination and/or prejudice because of their racial identity, an experience that adds additional complexity to adolescent development. The personal experience of racism, racial discrimination, and/ or racial prejudice has been documented in the literature as having numerous biopsychosocial effects with health and behavioral consequences (Brody, et al., 2014; Caldwell, Kohn-Wood, et al., 2004; Caldwell, Sellers, et al., 2004; R. Clark, et al., 1999; Rivas-Drake, et al., 2014). Enumeration of all documented consequences exceeds the scope of this dissertation; however, those pertaining to adolescent sexual-risk behaviors are central to this research.

Racial identity has been found to have a moderating or buffering effect against the health effects of discrimination or racism (R. Clark, et al., 1999; Stock, et al., 2011), alcohol use and violent behavior in adolescents/young adults (Caldwell, Kohn-Wood, et al., 2004; Caldwell, Sellers, et al., 2004), substance use vulnerability in older adolescents (Stock, et al., 2011), adolescent academic achievement (Chavous, et al., 2003), and psychosocial health and academic outcomes in adolescents (Rivas-Drake, et al., 2014). These findings elevate the significance of the healthy development of adolescent racial identity as a protective factor to oppose the negative health and behavioral consequences associated with experiencing racism, racial discrimination, and/or prejudice. Race-related stress is one of the well- substantiated consequences of racism and/or racial discrimination (Brody, et al., 2014; R. Clark, et al., 1999). It has been documented to significantly predict a higher number of sexual partners, a contributor to sexual-risk, in African American adolescents (Stevens-Watkins, et al., 2011). Race, ethnicity and stress will be included in this research to assess the use of protection by male and female adolescent SBHC users. Consistent with previous research on the buffering effect of race on adolescent sexual-risk behaviors, adolescent race/ethnicity will be treated as a moderator in the use of protection against STIs, HIV and unintended pregnancy by SBHC users in Michigan.

Adolescent Stress

Adolescent development is a dynamic period of biological, psychological, and sociological changes that can at times be turbulent for adolescents and their family, peers, and community. In addition to the rapid brain development that struggles to reconcile sensation-seeking behaviors with impulse control, as recently documented in the

neuroscience and behavioral literature, adolescents are negotiating family, peer, school, and community expectations and opportunities (Casey, et al., 2008; Steinberg, 2008, 2010a; Williams, et al., 2002). This complex combination often proves to be a stimulating and stress-filled period for adolescents that results in adaptive and maladaptive behaviors (L. Blum & Blum, 2009). This perspective was captured in the conceptual model described depicted as Figure 2.1.

"Adolescent stress can be viewed as the interaction between the individual's involuntary, biologically determined response set and the voluntary, environmentally, and psychologically determined response set" (Sales & Irwin Jr, 2009. DiClemente and colleagues (2009) posit that stress is not inherently problematic until it overwhelms the adolescents' coping mechanisms (adaptation to a stressor) or in the absence of support)and report that racial discrimination is a dominant stressor in their lives and over time (Brody, et al., 2014; Copeland-Linder, et al., 2011; Estrada-Martinez, et al., 2012). Other adolescent stressors reported in a qualitative study of inner city African Americans include family stress, peer stress, romantic relationship stress, school-related stress, and neighborhood stress (Anda, et al., 2000; Chandra & Batada, 2006). Several additional studies have substantiated these factors as adolescent stressors in the literature (Anda, et al., 2000; Copeland-Linder, et al., 2011; Tandon, et al., 2013). Further, neighborhood disadvantage and financial-related stressors including elements of poverty have also been documented in the literature as having health consequences (Estrada-Martinez, et al., 2012; Goodman, et al., 2005).

Adolescent stress and race-related stress are manifest in internalized behaviors that compromise physical and mental health, such as psychological distress and

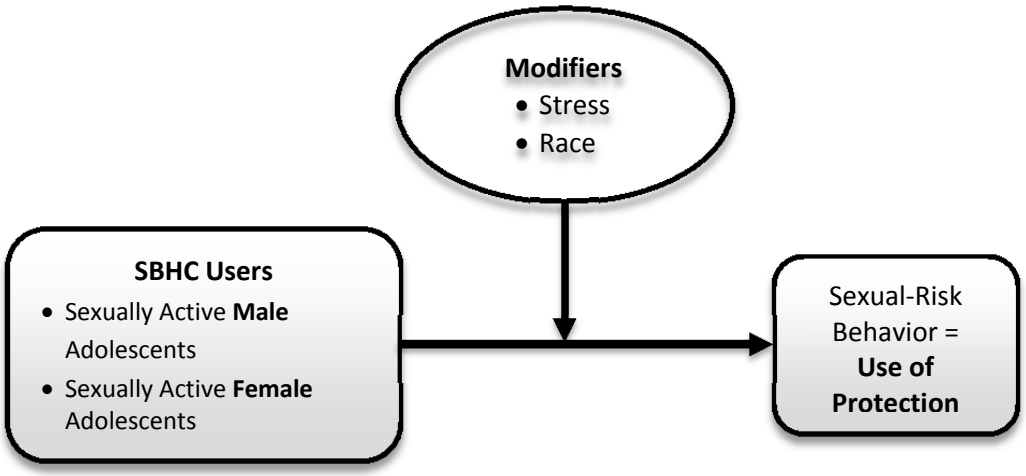
depressive symptoms (Goodman, et al., 2005), substance use (Elkington, et al., 2010; Estrada-Martinez, et al., 2012; Tandon, et al., 2013), subjective weathering (a social psychological component of aging) (Foster, et al., 2008), somatic complaints (Reynolds, et al., 2001), and increased allostatic load (physiological response to stress) (Brenner, et al., 2012; Brody, et al., 2014).

Adolescent responses to stressors and race-related stress also manifest in externalized behaviors such as violence and aggression (Caldwell, Kohn-Wood, et al., 2004; Estrada-Martinez, et al., 2012; Tandon, et al., 2013) and delinquency (McGee, et al., 2001). Several of these studies also identified gender-specific associations. Females were more likely than males to demonstrate internalizing behaviors such as depressive symptoms when faced with stressful experiences. Males were more likely to demonstrate externalizing behaviors like violence and aggression than females when faced with stressful experiences.

Research indicates that adolescents take more risks when they experience stress (Johnson, et al., 2012). Moreover, race-related stress (Stevens-Watkins, et al., 2011), and psychological distress (R. J. DiClemente, et al., 2001) have been found to significantly increase adolescent sexual-risk behaviors such as the number of sexual partners and unprotected sex. The conceptual model, as described earlier in this chapter, integrates adolescent stress as a construct and predictor of maladaptive behaviors such as sexual-risk. This study will explore the relationship between gender and the use of protection against STIs and unintended pregnancy by adolescent SBHC users as a main effect. Furthermore the moderating effect of race, as a social construct, and adolescent

stressors will be investigated. Figure 4.1 is the excerpt from the Biopsychosocial Model of Adolescent Development and Behaviors that will be tested in this research.

Figure 4.1: Conceptual Model



Research Aim and Hypotheses

The specific aim of this study is to explore the associations of gender, race, and stress with the use of protection against STIs and unintended pregnancy in sexually active adolescent SBHC users in Michigan in 2010-2012.

Hypotheses

The following overarching hypotheses will be tested in this study:

Hypothesis 1.

Female adolescents will be more likely than males to use protection (UOP) against STIs and unintended pregnancy among sexually active SBHC users.

Hypothesis 2. Race/ethnicity will moderate the association between gender and the UOP, such that White male adolescents will be more likely to use protection than Hispanic females.

Hypothesis 3.

Adolescent stressors, i.e., not having an adult to talk to, will moderate the association between gender and UOP.

Dataset

Secondary analyses of the Rapid Assessment for Adolescent Preventive Services (RAAPS) dataset will enable testing of these hypotheses. RAAPS is a 21-item clinic-based electronic risk screening system to specifically identify health-risk behaviors, including sexual-risk behaviors and stress factors of adolescent users of SBHCs (Salerno, et al., 2012). The RAAPS system supports the confidential disclosure of the behaviors and factors that contribute to 70% of the morbidities and mortalities experienced by adolescents. A detailed description of the RAAPS system may be found in Chapter III of this dissertation.

Scope of RAAPS dataset.

Three years (2010-2012) of the RAAPS system data obtained at state-funded SBHCs (N=30) will be used for this study. At the individual level of measurement, the RAAPS database provides the demographic data (age, gender, race/ethnicity, and insurance status) and measures of adolescent stress and sexual-risk behaviors for Hypotheses 1-3. The specific questions and full descriptions of the variables are described in the Method section of this chapter.

Validity and reliability of RAAPS survey.

Validity and reliability of the RAAPS survey instrument were assessed in a study by (Salerno, et al., 2012). Face validity, content validity and inter-rater reliability have

been established for the RAAPS survey instrument. Chapter III provides a detailed description of the procedures used to establish validity and reliability.

Method

Research Design

A quantitative correlational research design was used for the proposed cross-sectional study. This type of design was chosen for this study in order to investigate possible associations between the independent variable of gender, modifiers of adolescent stressors, and race/ethnicity variables, and the dependent variable of use of protection (UOP) against STIs and unintended pregnancy. The intent of this study was not to make predictions about outcomes. The purpose was to show the extent of the relationship between the independent variable of gender, modifiers of adolescent stressors, and race/ethnicity variables, and the dependent variable of use of protection (UOP). This study is explanatory and used a retrospective observational study method to examine relationships between the independent variable of gender, modifiers of adolescent stressors, and race/ethnicity variables, and the dependent variable of UOP.

Definition and Measurement of Key Study Variables

The **Use of Protection** variable was derived from RAAPS survey question 16, "If you have had sex, do you always use a method to prevent sexually transmitted infections and pregnancy (condoms, female barriers, other)?" Responses were coded as yes = 1 and no = 0. Use of Protection was used as the **dependent variable** for the logistic regression in this study.

The G**ender** variable was dichotomous and was coded as male = 0, female = 1. Male was the reference category for analysis. **Gender** was included as an **independent variable** for the logistic regression in this study.

The variable of **Age** was derived from the RAAPS survey. The variable **Age** was continuous and was used as a **control variable**.

The **Insurance Status** variable was nominal and was classified into three dummy coded classifications of (a) Private, (b) Uninsured, and (c) Unknown/Other. Each adolescent was coded in each of the dummy coded categories with a 1 representing his/her insurance status and 0 on the remaining insurance status. Adolescents classified as Public Insurance were coded as 0 in all three dummy coded classifications, thus making the **Insurance Status** of Public Insurance the reference category for the **Insurance Status** variable. The three dummy coded insurance status variables were included as **control variables** in the logistic regression analysis.

The **Race/Ethnicity** variable was nominal and was classified into three dummy coded classifications of (a) African American, (b) Hispanic, (c) White, and (d) Other. Each adolescent was coded in each of the dummy coded categories with a 1 representing his/her race/ethnicity and 0 on the remaining race/ethnicity variables. Adolescents classified as White were coded as 0 in all three dummy coded classifications, thus making the Race/Ethnicity of White the reference category for the **Race/Ethnicity** variable. The three dummy coded race/ethnicity variables were included as both **independent** and used as **moderator** variables (gender * race/ethnicity interaction terms) in the logistic regression analysis.

Moderator variables.

The **Stressor-Threatened** variable was derived from RAAPS Survey Question 6, "During the past month, have you been threatened, teased, or hurt by someone (on the Internet, by text, or in person) or has anyone made you feel sad, unsafe, or afraid?" Responses were coded as yes = 1 and no = 0, with 1 indicating an adolescent stressor of feeling threatened. Stressor-Threatened was a dichotomous variable and was included as an **independent** moderator **variable** (gender * Stressor-Threatened) in the logistic regression analysis.

The **Stressor-Abused** variable was derived from RAAPS Survey Question 7, "Has anyone ever abused you physically (hit, slapped, kicked), emotionally (threatened or made you feel afraid) or forced you to have sex or be involved in sexual activities when you didn't want to?" Responses were coded as yes = 1 and no = 0, with 1 indicating an adolescent stressor of feeling abused. Stressor-Abused was a dichotomous variable and was included as an **independent moderator variable** (gender * Stressor-Abused) in the logistic regression analysis.

The **Stressor-LGBTQ** variable was derived from RAAPS Survey Question 15, "Have you ever been attracted to the same sex (girl to girl/guy to guy) or do you feel that you are gay, lesbian, or bisexual?" Responses were coded as yes = 1 and no = 0, with 1 indicating an adolescent stressor of sexual orientation. Stressor- LGBTQ was a dichotomous variable and was included as an **independent moderator variable** (gender * Stressor-LGBTQ) in the logistic regression analysis.

The **Stressor-Sadness** variable was derived from RAAPS Survey Question 18, "During the past month, did you often feel sad or down as though you had nothing to

look forward to?" Responses were coded as yes = 1 and no = 0, with 1 indicating an adolescent stressor of feeling sadness or depression. Stressor-Sadness was a dichotomous variable and was included as an **independent moderator variable** (gender * Stressor-Sadness) in the logistic regression analysis.

The **Stressor-Worries** variable was derived from RAAPS Survey Question 19, "Do you have any serious problems or worries at home or school?" Responses were coded as yes = 1 and no = 0, with 1 indicating an adolescent stressor of feeling worried. Stressor-Sadness is a dichotomous variable and was included as an **independent moderator variable** (gender * Stressor-Worries) in the logistic regression analysis.

The **Stressor-Lack of Supporting Adult** variable was derived from RAAPS Survey Question 21, "Do you have at least one adult in your life that you can talk to about any problems or worries?" Responses were coded as yes = 0 and no = 1, with 1 indicating an adolescent stressor of feeling they do not have adult support. Stressor-Lack of Adult Support was a dichotomous variable and was included as an **independent moderator variable** (gender * Stressor- Lack of Supporting Adult) in the logistic regression analysis.

Data Analysis

SPSS v.22 was used for all descriptive and inferential analysis. All inferential analyses were set at a 95% level of significance ($\alpha = .05$). The study included RAAPS survey responses for adolescent SBHC users for the years of 2010-2012. The adolescents differ from year to year and all records for all years were included together for study. However, before analysis, the mean ages as well as the proportions of gender and race/ethnicity groups for each year were compared to ascertain that no significant

differences existed on the demographics year-to-year. The populations of adolescents year-to-year were homogenous.

Descriptive findings were presented for the variables of study. Prior to hypothesis testing, Pearson's product moment correlations were performed to investigate bivariate relationships between the UOP, gender, age, insurance status classifications, race/ethnicity classifications, and individual stressor variables.

Assumptions

A binary logistic regression was used to test the three statistical hypotheses of this study. Prior to analysis, the data set was investigated to ensure that it satisfied the logistic regression assumptions of (a) absence of outliers, and (b) absence of multicollinearity between the independent variables.

Outliers in a dataset have the potential to distort results of an inferential analysis. With the exception of the continuous variable of Age, all of the variables in the study were nominal and dichotomous. Frequency tables were checked to ascertain that appropriate coding was present for each of the dichotomous variables. All records for the nominal variables were coded as 0, 1, or missing. Therefore the outlier assumption was not violated.

Multicollinearity between the variables used as independent predictors and control variables in the logistic regression were performed via correlational analysis. Multicollinearity may be assumed if a correlation coefficient between two variables is .90 or greater, (Pallant, 2007). Multicollinearity was not detected for any of the variables used as independent predictors for the logistic regression. Therefore, the assumption of absence of multicollinearity was met.

Statistical Model

A hierarchical logistic regression analysis was performed to address all three statistical hypotheses of this study. The dependent variable was UOP. The independent variable was gender. Control variables were insurance status and age. Moderator variables included the individual stressor variables of (a) Stressor-Threatened, (b) Stressor-Abused, (c) Stressor-LGBTQ, (d) Stressor-Sadness, (e) Stressor-Worries, and (f) Stressor-Lack of Supporting Adult, and also the ethnicity variables of (g) Race/Ethnicity = African American, (h) Race/Ethnicity = Hispanic, and (i) Race/Ethnicity = Other. The moderator variables were included in the regression as single variables and also as interaction terms with the gender variable (the gender * moderator interaction term served as moderator variables.)

The hierarchical model specifications of this study were as follows:

Step 1:

$$_{UOP} = \beta_0 + \beta_{1gender} + \beta_{2age} + \beta_{3race = AA} + \beta_{4race = Hispanic} + \beta_{5race = Other} + \beta_{6insurance\ status = Private} + \beta_{7insurance\ status = Uninsured} + \beta_{8insurance\ status = Unknown/other} + \varepsilon$$

Step 2:

$$\text{logit)}Y_{UOP} = \beta_0 + \beta_{1gender} + \beta_{2age} + \beta_{3race = AA +} + \beta_{4race = Hispanic} + \beta_{5race = Other} + \beta_{6insurance\ status = Private} + \beta_{7insurance\ status = Uninsured} + \beta_{8insurance\ status = Unknown/other} + \beta_{9stessor = threatened} + \beta_{10stressor = abused} + \beta_{11stressor = LGBTQ} + \beta_{12stressor = sadness} + \beta_{13stressor = worries} + \beta_{14stressor = lack\ of\ supporting\ adult} + \varepsilon$$

Step 3:

$$\text{logit)}Y_{UOP} = \beta_0 + \beta_{1gender} + \beta_{2age} + \beta_{3race = AA +} + \beta_{4race = Hispanic} + \beta_{5race = Other} + \beta_{6insurance\ status = Private} + \beta_{7insurance\ status = Uninsured} + \beta_{8insurance\ status = Unknown/other} + \beta_{9stessor = threatened} + \beta_{10stressor = abused} + \beta_{11stressor = LGBTQ} + \beta_{12stressor = sadness} + \beta_{13stressor = worries} + \beta_{14stressor = lack\ of\ supporting\ adult} +$$

$\beta_{15(\text{gender *race = AA})} + \beta_{16(\text{gender *race = Hispanic})} + \beta_{17\ (\text{gender *race = Other})} + \beta_{18(\text{gender *stressor = threatened})} + \beta_{19(\text{gender*stressor = abused})} + \beta_{20(\text{gender *stressor = LGBTQ})} + \beta_{21(\text{gender *stressor = sadness})} + \beta_{22(\text{gender * stressor = worries})} + \beta_{23(\text{gender *stressor = lack of supporting adult})} + \varepsilon$

Study Power

An *a priori* power analysis was performed to determine the required sample size for this study. GPOWER 3.0.10 software (Faul, et al., 2007) was used in this determination. The analysis was performed for a Pearson's product moment correlation and a logistic regression. The alpha level was set to .05, with a power of .80. Power is (1-β), where β is the chance of Type II error (i.e., one accepts the null hypothesis when it is, in fact, false). At a power of .80, one has an 80% chance of seeing significance that was truly in the data.

The sample size needed for a Pearson's correlation with a medium effect size of *r* = .30 (Cohen, 1988), two-tailed test, was 84 records.

The sample size needed for a logistic regression to detect an odds ratio of 1.5 with the conditional probability that Y=1 given X=1 of .50, was 308 records.

The overall results of the power analyses indicated sufficient samples sizes for each statistical test required for this study (N = 5,249).

Results

The results of this study are presented in two sections (a) description of the study population and (c) tests of hypotheses. The Results section concludes with a summary of the results. The purpose of this cross-sectional retrospective observational study was to explore the associations of gender, race, and adolescent stress with sexual-risk behaviors in SBHC users, 13-18 years old, in Michigan in 2010-2012.

Population and Demographics of Study Participants

The study consisted of 5,249 sexually active adolescents aged 13-18 who completed the RAAPS survey and received services in state-funded SBHCs (N=30) between the years of 2010-2012, inclusive. Table 4.1 presents the frequency counts and percentages of the demographic variables and the measures of central tendencies for the continuous variables of the study. The ages of the adolescents included in the sample ranged from 13 to 18 years (M = 16.16, SD = 1.30). The adolescents were fairly evenly distributed across gender, 57.2% were female and 42.8% were male. The majority of the adolescents in the sample were classified as White (34.9%) or African American (50.5%). More than half of the adolescents (60.2%) had public insurance and 23.7% had private insurance. The majority of adolescents who were sexually active (N = 5,249) were using protection (n = 3742, 71.3% of SAA).

A total of six variables used as indicator variables for adolescent stressors were derived from the responses of the adolescents to the RAAPS survey questions. When asked "During the past month, have you been threatened, teased, or hurt by someone (on the Internet, by text, or in person) or has anyone made you feel sad, unsafe, or afraid?" (RAAPS Question 6), approximately 19% of the adolescents answered yes. These adolescents were coded as yes responses for the stressor of *Threatened*.

Approximately 18% of the adolescents responded yes to RAAPS Question 7, "Has anyone ever abused you physically (hit, slapped, kicked), emotionally (threatened or made you feel afraid), or forced you to have sex or be involved in sexual activities when you didn't want to?" and were coded as yes responses for the stressor of *Abused*.

Question 15 of the RAAPS survey asked: "Have you ever been attracted to the same sex (girl to girl/guy to guy) or do you feel that you are gay, lesbian, or bisexual?" Approximately 13% of the adolescents answered yes, and were coded as yes responses for the stressor of *LGBTQ*.

Question 18 of the RAAPS survey asked, "During the past month, did you often feel sad or down as though you had nothing to look forward to?" Approximately 32% of the adolescents answered yes, and were coded as yes responses for the stressor of *Sadness*.

RAAPS Survey Question 19 asked, "Do you have any serious problems or worries at home or school?" Approximately 17% of the adolescents answered yes to this question and were coded as yes responses for the stressor of *Worries*.

RAAPS Survey Question 21 asked, "Do you have at least one adult in your life that you can talk to about any problems or worries?" The majority of the adolescents (89%) answered that they did have at least one supporting adult. Adolescents who answered "no" to RAAPS Survey Question 21 (11%) were coded as "yes" responses for the stressor of *Lack of Supporting Adult*.

Table 4.1
Descriptive Results of Key Study Variables (N = 5,249)

Variable	Type	Levels	*N*	%	*M*	*SD*
User Data						
Age						
	Continuous	---	---	---	16.16	1.30
Gender	Nominal					
		Male (Ref)	2246	42.8	---	---
		Female	3003	57.2	---	---
Race/Ethnicity	Nominal					
		White (Ref)	1834	34.9	---	---
		African American	2652	50.5	---	---
		Hispanic	337	6.4	---	---
		Other	426	8.1	---	---
Insurance Status	Nominal					
		Public (Ref)	3162	60.2	---	---
		Private	1243	23.7	---	---
		Uninsured	631	12.0	---	---
		Unknown/Other	213	4.1	---	---
Behavioral Data						
SAA & Use of Protection (UOP)	Nominal					
		Yes	3742	71.3	---	---
		No	1507	28.7	---	---
Adolescent Stressors						
Stressor-Threatened (Q6)	Nominal					
		Yes	985	18.8	---	---
		No	4264	81.2	---	---
Stressor-Abused (Q7)	Nominal					
		Yes	932	17.8	---	---
		No	4317	82.2	---	---
Stressor-LGBTQ (Q15)	Nominal					
		Yes	667	12.7	---	---
		No	4582	87.3	---	---
Stressor-Sadness (Q18)	Nominal					
		Yes	1678	32.0	---	---
		No	3571	68.0	---	---
Stressor-Worries (Q19)	Nominal					
		Yes	887	16.9	---	---
		No	4362	83.1	---	---

Table 4.1 (cont'd)

Variable	Type	Levels	*N*	%	*M*	*SD*
Stressor-Lack of Supporting Adult (Q21)	Nominal					
		Yes	595	11.3	---	---
		No	4654	88.7	---	---

Note. M = Mean; *SD* = Standard Deviation; *Mdn* = Median

Correlational Analysis

Prior to hypothesis testing, a bivariate correlational analysis was investigated between the 17 inferential analysis variables of (a) Gender, (b), Age, (c) Race/Ethnicity = African American, (d) Race/Ethnicity = Hispanic, (e) Race/Ethnicity = White, (f) Race/Ethnicity = Other, (g) Insurance Status = Private, (h) Insurance Status = Public, (i) Insurance Status = Uninsured, (j) Insurance Status = Unknown/Other, (k) Stressor-Threatened, (l) Stressor-Abused, (m) Stressor-LGBTQ, (n) Stressor-Sadness, (o) Stressor-Worries, (p) Stressor-Lack of Adult Support, and (q) UOP. Table 4.2 presents the correlation coefficients for the bivariate associations.

Correlations of .10 to .29 are considered weak; .30 to .49 are moderate; and .50 to 1.0 are strong (Pallant, 2007). The results returned many weak, yet significant, correlations. Significance on the weak correlations was most likely due to the size of the data set, which can be considered as large; larger datasets will return significant findings on smaller effects (Tabachnick & Fidell, 2007). Only moderate to strong correlations of interest are reported in the body of this chapter to preserve parsimony.

The variable of Stressor-Abused was significantly correlated with the variable of Stressor-Threatened ($r = .322$, $p < .0005$). The direct relationship between the variables

suggested that adolescents who reported being abused had also reported feeling threatened during the past month.

The Stressor-Sadness variable was significantly correlated with Stressor-Threatened variable ($r = .337$, $p < .0005$). The direct relationship between the variables suggested that adolescents who reported feeling sad or down in the past month also reported being threatened within the past month. The Stressor-Sadness variable was significantly correlated with Stressor-Abused variable ($r = .305$, $p < .0005$). The direct relationship between the variables suggested that adolescents who reported feeling sad or down in the past month also reported being abused within the past month.

The Stressor-Worries variable was significantly correlated with the Stressor-Threatened variable ($r = .307$, $p < .0005$). The direct relationship between the variables suggested that adolescents who reported having serious problems at home or school also reported being threatened in the past month. The Stressor-Worries variable was significantly correlated with the Stressor-Abused variable ($r = .323$, $p < .0005$). The direct relationship between the variables suggested that adolescents who reported having serious problems at home or school also reported being abused in the past month. The Stressor-Worries variable was also significantly correlated with the Stressor-Sadness variable ($r = .391$, $p < .0005$). The direct relationship between the variables suggested that adolescents who reported having serious problems at home or school also reported feeling sad or down in the past month.

Table 4.2
Correlations for Bivariate Relationships of Variables Utilized for Inferential Analysis

	Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1.	Age																	
2.	Gender	052**																
3.	African American	-.097**	-.100**															
4.	Hispanic	-.001	-.004	-.265**														
5.	White	122**	074**	-.741**	-.192**													
6.	Other ethnicity	-.035*	057**	-.300**	-.078**	-.218**												
7.	Private insurance	062**	-.012	-.224**	-.062**	271**	-.008											
8.	Public insurance	-.104**	021	225**	000	-.233**	-.005	-.686**										
9.	Uninsured	076**	-.012	-.049**	099**	003	-.005	-.206**	-.455**									
10.	Unknown/Other insurance	-.001	-.008	005	-.030*	-.011	038**	-.115**	-.253**	-.076**								
11.	UOP	-.063**	-.164**	-.001	-.023	015	-.004	063**	-.039**	-.017	-.012							
12.	Stressor-Threatened	-.075**	180**	-.054**	-.046**	075**	011	-.029*	020	002	010	-.099**						
13.	Stressor-Abused	-.026	174**	-.103**	-.018	107**	017	-.016	019	-.003	-.007	-.112**	322**					
14.	Stressor-LGBTQ	-.007	202**	-.029*	-.018	035*	008	-.046**	058**	-.013	-.023	-.131**	177**	218**				
15.	Stressor-Sadness	-.047**	189**	-.055**	035*	042**	-.005	-.055**	026	020	021	-.146**	337**	305**	196**			
16.	Stressor-Worries	-.042**	127**	-.038**	006	037**	-.002	-.054**	037**	015	000	-.088**	307**	323**	153**	391**		
17.	Stressor-Lack of Supporting Adult	-.020	068**	-.001	017	-.015	013	-.038**	017	008	027	-.077**	116**	098**	069**	175**	168**	

*$p < .05$; **$p < .001$

Hypothesis Testing and Conclusions

A hierarchical logistic regression was performed. The dependent variable was Use of Protection (UOP), which was coded dichotomously as 1 = yes, 0 = no. The predictor variables were entered into the model in three blocks of information as follows: (Block 1) the independent variable Gender (coded 1= females, 0 = males), the four control variables of (a) Age, (b) Private insurance, (c) Uninsured, and (d) Unknown/Other (Public was the reference category for insurance status), and three independent moderator variables of (a) African American, (b) Hispanic, and (c) Other (White was the reference category for ethnicity); (Block 2) Block 1 predictors plus six independent moderator variables of (a) Stressor-Threatened, (b) Stressor-Abused, (c) Stressor-LGBTQ, (d) Stressor-Sadness, (e) Stressor-Worries, and (f) Stressor-Lack of Supporting Adult; and (Block 3) Block 2 predictors plus nine interaction terms between the gender variable and the moderator variables.

A test of the Step 1 model with the predictors of gender, age, ethnicity, and insurance status against a constant only model (no predictors, and assuming that none of the adolescents were using protection) was statistically significant. The Omnibus Tests of Model Coefficients indicated significance, χ^2 (8) = 187.69, p <.0005, indicating that the predictors, as a set, reliably differentiated between those classified as using protection and those who were not. The step 1 model's goodness-of-fit was also assessed using the Hosmer and Lemeshow Test, χ^2 (8) = 3.91, p = .865. For this test, a p-value greater than .05 indicates the data fits well with the model. Therefore, goodness-of-fit was indicated for this model.

Variability of the Step 1 model was assessed using two statistics, Cox and Snell R-Square (R^2 = .035) and Nagelkerke R-Square (R^2 = .050). These two tests indicated that between 4% and 5% of the variability in the dependent variable was explained by the predictors of the Step 1 model. Percentage accuracy in classification (PAC) of the correct outcome category of using protection (UOP) for the Step 1 model was 71.3%, and improvement over the base model constant only (no predictors, all cases reported not using protection) percentage correct of 28.7%.

Table 4.3 presents the findings of Step 1 of the hierarchical logistic regression analysis. Wald statistics indicated that three of the predictors for the Step 1 model contributed significantly to the model. The variable Age was statistically significant for the outcome of UOP [OR = 0.90, 95% CI OR = (0.86, 0.94); p <.0005]. The odds ratio indicated that for each one-year increase in age, an adolescent was 10% less likely to use protection. Gender was significant [OR = 0.47, 95% CI OR = (0.41, 0.53); p <.0005]. The odds ratio for the gender variable indicated that females were 53% less likely than males (reference group) to use protection. The insurance status group of Private was statistically significant [OR = 1.39, 95% CI OR = (1.18, 1.63); p <.0005]. The odds ratio indicated that adolescents who had Private insurance were 39% more likely to use protection than adolescents who had Public insurance (reference group).

Table 4.3

Step 1 of the Hierarchical Logistic Regression Analysis of UOP as a Function of Independent, Moderator, and Control Variables of Study (N =5,249)

Variable	B	*SE* B	Wald χ^2	Sig.	Odds Ratio	95% CI for Odds Ratio	
						Lower	Upper
Age	-0.107	0.25	18.62	<.0005	0.899	0.856	0.943
Gender (Female)	-0.761	0.066	134.08	<.0005	0.467	0.411	0.531
Race/Ethnicity							
African American	-0.073	0.072	1.02	.312	0.930	0.807	1.071
Hispanic	-0.221	0.132	2.82	.093	0.802	0.620	1.038
Other	-0.026	0.121	0.05	.830	0.974	0.768	1.236
Insurance Status							
Private	0.329	0.082	16.17	<.0005	1.389	1.183	1.630
Uninsured	-0.006	0.097	0.00	.948	0.994	0.821	1.202
Unknown/Other	-0.087	0.155	0.31	.576	0.917	0.676	1.243
Constant	3.087	0.410	56.72	---	---	---	---
Model χ^2 = 187.69 Sig. < .0005							

Note. Sig. = Significance; CI = Confidence Interval

A test of the Step 2 model was performed with the predictors of gender, age, ethnicity, insurance status and the six independent moderator variables of (a) Stressor-Threatened, (b) Stressor-Abused, (c) Stressor-LGBTQ, (d) Stressor-Sadness, (e) Stressor-Worries, and (f) Stressor-Lack of Supporting Adult against the Step 1 model with the predictors of gender, age, ethnicity, and insurance status was statistically significant. The Omnibus Tests of Model Coefficients indicated significance for the Step 2 *block*, $\chi 2$ (6) = 125.81, p <.0005, indicating that the model with the addition of the six stressor variables was an improvement in fit over the Step 1 model with the predictors of gender, age, ethnicity, and insurance status. The Omnibus Tests of Model Coefficient table value for

the Step 2 *model* was also significant [χ^2 (14) = 313.49, p <.0005 indicating that the predictors, as a set, reliably differentiated between those classified as using protection and those who were not. The Step 2 model's goodness-of-fit was also assessed using the Hosmer and Lemeshow Test, χ^2 (8) = 11.18, p = .192. For this test, a p-value greater than .05 indicates the data fits well with the model. Therefore, goodness-of-fit was indicated for the Step 2 model over the baseline (no predictor model), and the Step 1 model.

Variability of the Step 2 model was again assessed using two statistics, Cox and Snell R-Square (R^2 = .058) and Nagelkerke R-Square (R^2 = .083). These two tests indicated that between 6% and 8% of the variability in the dependent variable was explained by the predictors of the Step 2 model. Percentage accuracy in classification (PAC) of the correct outcome category of using protection (UOP) for the second model was 71.3%, and improvement over the base model constant only (no predictors, all cases reported not using protection) percentage correct of 28.7%.

Table 4.4 presents the findings of Step 2 of the hierarchical logistic regression analysis. Wald statistics indicated that eight of the predictors for main effects contributed significantly to the model. The variable Age was statistically significant for the outcome of UOP [OR = 0.88, 95% CI OR = (0.83, 0.92); p <.0005]. The odds ratio indicated that for each one-year increase in age, an adolescent was 12% less likely to use protection. Gender was significant [OR = 0.56, 95% CI OR = (0.49, 0.64); p <.0005]. The odds ratio for the gender variable indicated that females were 44% less likely than males (reference group) to use protection. The ethnicity group, Hispanics, was significant [OR = 0.76, 95% CI OR = (0.59, 0.99); p = .042]. The odds ratio indicated that Hispanic adolescents were 24% less likely than White adolescents (reference group) to use protection. The

insurance status group of Private was statistically significant [OR = 1.30, 95% CI OR = (1.10, 1.53); p = .002]. The odds ratio indicated that adolescents who had Private insurance were 30% more likely to use protection than adolescents who had Public insurance (reference group).

The variable of Stressor-Abused was significant [OR = 0.79, 95% CI OR = (0.67, 0.94); p = .008]. The odds ratio indicated that adolescents who felt abused during the past month were 21% less likely to use protection when compared to adolescents who did not report feeling abused in the past month. The variable Stressor-LGBTQ was significant [OR = 0.64, 95% CI OR = (0.54, 0.77); p <.0005]. The odds ratio indicated that adolescents who were of same-sex orientation were 46% less likely to use protection when compared to adolescents who did not report same-sex orientation. The variable of Stressor-Sadness was significant [OR = 0.68, 95% CI OR = (0.59, 0.79); p <.0005]. The odds ratio indicated that adolescents who had feelings of sadness or depression during the past month were 32% less likely to use protection when compared to adolescents who did not report feeling sad or depressed in the past month. The variable of Stressor-Lack of Supporting Adult was significant [OR = 0.76, 95% CI OR = (0.63, 0.92); p = .004]. The odds ratio indicated that adolescents who reported that they did not have at least one supporting adult in their life were 24% less likely to use protection when compared to adolescents who did report having at least one supportive adult in their life.

Table 4.4

Step 2 of the Hierarchical Logistic Regression Analysis of UOP as a Function of Independent, Moderator, and Control Variables of Study (N =5,249)

Variable	B	*SE* B	Wald χ^2	Sig.	Odds Ratio	95% CI for Odds Ratio	
						Lower	Upper
Age	-0.131	0.025	27.15	<.0005	0.877	0.834	0.921
Gender (Female)	-0.577	0.068	71.03	<.0005	0.562	0.491	0.642
Race/Ethnicity							
Black/African American	-0.144	0.074	3.84	.050	0.866	0.750	1.000
Hispanic	-0.272	0.134	4.13	.042	0.762	0.586	0.991
Other	-0.080	0.123	0.42	.518	0.923	0.725	1.176
Insurance Status							
Private	0.260	0.083	9.88	.002	1.297	1.103	1.526
Uninsured	-0.014	0.099	0.02	.888	0.986	0.813	1.197
Unknown/Other	-0.101	0.157	0.41	.521	0.904	0.665	1.229
Stressor-Threatened	-0.141	0.086	2.71	.100	0.868	0.734	1.027
Stressor-Abused	-0.230	0.087	7.05	.008	0.794	0.670	0.941
Stressor-LGBTQ	-0.445	0.091	24.03	<.0005	0.641	0.536	0.766
Stressor-Sadness	-0.380	0.075	25.97	<.0005	0.684	0.591	0.791
Stressor-Worries	-0.019	0.091	0.04	.836	0.981	0.822	1.172
Stressor-Lack of Supporting Adult	-0.276	0.095	8.33	.004	0.759	0.630	0.915
Constant	3.746	0.422	78.62	---	---	---	---
Block $\chi^2 = 125.81$ Sig. < .0005							
Model $\chi^2 = 313.49$ Sig. < .0005							

Note. Sig. = Significance; CI = Confidence Interval

A test of the Step 3 model with the Step 1 predictors of gender, age, ethnicity, insurance status, The Step 2 main effects of (a) Stressor-Threatened, (b) Stressor-Abused, (c) Stressor-LGBTQ, (d) Stressor-Sadness, (e) Stressor-Worries, and (f) Stressor-Lack of Supporting Adult, and the nine interaction terms between the gender variable and the stressor and ethnicity variables against the Step 2 model with the predictors of gender, age, ethnicity, insurance status and the six stressor variables was statistically significant χ^2 (9) = 22.38, p = .008, and indicated a significant improvement in fit of the Step 3 model over the Step 2 model.

The Omnibus Tests of Model Coefficient table value for the Step 3 model was also significant χ^2 (23) = 335.88, p <.0005 indicating that the predictors, as a set, reliably differentiated between those classified as using protection and those who were not. The Step 3 model's goodness-of-fit was also assessed using the Hosmer and Lemeshow Test, χ^2 (8) = 7.71, p = .462. For this test, a p-value greater than .05 indicates the data fits well with the model. Therefore, goodness-of-fit was indicated for the Step 3 model, with a significant improvement in fit over the baseline (no predictors) model and the Step 2 model.

Variability of the model was assessed using Cox and Snell R-Square (R^2 = .062) and Nagelkerke R-Square (R^2 = .089). These two tests indicated that between 6% and 9% of the variability in the dependent variable was explained by the predictors of the Step 3 model. Percentage accuracy in classification (PAC) of the correct outcome category of using protection (UOP) for the second model was 71.2%, an improvement over the base model constant only (no predictors, all cases reported not using protection) percentage correct of 28.8%.

Table 4.5 presents the findings of Step 3 of the hierarchical logistic regression analysis. Wald statistics indicated that six of the predictors for main effects and three predictors for interaction effects contributed significantly to the model. The variable Age was statistically significant for the outcome of UOP [OR = 0.88, 95% CI OR = (0.84, 0.93); p <.0005]. The odds ratio indicated that for each one-year increase in age, an adolescent was 12% less likely to use protection. Gender was significant [OR = 0.58, 95% CI OR = (0.45, 0.75); p <.0005]. The odds ratio for the gender variable indicated that females were 42% less likely than males (reference group) to use protection. The insurance status group of Private was statistically significant [OR = 1.30, 95% CI OR = (1.11, 1.53); p = .001]. The odds ratio indicated that adolescents who had Private insurance were 30% more likely to use protection than adolescents who had Public insurance (reference group).

The variable Stressor-LGBTQ was significant [OR = 0.35, 95% CI OR = (0.23, 0.52); p <.0005]. The odds ratio indicated that adolescents who were of same-sex orientation were 65% less likely to use protection when compared to adolescents who did not report same-sex orientation. The variable of Stressor-Sadness was significant [OR = 0.62, 95% CI OR = (0.47, 0.80); p <.0005]. The odds ratio indicated that adolescents who had feelings of sadness or depression during the past month were 38% less likely to use protection when compared to adolescents who did not report feeling sad or depressed in the past month. The variable of Stressor-Lack of Supporting Adult was significant [OR = 0.69, 95% CI OR = (0.49, 0.97); p = .033]. The odds ratio indicated that adolescents who reported that they did not have at least one supporting adult in their life

were 31% less likely to use protection when compared to adolescents who did report having at least one supportive adult in their life.

The interaction effect between Gender and Race/Ethnicity = Hispanic was significant [OR = 0.54, 95% CI OR = (0.31, 0.95); p = .032]. The odds ratio for the Gender*Hispanic interaction indicated that a Hispanic female was 46% less likely to use protection than a White male. The interaction between Gender and the variable of Stressor-LGBTQ was also significant [OR = 2.11, 95% CI OR = (1.34, 3.31); p = .001]. The odds ratio for the Gender*Stressor-LGBTQ interaction indicated that LGBTQ females were 2.1 times more likely to use protection than White males who did not report a same-sex orientation.

Table 4.5
Step 3 of the Hierarchical Logistic Regression Analysis of Outcome on UOP as a Function of Independent, Moderator, and Control Variables of Study (N =5,249)

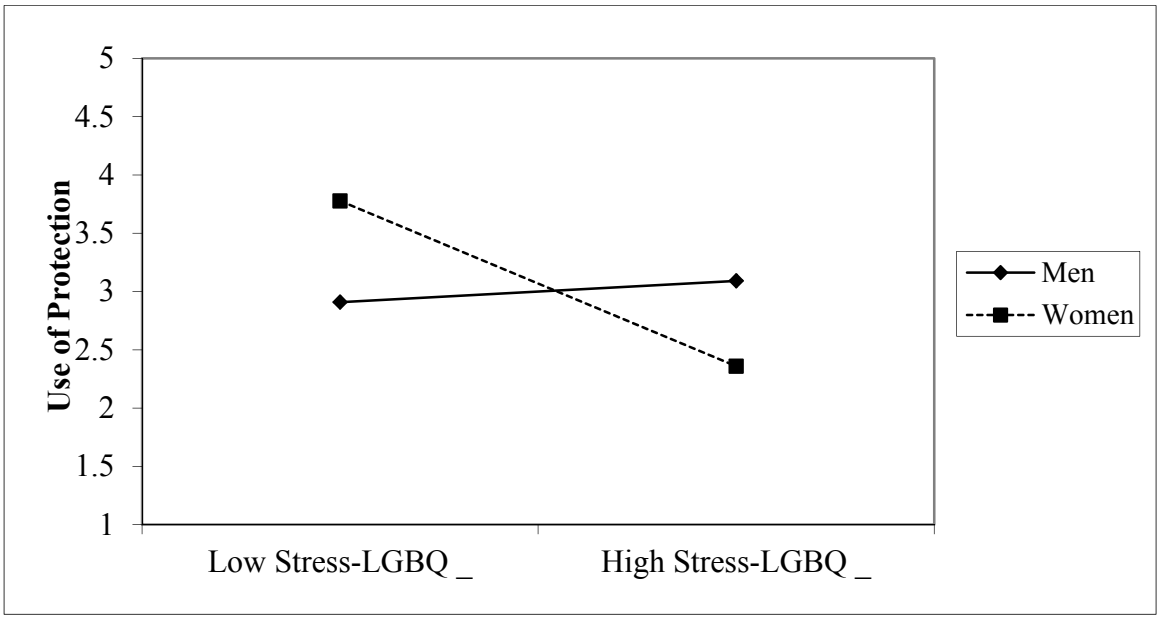
Variable	B	*SE* B	Wald χ^2	Sig.	Odds Ratio	95% CI for Odds Ratio	
						Lower	Upper
Age	-0.123	0.025	23.49	<.0005	0.884	0.841	0.929
Gender (Female)	-0.542	0.132	16.89	<.0005	0.581	0.449	0.753
Race/Ethnicity							
Black/African American	0.018	0.122	0.02	.885	1.018	0.801	1.294
Hispanic	0.136	0.236	0.33	.564	1.146	0.721	1.821
Other	0.104	0.240	0.19	.666	1.109	0.693	1.775
Insurance Status							
Private	0.264	0.083	10.14	.001	1.302	1.107	1.532
Uninsured	-0.013	0.099	0.02	.892	0.987	0.813	1.198
Unknown/Other	-0.087	0.157	0.31	.577	0.916	0.674	1.246
Stressor-Threatened	-0.117	0.173	0.46	.498	0.889	0.633	1.249
Stressor-Abused	-0.134	0.177	0.57	.449	0.875	0.618	1.237
Stressor-LGBTQ	-1.064	0.208	26.22	<.0005	0.345	0.230	0.518
Stressor-Sadness	-0.483	0.135	12.72	<.0005	0.617	0.473	0.804
Stressor-Worries	-0.198	0.169	1.36	.243	0.821	0.589	1.143
Stressor-Lack of Supporting Adult	-0.371	0.174	4.53	.033	0.690	0.491	0.971
Gender*Black/African American	-0.241	0.148	2.64	.104	0.786	0.587	1.051
Gender*Hispanic	-0.613	0.286	4.58	.032	0.542	0.309	0.950
Gender*Other ethnicity	-0.250	0.279	0.80	.370	0.779	0.451	1.345

Table 4.5 (cont'd)

Variable	B	*SE* B	Wald χ^2	Sig.	Odds Ratio	95% CI for Odds Ratio	
						Lower	Upper
Gender*Stressor-Threatened	-0.038	0.199	0.04	.850	0.963	0.652	1.423
Gender*Stressor-Abused	-0.138	0.203	0.46	.498	0.871	0.585	1.298
Gender*Stressor-LGBTQ	0.746	0.231	10.43	.001	2.108	1.341	3.314
Gender*Stressor-Sadness	0.161	0.162	0.99	.320	1.175	0.855	1.614
Gender*Stressor-Worries	0.251	0.200	1.58	.209	1.286	0.869	1.903
Gender*Stressor-Lack of Supporting Adult	0.134	0.208	0.42	.519	1.143	0.761	1.719
Constant	3.570	0.432	68.20	---	---	---	---
Block $\chi^2 = 22.38$ Sig. = .008							
Model $\chi^2 = 335.88$ Sig. < .0005							

Note. Sig. = Significance; CI = Confidence Interval

Figure 4.2: Plot of Interaction between Gender, Stress-LGBQ, and Use of Protection



This graph plot of the interaction between gender, stress-LGBQ and Use of Protection illustrates that there is an interaction effect because the lines are not parallel. This graph illustrates that the higher the stress the lower use of protection for women and use of protection actually decreases. For men the higher the stress the higher use of protection. The lower the stress the better for women in terms of their chances of using protection. Also considering that the stress is related to the LGBQ community anal sex among men is associated with higher transmission of sexually transmitted diseases than sex among two women which may also explain the results and the interaction effect. Women who identify as bisexual or gay may feel there is less of a risk to use protect. More research is needed to investigate these results.

Conclusions as Related to Hypotheses

Hypothesis 1. The main effect for Gender was significantly associated with UOP. Therefore, Null Hypothesis 1 if rejected. There is sufficient evidence to indicate that Gender is significantly associated with UOP.

Hypothesis 2. The interaction effect of Gender*Hispanic was as a significant moderator variable for the outcome of UOP. Therefore, Null Hypothesis 2 is rejected. Race/ethnicity significantly moderated the association between Gender and UOP.

Hypothesis 3. Step 2 main effects of Stressor-LGBTQ, Stressor-Sadness, and Stressor – Lack of Supporting Adult, and Stressor-Abused were significant moderators between Gender and UOP. With the exception of Stressor-Abused, the stressor main effects remained the same for the Step 3 model. The Step 3 interaction effect of Gender*Stressor-LGBTQ was also significantly associated with the UOP outcome. Therefore, Null Hypothesis 3 is rejected. There is sufficient evidence to indicate at least one adolescent stressor significantly moderated the association between Gender and UOP.

Results Summary

Significant results were found for the logistic regression. Gender was significantly associated with UOP, which supported **Hypothesis 1**. The main effect of Stressor-LGBTQ was as a significant moderator between Gender and UOP. The interaction effect of Gender*Stressor-LGBTQ was also significantly associated with the UOP outcome, supporting **Hypothesis 2**. The interaction effect of Gender*Hispanic was a significant moderator variable for the outcome of UOP, and **Hypothesis 3** was supported.

Discussion and Conclusions

This study aimed to investigate the relationship between sexually active male and female adolescent SBHC users in Michigan and the use of protection against STIs and unintended pregnancies, as measured by RAAPS from 2010-2012, inclusive. Almost

one-third of the study population were sexually active and reported that they did not always use protection such as condoms and/or contraceptives, and thus, were at risk for contracting an STI, HIV, becoming pregnant, or causing a pregnancy. In an effort to explore SBHCs ability to refine their strategies and effectively reduce the sexual-risk behaviors of SBHC users, I hypothesized that: 1) gender would predict the use of protection; 2) race/ethnicity would modify the association between gender and the use of protection; and 3) at least one adolescent stressor would modify the association between gender and the use of protection. There was statistically significant support for all three hypotheses.

Gender and the Use of Protection

In this study sexually active adolescent female SBHC users were less likely than their male counterparts to use protection and Hispanic females were less likely than White male SBHC users. Previous studies have indicated that female adolescents are more likely than male adolescents not to use condoms or contraceptives (Brown, et al., 1992; Niyonsenga & Hlaing, 2007; Waddell, et al., 2010). However findings about the use of protection by adolescent females should be contemplated within the demographic characteristics and associated sexual behaviors that have been substantiated in the literature. For example, female adolescents have been found to use protection when they first initiate sex (Lindberg & Maddow-Zimet, 2012; Mueller, et al., 2008); however, the use of protection in this present study sample decreased by as age increased. This suggests that as they grow older they do not use protection. Moreover, it is not unusual for female adolescents to be in a sexual relationship with partners at least two or more years older than themselves (R. J. DiClemente, et al., 2002; Michigan Department of

Education, 2011). These older relationships may be subjected to more gender-related dynamics relative to sexual decision-making and negotiating of condom use (R. A. Crosby, et al., 2000; R. J. DiClemente, et al., 2002), as well as the reasons cited earlier why adolescent females have sex, including romanticized notions (Ozer, et al., 2003; L. E. Widdice, et al., 2006). And finally, the mean age of this study population was 16.16 years; neuroscientists and behavioral scientists have found that the structure and function of the adolescent brain evolves through a course of sensation-seeking events that manifest as risk-taking behaviors (Steinberg, 2007, 2008). This dynamic continues, without the benefit of mature impulse control mechanisms, until the adolescent reaches young adulthood, at about 19-20 years of age. It is plausible that the present study population of middle adolescents was in the midst of the tension between sensation-seeking and impulse control (Jessor, 1991).

SBHCs might consider a more nuanced approach to improving the use of protection among female adolescents that includes recognizing these salient findings, such as age and relationship dynamics. There is substantial evidence that suggests the use of protection improves when condoms and/or contraceptives are available on site (Ethier, et al., 2011; Galavotti & Lovick, 1989; Minguez, et al., 2011; Sidebottom, et al., 2003; Zimmer-Gembeck, et al., 2001).

Stress and the Use of Protection

Three out of seven stressors reported by adolescent SBHC users in the present study were found to be statistically significant in relation to the likelihood of using protection against STIs and/or pregnancy. SBHC users who reported: same-sex orientation were less likely to use protection; feeling sad or down in the last month were

less likely to use protection; and not having a supportive adult to talk to about problems or worries were less likely to use protection than users without these stressors. Furthermore, female adolescents who reported having same-sex orientation were 2.1 times more likely not to use protection than White males who did not report having same-sex orientation.

It is important to put these findings in context of the total study population, whereby between 11% and 32% of respondents experienced at least one of these significant stressors (feeling sad or down, same-sex orientation, or lack of a supporting adult). These reports can be viewed as signs of sexual-risk; these were the SBHC users who did not use condoms and/or contraceptives to protect themselves and their sexual partners from STIs, HIV, or pregnancy. The developmental trajectory of adolescence is a naturally stressful period. As noted earlier, stress is not inherently problematic until it overwhelms the adolescents' coping mechanisms (adaptation to a stressor) or in the absence of support; then, it becomes a maladaptive response or health risk, in this case, sexual-risk (Sales & Irwin Jr, 2009). SBHCs have the opportunity to use adolescent stressors as a risk marker and to provide the support and services, including condoms and contraceptives, required to avert sexual-risks that are predictable.

Insurance Status and the Use of Protection

Insurance status functioned as an income indicator of the adolescent's family. It was a consistent statistically significant predictor of adolescents' use of protection against STIs and unintended pregnancy. SBHC users with private insurance were more likely to use protection than users with public insurance such as Medicaid. The literature on the relationship between adolescent risk-taking and/or sexual-risk behaviors and low

socioeconomic status (SES) is inconclusive. There is some evidence that establishes an association of income inequality, poverty, and low socioeconomic status with adolescent risk-taking behaviors, including those associated with sexual-risks (R. Crosby, et al., 2003; Males, 2009; Sionean, et al., 2001). Similarly, there is research that questions this association (R W. Blum, et al., 2000; Cubbin, et al., 2010) and recommends that SES be considered as a risk marker for intervention as opposed to a risk factor.

Limitations

This study was not without its limitations. First, the RAAPS dataset relied on adolescents' self-reported responses about sensitive behavioral issues. While numerous safeguards have been used to maximize the reliability of the RAAPS system, e.g., it is a validated survey instrument electronically administered in accordance with adolescent preferences, some respondents might be sensitive to adult preferences for certain responses.

Another potential limitation was that a determination of sexual-risk was based on the responses to only two questions from the RAAPS survey. The RAAPS system was modeled after the school-based Youth Risk Behavior Surveillance System (YRBSS) that has been collecting data from adolescents since 1990. The YRBSS uses multiple questions to assess sexual-risk behaviors, including but not limited to age at first sexual intercourse and the number of sexual partners. In contrast, the RAAPS system was developed to be a rapid (5-7 minutes) yet highly reliable assessment for SBHCs and similar clinic environments; its most direct questions regarding sexual-risks were selected from the YRBSS. Nonetheless, analysis of additional RAAPS questions regarding health-risk behaviors such as use of drugs or alcohol might have provided insight into

additional dimensions of sexual-risks among adolescent SBHC users. This is an area for further research.

Finally, this study included a sample of sexually active adolescents attending public schools with SBHCs in Michigan. Therefore, the results may not be generalizable to a national adolescent population or to adolescents attending non-public schools.

Even in light of these limitations, this study contributes to the literature by exploring how policies might influence the sexual-risk behaviors of sexually active adolescents in Michigan. Study findings have implications for policymakers in Michigan and perhaps nationwide.

Conclusion

In Michigan, adolescents have the option of seeking sexual health services at sixty-five SBHCs. Evidence from the present study supports the conclusion that SBHCs served adolescents at risk for contracting STIs, HIV, or unintended pregnancies. Furthermore, SBHC users experienced adolescent stressors that increased their likelihood of engaging in sexually risky behaviors. SBHCs have the opportunity to provide a school-wide perspective that incorporates the maximum potential for arresting adolescent sexual-risk behaviors. Current evidence on school-based risk-reduction strategies that integrate all of the theoretical constructs influencing adolescent behaviors, whether adaptive or maladaptive (See Figure 2.1), hold the most promise. SBHCs have the potential to influence adolescents' sexual-risk behaviors through their peers, school climate, and the presence of other adults in the school environment (Kotchick, Shaffer, Miller, & Forehand, 2001). Such a model has demonstrated success when it comprehensively meets the sexual-health needs of all adolescents and avoids fragmentation of services

(Basen-Engquist, et al., 2001). However, policy must be supportive of sexually active adolescents' intent to practice safe sex; policy changes are needed that will improve access to the health information, support, and services including condoms and contraceptives, adolescents are entitled to through Michigan's Minor Consent Laws.

CHAPTER V

CONCLUSIONS

This dissertation is based in the premise that adolescents are unique in their developmental trajectory and resulting behaviors. I explored both their development and their behaviors in this dissertation. The specific adolescent behaviors of focus were sexual-risk behaviors and to a limited extent health-risk behaviors.

Adolescent health- and sexual-risk behaviors have the attention of national public health officials as evidenced in CDC's top ten priorities and in the Healthy People 2020 Objectives for the nation. Five of the ten priorities for CDC, also known as "Winnable Battles"[3], have adolescents as a priority target group. They are HIV infection, teen pregnancy, motor vehicle injuries, tobacco and nutrition/physical activity and obesity. In addition, for the first time in three decades the nation's guiding health policy agenda, Healthy People 2020, has approximately 30 objectives and sub-objectives devoted to adolescent health[4]. Collectively, these two public health agencies have illuminated a number of adolescent health concerns that are largely behavioral in their origin. Indeed 70% of the morbidities and mortalities experienced by adolescents are behavioral in their origin (CDC, 2012b). Examples include, use of tobacco, driving while intoxicated or having unsafe sex. It is reasonable then to re-consider existing interventions for adolescent health to assess where there is evidence of successful strategies and determine

[3] Centers for Disease Control and Prevention. (2014, April 14). *Winnable battles.* Retrieved April 13, 2014, from http://www.cdc.gov/winnablebattles/focusareas.html

[4] U.S. Department of Health and Human Services. (2013, November 13). *Healthypeople.gov*. Retrieved April13, 2014 from http://www.healthypeople.gov/2020/topicsobjectives2020/overview.aspx?topicid=2

how to strengthen them. This dissertation is my investigation into adolescent sexual-risk behaviors and SB/SLHCs as adolescent-specific strategies to intervene in the seemingly intractable prevalence of sexually transmitted infections including HIV, and unintended pregnancies.

Findings

Chapter I provided a comprehensive overview of SB/SLHCs with an emphasis on their ability to reach and serve adolescents primarily in urban disadvantaged communities. They are distinctive from other community health providers because they are in or linked with schools and have a specialized focus on providing health care and services in a manner that is sensitive to adolescents' concerns of confidentiality, accessibility, and cost. I provided substantial evidence on the effectiveness of SBHCs to affect both health- and sexual-risk behaviors, where policies are supportive. I emphasized that because SBHCs are located in schools they are controlled by school policies that, in the state of Michigan, restrict them from providing condoms and contraceptives to sexually active adolescents. SLHCs are distinct from SBHCs because they are located in the community and, therefore, sexually active adolescents can receive sexual health services including condoms and contraceptives. These services are confidential because adolescents can consent for their sexual health care and services under the Michigan's Minor Consent laws. While SLHCs are a viable alternative they fall short in their ability to serve a whole school of adolescents and potentially shape the social norms for adolescent sexual behaviors inclusive of condom and contraceptive use for those who are sexually active. I argue that the policies that govern SBHCs may be

less than supportive of sexually active adolescents to use protection from STIs and unintended pregnancies.

Chapter II explores the empirical literature to extract the evidence for the predictors and determinants of adolescent sexual-risk behaviors. One of the aims of this literature review was to develop a conceptual model that captures both adolescent development and behaviors. Moreover based on the empirical literature the conceptual model included the multi-level constructs of influence on adolescent development and behavior. The Biopsychosocial Model of Adolescent Development and Behavior (Figure 2.1) emerged from this review.

The model reflects the direct relationships between environmental, interpersonal/social, and individual developmental constructs and adolescent behaviors associated with the use of SB/SLHCs and the use of protection. Of particular note is the explicit inclusion of policy as a macro-level environmental construct, which is typically invisible in the empirical research literature. Further, the model includes the interplay of the constructs and represents them as dynamic and stressful as the adolescent is developing. Finally, based on the literature, the model integrates the recent neuroscience on the evolving structure and function of the adolescent brain that leads to increased risk-taking behaviors.

I argue that SBHCs are a critical strategy for responding to the complexities of adolescent behaviors, particularly sexual-risk behaviors, in light of adolescents' evolving brains. However, SBHCs are rendered somewhat impotent in their ability to respond to the sexual health care and services their users ought to have. The irony was that SBHCs can conduct pregnancy tests and, if it is positive, refer adolescents for prenatal care.

SBHCs can also diagnose and treat STIs, but in Michigan SBHCs cannot provide the condoms or contraceptives which might prevent either of these conditions from occurring. This prohibition deprives sexually active adolescents of their right to obtain the sexual health services that protect them from unintended pregnancies and STIs. Furthermore, difficulty with access to condoms and/ or contraceptives may indeed contribute to the rates of STIs and unintended pregnancies. Sexually active adolescents who use SBHCs have to go to another health care provider to receive contraceptives or to the pharmacy to purchase condoms. This is a less-than-ideal situation for many adolescents, as it presents numerous obstacles to obtaining services when one considers the complexities of the adolescent brain and related behaviors.

The literature reviewed in Chapter II provided the theoretical underpinnings for the conceptual model that formed the foundation for the quantitative research in chapters III and IV. Furthermore, the Biopsychosocial Model of Adolescent Development and Behaviors may inform the design of future research and interventions for adolescent sexual health.

Chapter III provided a quantitative analysis of health and sexual-risk behaviors of adolescent users of SBHCs and SLHCs in Michigan where SBHCs are prohibited from providing condoms and contraceptives to sexually active adolescents. The results indicated that the users of these two types of clinics did not differ from one another in sexual- or health- risk behaviors. It was theorized that SLHC users were more likely to use protection because they had direct access to those services as opposed to SBHC users who do not. Another finding from this research indicated that the SBHCs and SLHCs had comparable clinical outcomes for STIs (gonorrhea and chlamydia) however SBHCs

had statistically significant more positive pregnancy tests than SLHCs. Collectively these findings suggest that the adolescent users of both the community-based and the school-based clinics are at risk for unintended pregnancy and STIs are equally in need of easily accessible condoms and contraceptives. Policies should support sexually active adolescents to have direct access to the services required to protect themselves.

Chapter IV inquired about another dimension of the Biopsychosocial Model of Adolescent Development and Behaviors (Figure 2.1). This quantitative analysis advanced corroborated findings in the literature about gender differences in the use of condoms and contraceptives. The research found that among adolescent SBHC users, females were less likely to use protection than males. It was also analyzed how that relationship would be modified by race and stress and found that adolescent females who were experiencing stress associated with their sexual orientation were less likely to use protection than those who were White males. Hispanic females were less likely to use protection than white males.

In conclusion, the outcomes from the literature review and empirical research in this dissertation have implications for future research, policy and interventions. Additional research is needed on the role and influence of SLHCs on adolescent health and behaviors. This investigation did not identify any outcome research on this model of adolescent health care; research to date occurred over 20 years ago and is descriptive in nature (Fothergill & Ballard, 1998; Peak & Hauser McKinney, 1996). This model of care fills a strategic gap for sexually active adolescents because it is able to provide and support the use of condoms and contraceptives. In addition, public health research on policies that support or inhibit interventions such as SBHCs from providing full-service

care to sexually active adolescents would contribute greatly to filling the void in understanding how this policy interacts with this dimension of adolescent behavior. Additionally, the findings on adolescent risk behaviors uncovered by assessment tools such as RAAPS and YRBSS ought to be systematically incorporated into SSB/SLHC practice. These tools are able to identify risk-behaviors that can be mediated before they manifest into undesirable health outcomes. In particular, RAAPS uncovered a number of correlates of sexual-risk behavior that SB/SLHCs can use as risk markers, i.e., adolescent stressors. Administering RAAPS school-wide may reveal unimaginable opportunities for public health prevention programming and policies to prevent or reduce health- and sexual-risk behaviors among adolescents.

Together SB/SLHCs are serving a population at-risk for numerous morbidities that are preventable; the model should be fortified to strengthen and broaden their influence in an environment that research supports as being strategic – schools.

Finally, there appears to be substantial research on adolescent behaviors that omits consideration of adolescent development. The evidence on the scientific underpinnings of adolescent risk-taking compels the need for future research to deliberately and consistently consider adolescent behaviors in light of their neurobiological development. Furthermore, research in adolescent sexual- and health-risk behaviors might be enriched by a multi-dimensional ecological approach such as that illustrated in the Biopsychosocial Model of Adolescent Development and Behaviors (Figure 2.1). This type of approach would assure that the complex realities of adolescents' lives as they transition from childhood to adulthood, i.e., community conditions and policy, were factored into research designs and findings.

Policy Implications and The Affordable Care Act

The Affordable Care Act (ACA) amended the former Health and Education Reconciliation Act and became effective by law on March 23, 2010 with full implementation in January 2014 (Rosenbaum, 2011). ACA will drastically alter the practice of public and primary health care delivery by aiming to achieve nearly universal health care through shared responsibility between government, individuals, and employment entities. Its major goal is to improve health care quality while reducing unnecessary spending, such as recurring emergency room visits (Rosenbaum, 2011).

In that vein, the ACA allocated $200 million for the delivery and expansion of SBHCs in 2011 (HHS, 2012). SBHCs help to meet a major goal of the ACA, which is to streamline primary care and make it accessible to underserved populations. SBHCs provide a "safety net" for uninsured children by having primary care available within the school system, decreasing rates of preventable diseases (Rosenbaum, 2011). The ACA also provided SBHC grants to expand programs, capacity building, and technical expertise to meet the needs of the communities they were serving (HHS, 2012).

However, meeting the goals of the ACA translates in SBHC and SLHC to also addressing risky sexual health behaviors of adolescent youth that undoubtedly lead to preventable sexual transmitted diseases and unwanted pregnancies. Therefore, in order for the ACA to meet their goals and mission of streamlining quality health care and preventing diseases, policy changes must be made so the SBHCs can more effectively serve the needs of their populations by providing quality sex education and contraception. The research from this dissertation proves that there is a gap in SBHCs to fundamentally provide primary care that meets the unique needs of the populations that use SBHCs.

Even though the ACA has provisions in place to improve and expand quality health care, the federal government cannot enforce states to oversee federal laws without violating the Tenth Amendment of the Constitution. Therefore, if demanding that SBHCs dispense contraception violates a federal law, there are incentives in place by ACA for programs that reduce preventable diseases and improve health care value and quality that meets the needs of diverse populations.

This research is a critical first step in providing evidence for the ACA to add incentives for SBHCs that add contraception to their programs serving sexually active adolescents.

Future Research

The RAAPS dataset was an ideal dataset for preliminary investigation of clinical outcomes related to sexually transmitted diseases and pregnancies among adolescent youth that use SBHCs and SLHCs. However, for future research a national dataset that explores the efficacy of SBHCs and SLHCs according to the ACA and which includes items that address dispensing contraception in SBHCS and SLHCs would be the next logical step. Since over $200 million was given to SBHCs, this is a prime opportunity to create a dataset to investigate the efficacy of reducing preventable diseases and reaching the goals of the ACA. Additionally, including questions that address the developmental stages of adolescent youth according to their risk behaviors and investigating how SBHCs and SLHCs are meeting those needs would also be critical. If further research supports the dispensing of contraception as an effective way of reducing sexually transmitted diseases, this helps provide leverage for future initiatives to include

incentives for SBHCs and SLHCs to provide comprehensive care, including contraception for adolescent youth.

APPENDIX

RAAPS Survey

CONFIDENTIAL - ADOLESCENT HEALTH RAAPS

Name: _____ Sex: _____ Insurance: _____

Birthdate: _____ Ethnicity/Race: _____ Reg #: _____

Health Risk Profile: Confidential — Your answers will only be seen by the center staff					Office Use Only
1. **In the past 12 months**, have you tried to lose weight by taking diet pills or laxatives, making yourself vomit (throw up) after eating, or starving yourself?		No		Yes	
2. Do you eat some fruits and vegetables every day?		Yes		No	
3. Are you active after school or on weekends (walking, running, dancing, swimming, biking, playing sports) for **at least 1 hour, on at least 3 or more days each week?**		Yes		No	
4. Do you **always** wear a seat belt when you are driving or riding in a car, truck, or van?		Yes		No	
5. Do you **always** wear a helmet when you are biking, rollerblading, skateboarding, motorcycling, snowmobiling, skiing or snowboarding?		Yes		No	
6. **During the past month**, have you been threatened, teased, or hurt by someone (on the internet, by text, or in person) or has anyone made you feel sad, unsafe, or afraid?		No		Yes	
7. Has anyone **ever abused** you physically (hit, slapped, kicked), emotionally (threatened or made you feel afraid) or **forced you** to have sex or be involved in sexual activities when you didn't want to?		No		Yes	
8. Have you **ever** carried a weapon (gun, knife, club, other) to protect yourself?		No		Yes	
9. **In the past 3 months**, have you smoked cigarettes or any other form of tobacco (black and mild, hookah, other) or chewed/used smokeless tobacco?		No		Yes	
10. **In the past 12 months**, have you driven a car drunk, high, or while texting or ridden in a car with a driver who was?		No		Yes	
11. **In the past 3 months**, have you drunk more than a few sips of alcohol (beer, wine coolers, liquor, other)?		No		Yes	
12. **In the past 3 months**, have you smoked marijuana, used other street drugs, steroids, or sniffed inhalants ("huffed" household products)?		No		Yes	
13. **In the past 12 months**, have you used **someone else's** prescription (from a doctor or other health provider) or any nonprescription (from a store) drugs to sleep, stay awake, concentrate, calm down, or get high?		No		Yes	
14. Have you **ever** had any type of sex (vaginal, anal or oral sex)?		No		Yes	
15. Have you ever been attracted to the same sex (girl to girl/guy to guy) or do you feel that you are gay, lesbian, or bisexual?		No		Yes	
16. If you have had sex, do you **always** use a method to prevent sexually transmitted infections and pregnancy (condoms, female barriers, other)?		Yes		No	
17. When you are angry, do you do things that could get you in trouble?		No		Yes	
18. **During the past month**, did you **often** feel sad or down as though you had nothing to look forward to?		No		Yes	
19. Do you have any serious problems or worries at home or at school?		No		Yes	
20. **In the past 12 months**, have you seriously thought about killing yourself, tried to kill yourself, or have you purposely cut, burned or otherwise hurt yourself?		No		Yes	
21. Do you have at least one adult in your life that you can talk to about any problems or worries?		Yes		No	

For Office Use Only

Evaluation: _____ at risk counseled _____ at risk Needs f/u _____ no current risk Referred to: _____

Provider Signature: _____ Date: _____

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