1-6-2012

Changes in Sexual Risk Perception and Risk Taking Among Urban African American Adolescents

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CHANGES IN SEXUAL RISK PERCEPTION AND RISK TAKING AMONG URBAN AFRICAN AMERICAN ADOLESCENTS

By

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B.A., WELLESLEY COLLEGE

A Thesis Submitted to the Graduate Faculty
of Georgia State University in Partial Fulfillment
of the
Requirements for the Degree

MASTER OF PUBLIC HEALTH

ATLANTA, GEORGIA
30303

CHANGES IN SEXUAL RISK PERCEPTION AND RISK TAKING AMONG URBAN AFRICAN AMERICAN ADOLESCENTS

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Acknowledgements

Thank you to Dr. Richard Rothenberg, my thesis advisor, for his guidance and mentoring through the thesis process and the completion of my degree. I am also grateful for the financial support afforded me by the Georgia Health Foundation Scholarship.

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ABSTRACT

ROSA M. STEEN
Changes in Sexual Risk Perception and Risk Taking Among Urban African American Adolescents.

Background: Adolescents and young adults aged 15 to 24 acquire nearly half of all new STDs in the United States, yet they represent only 25% of the sexually active population. Young men and women in this age group have the highest rates of chlamydia, gonorrhea, and syphilis, especially in the African American population. Adolescent risk factors include having a history of pregnancy or STDs, being arrested or incarcerated, substance abuse, early sexual debut and having 4 or more lifetime sexual partners. Protective behaviors such as parental involvement, school enrollment, and consistent condom use have been associated with decreased incidence of STDs. The purpose of this study is to observe changes in adolescent behaviors and experiences that are known risk factors for acquiring sexually transmitted diseases. The aim is to identify the time at which STD prevention interventions may be administered most effectively. In addition, the study aims to identify relevant themes and content that may be useful in creating interventions targeted to different age groups and genders.

Methods: This study utilizes primary data collected between 1999 and 2003 by Dr. Rothenberg and colleagues for a community-based network study of low-income African American adolescents living in a working class neighborhood in Southwest Atlanta. Two descriptive analyses were conducted: a period analysis in which all participants ages 15 to 18 who completed any or all of three interviews were included; and a cohort analysis, which included only participants who completed three interviews and who were 15, 16, 17 or 18 years of age at the time of the first interview. Univariate analysis was used to describe each variable and the resulting frequencies and percentages were reported.

Results: In both period and cohort analyses, higher proportions of older adolescents (ages 17 and 18) reported engaging in risky behaviors including drinking alcohol, using marijuana, having sex and having multiple sexual partners, compared to younger adolescents (ages 15 and 16). Males reported higher proportions of engaging in risky behaviors than females, but also higher proportions of condom use. The proportion of participants diagnosed with one or more STDs decreased at each interview. In the cohort analysis, the proportion of participants who perceived their STD risk as “medium” or “high” increased over time.

Conclusions: The findings suggest that as adolescents mature they engage in a greater variety of risky behaviors known to have a positive association to STD diagnosis. Period analyses, which have usually been done to study the sexual behaviors of adolescents, may give aberrant results that are clearer when the population is studied as a cohort. Future studies are needed to more precisely identify the period during which adolescents experience rapid changes in their risk behaviors.

CHAPTER I

INTRODUCTION

1.1 Background

Sexually transmitted infections (STDs) are the most common infections in the United States. In 2009, there were 1,244,180 cases of sexually transmitted *Chlamydia trachomatis* infections, 301,174 cases of gonorrhea, and 13,997 cases of syphilis reported to the Centers for Disease Control and Prevention (Centers for Disease Control and Prevention [CDC], 2010b). Nationally, both chlamydia and syphilis rates are on the rise since 2008 (ibid). Adolescents are particularly vulnerable to acquiring STDs as is reflected in the higher incidence and prevalence estimates of STDs among the 15- to 24-year-old population.

Adolescents in the above-mentioned age group acquire nearly one half of all new STDs in the United States but constitute only 25% of the sexually active population (Weinstock, Berman & Cates, 2004). Compared to other age groups, young men and women ages 15 to 24 have the highest rates of chlamydia and gonorrhea; they also have the highest rates of primary and secondary syphilis (CDC, 2010b). These estimates represent only the three nationally notifiable STDs in the country. According to earlier estimates of STD incidence among adolescents, three infections account for 88% of cases: human papillomavirus, trichomoniasis and chlamydia (Weinstock, et al., 2004). Furthermore, in 2009, 8,300 people ages 13 to 24 from 40 different states reported living with HIV (CDC, 2011).

Along with disparities among age groups, surveillance data also indicate higher rates of STDs among racial or ethnic minorities compared to whites. Of all the reported

cases of chlamydia in 2009, nearly half occurred among blacks, whose rate is eight times higher than that of whites (CDC, 2010b). Although gonorrhea rates have decreased both at the national level and within all ethnic groups, 71% of all reported gonorrhea cases occurred among blacks. The rate of gonorrhea among blacks is considerably higher compared to whites, in particular among men and women ages 15 to 24 (ibid). Similarly, 52% of reported cases of primary and secondary syphilis occurred among blacks. Young black men and women ages 15 to 19 have been significantly affected by increased rates, 26 and 29 times higher than whites, respectively, compared to whites of the same age group (ibid). Similar disparities were observed for trichomoniasis and herpes simplex virus (HSV-2) (CDC, 2010a).

The higher incidence of STDs among adolescents in general, and black adolescents in particular is a direct consequence of the risky sexual behaviors in which they engage. According to the results of the 2009 Youth Risk Behavior Survey (YRBS), 46% of students in grades 9 through 12 reported that they had ever had sexual intercourse. Among black males, the prevalence was 72.1% and among black females, 58.3%, higher than any other ethnic group for both genders. Black adolescents also had a higher prevalence than white students for having their first sexual intercourse before age 13 (65.2% and 42%, respectively), having sexual intercourse with four or more persons in their lifetime (28.6% and 10.5%) and being sexually active (47.7% and 32 %) (CDC, 2010c), behaviors that are associated with increased risk of acquiring an STD. Results for protective behaviors such as condom use and being tested for HIV indicated an equal prevalence for the former, approximately 60% for both blacks and whites, and a higher prevalence of HIV testing among blacks (21.4%) compared to whites (11%) (CDC,

2010c). The prevalence of drinking alcohol or using drugs before the last sexual intercourse was higher among males than females, 25.9% and 17.1% respectively, and higher for white males than black males, 28.0% and 20.8% respectively (ibid).

Analysis of YRBS data trends from 1991 to 2009 indicate that there was an overall decrease in the prevalence of sexual experience among female, male, white and black students. Among black students, most of this change occurred during the period between 1991 and 2001 and subsequently leveled off. From 1991 to 2009, there was also a decrease in the prevalence of multiple sex partners and the prevalence of current sexual activity reported by students. In the same time period, the overall prevalence of condom use increased for all groups. Although this last trend is encouraging on the surface, for black students, the prevalence increased from 1991 to 1999 but decreased during 1999 to 2009. In addition, the prevalence of injection drug use also increased for black students during the period of 1995 to 2009. Further exacerbating the problem of risky sexual behaviors, the percentage of students who receive HIV- and STD- prevention education decreased from 91% in 1997 to 87% in 2009. Often, students do not receive this education before becoming sexually active and the curriculum of topics covered in these courses varies greatly by state (Eaton, Lowry, Brener, Kann, Romero & Wechsler, 2011).

Sexual Networks as Contributing Factors in Sexual Health Disparities

Disparities in sexual health exist between black and whites in the U.S. even when sociodemographic and individual risk factors are similar. STD rates for African Americans are consistently higher than in whites across the socioeconomic gradient and geographical location, in both urban and rural settings. Sexual health disparities are the

result of the interaction between social determinants and the population dynamics of disease transmission (Hogben & Leichliter, 2008; Farley, 2006). Social factors that influence disparities in STD rates include racial segregation, low socioeconomic status, social disorganization, and high rates of male incarceration in black communities (ibid.).

Social factors alone do not explain the discrepancies in the rates of STDs by race. A more complete picture emerges when the sexual network characteristics of blacks and whites are considered. The literature suggests that blacks make different sexual partner choices than whites; mainly that concurrency, having sexual relationships that overlap in time, is more prevalent in the sexual networks of blacks than whites (Morris, Kurth, Hamilton, Moody & Wakefield, 2009; Hogben & Leichliter, 2008; Newman & Berman, 2008). The disparity in STD rates persists because the sexual networks of blacks and whites are for the most part segregated and within white networks, interactions between partners do not include high levels of concurrency (Newman & Berman, 2008; Morris et al., 2008). In addition to sociodemographic factors, the sexual risk of any individual is influenced by personal behavior, partner behavior and the individual's position in the sexual network, which determine levels of individual exposure and the population dynamics of infection spread (Morris et al, 2008).

Although limited, studies on the sexual networks of adolescents have yielded similar findings as those of adult sexual networks: concurrency, geography, and STD prevalence determine individual STD risk for adolescents. Jennings and colleagues found that adolescent risk for STDs depends on the interconnectedness between the individual and the sexual network. In their study, living in a geographic area of high STD prevalence was significantly associated with a current bacterial STD when an individual

had a main sex partner who had concurrent sexual relationships (Jennings, Glass, Parham, Adler & Ellen, 2004). Another study of urban adolescents living in Atlanta by Rothenberg et al. found that the STD prevalence to which population subgroups are exposed varies from the overall STD prevalence in the population and that STD risk depends on the personal network of the individual (Rothenberg, Hoang, Muth & Crosby, 2007). In addition, Rothenberg and colleagues also observed protective factors that mitigated disease transmission in this population; for example, adolescents in this study did not use injecting drugs or crack, and they did not associate with older persons in their sexual networks. Social networks may hinder or accelerate disease transmission and are thus essential to understanding sexual health disparities and creating effective interventions to prevent future STD transmission.

Epidemiology of STDs among Georgia Adolescents and Young Adults

According to the Georgia Epidemiology Report, there are 65,000 new STD infections reported annually (2008). Consistent with national trends, young people ages 15 to 24 are most affected by STDs and African Americans had the highest rates of chlamydia, gonorrhea and syphilis. By age group, the highest rates of chlamydia and gonorrhea occurred in 15- to 24-year-olds, and for primary and secondary syphilis, in persons 20 to 29 years of age. Furthermore, in 2007, 77% of all STD cases reported occurred in the metropolitan Atlanta area. Among young people aged 15 to 24, there were 28,563 cases of chlamydia, 8,624 cases of gonorrhea, and 227 cases of primary and secondary syphilis reported in 2009 (CDC, 2011). In the same year, 64 adolescents ages 13 to 19 were newly diagnosed with HIV, and 26 with AIDS, which represents 4% of all

the newly diagnosed cases for that year (Georgia Department of Community Health, 2009). In addition, there were 352 adolescents ages 13 to 19 living with HIV and 138 adolescent living with AIDS in the state of Georgia (ibid), which represents 1% of the total population currently living with HIV and AIDS in Georgia. Although these percentages seem low, prevention of STDs among adolescents remains a priority as most newly diagnosed cases of AIDS occur among people ages 30 to 39 (ibid.), which suggest that many of these infections may have been acquired during these individuals' late teens and early twenties.

Economic costs of treating STDs

Although many studies have assessed the cost-effectiveness of STD prevention for adolescents, few studies have assessed the economic impact of STD treatment specifically incurred by youths in the United States. A study published by Chesson, Blandford, Gift, Tao and Irwin estimates that in 2000, direct costs associated with STDs among persons ages 15 to 24 amounted to $6.5 billion dollars. Viral STDs accounted for 94% of the economic burden, especially HIV and HPV, which contributed 90% of the calculated costs (2004). The estimated average cost per case of Chlamydia was $20 for men and $244 for women; gonorrhea, $53 for men and $266 for women; and syphilis, $444 per case (ibid). In addition to the direct medical costs associated with treatment, there are also indirect costs incurred when STDs are left untreated due to loss of productivity. Blanford & Gift estimated that the lifetime productivity cost of untreated chlamydia infection per case was $130 and for pelvic inflammatory disease, $649 per incident (2006).

The Kaiser Family Foundation reported similar findings in an earlier study. Bacterial STDs, such as chlamydia, gonorrhea, trichomoniasis and syphilis, were less costly if they were diagnosed and treated early because in general, these are curable conditions (1998). Costs increased significantly when these diseases, especially chlamydia and gonorrhea, were left untreated leading to complications such as pelvic inflammatory disease, infertility, ectopic pregnancy or transmission of the disease to infants born to infected mothers. The costs associated with viral STDs were considerably higher because they require ongoing treatment. The greatest costs were also associated with HPV infection, which can lead to precancerous cervical lesions, and HIV/AIDS. The total direct cost of treating STDs in the U.S. was estimated at $8.4 billion (1997 U.S. dollars), which does not include lost wages and productivity, out of pocket expenses and preventive services (ibid.).

1.2 Purpose of Study

Sexually transmitted diseases create an undue social and economic burden in our society. Especially affected are minority youth who are already at a disadvantage by being subject to racial prejudice, segregation, lack of access to healthcare resources, and low socioeconomic status. The current statistics indicate that STDs among African American youth are widespread and on the rise. Given these facts, it would be beneficial to continue the study of adolescent sexual behaviors with the aim to broaden the knowledge base to guide preventive interventions and policy making.

The purpose of this study is to observe changes in adolescent behaviors and experiences that are known risk factors for acquiring sexually transmitted diseases. The

aim is to identify the time at which STD prevention interventions may be administered most effectively. In addition, the study aims to identify relevant themes and content that may be useful in creating interventions targeted to different age groups and genders.

1.3 Research Questions

The following are the specific research questions for this study:

1. How do adolescents change in terms of their behaviors and experiences that are known risk factors for acquiring sexually transmitted diseases?
2. Are there differences in these changes between males and females?
3. Are there differences in these changes between younger adolescents (ages 15 and 16) and older adolescents (age 17 and 18)?

Hypotheses

1. For the period analysis, there will be no change in the behaviors and experiences that are known risk factors for acquiring STDs.
2. For the cohort analysis, there will be change in all variables, with a higher proportion of participants reporting more behaviors and experiences that are known risk factors for acquiring STDs.
3. For the cohort analysis, the percentage of participants who perceived their risk of acquiring an STD as “medium” or “high” will increase.
4. For the cohort analysis, the percentage of participants who tested positive for one or more STDs will decrease.

CHAPTER II

REVIEW OF THE LITERATURE

The purpose of the present study is to observe changes in adolescent behaviors and experiences that are known risk factors for acquiring sexually transmitted diseases. There are multiple social, behavioral and environmental factors that interact with one another to influence adolescents' exposure and susceptibility to STDs. The following is an overview of the protective and risk factors that are relevant to this study.

2.1 Parental involvement and school enrollment

Parental supervision is a mitigating factor against the influence of deviant peers and engagement in risky sexual behaviors (Capaldi, Stoolmiller, Clark & Owen, 2002; Miller, Forehand & Kotchnik, 1999). In a study of urban African American adolescent females, high levels of parental supervision were significantly associated with a decreased incidence of gonorrhea and chlamydia, even in single-parent households (Bettinger, Celentano, Curriero, Adler, Millstein & Ellen, 2004). In a previous study, Romer et al. found that children and adolescents who reported high levels of parental supervision were less likely to initiate sex in preadolescence and also reported lower rates of sexual initiation as they got older (Romer, Stanton, Galbraith, Feigelman, Black & Li, 1999). The authors also found that parental communication positively influenced initiation of condom use as well as consistent condom use. Bettinger and colleagues, on the other hand, did not find an association between parental communication and reduced incidence of STDs.

Research also suggests that school enrollment has a protective effect against STD acquisition (Crosby, DiClemente, Wingood, Salazar, Rose & Sales, 2007; Kirby, 2002). In a study by Crosby and colleagues, adolescent females not enrolled in school were two times more likely to test positive for chlamydia, trichomoniasis, or gonorrhea than females who were enrolled in school (Crosby, DiClemente, Wingood, Salazar, Rose & Sales, 2007). Being enrolled in school also protected against other risk factors such as having multiple sex partners and having sex with risky partners (defined as older and/or recently incarcerated). A review of studies that examined the impact of school involvement on sexual risk taking reveals that school involvement and academic achievement are associated with a reduction in sexual risk behaviors as well as a reduction in pregnancy rates (Kirby, 2002). School enrollment is also associated with adolescents reporting higher self-esteem and increased ability to negotiate condom use with sex partners (Crosby et al., 2007; Kirby 2002).

2.2 Pregnancy

Pregnant adolescents are at high risk of acquiring an STD given that they have a history of unprotected sex as well as physiologic susceptibility. When pregnancy risk is no longer a concern, there is often a reduction in condom use among pregnant adolescents (Crosby, DiClemente, Wingood, Rose & Lang, 2003; Niccolai, Ethier, Kershaw, Lewis & Ickovics, 2003; and Crosby, DiClemente, Wingood, Sionean, Harrington, et al., 2002). Pregnant adolescents report less and more infrequent condom use and more unprotected vaginal intercourse than their non-pregnant peers (Niccolai, et al., 2003; Crosby, DiClemente, Wingood, Sionean, Harrington, et al., 2002).

In a study by Niccolai and colleagues, almost 20% of a sample of pregnant teens tested positive for chlamydia or gonorrhea, although most of them reported being in committed, monogamous relationships (2003). Increased trust in and familiarity with sex partners provides the sense that these partners are safe and that STD prevention measures are unnecessary (Crosby, DiClemente, Wingood, Rose & Lang, 2003).

2.3 Being Detained or Incarcerated

Being arrested or incarcerated is a predictor of high-risk sexual behaviors and positive STD status. Youths who have been arrested or detained report more high-risk sexual behaviors including ever having intercourse, lower rates of condom use, having multiple sex partners, drug and alcohol use, and earlier sexual debut than youths who have not been arrested or detained (Belenko, Dembo, Weiland, Rollie, Salvatore, et al., 2008; Morris, Harrison, Knox, Tromanhauser, Marquis & Watts, 1995). Adolescent detainees have a high rate of STDs and can become core transmitters when they reenter the community. Belenko et al. found that among an urban population of juvenile offenders, 11.5% tested positive for chlamydia, 4.2% tested positive for gonorrhea, and 13.2% for both infections (2008). Among youths who were remanded to secure detention the proportions of STD prevalence were even higher, 16.3% for males and 34.2% for females (ibid.). In comparison the rates for chlamydia and gonorrhea among the general U.S. population ages 15 to 19, were 3,329.3 and 568 per 100,000, respectively for females (CDC, 2010b). For males rates were 735.5 per 100,000 for chlamydia and 250.0 per 100,000 for gonorrhea (ibid).

2.4 Alcohol and Marijuana Use

Numerous studies have documented the relationship between alcohol consumption and sexual activity among adolescents. Analyzing data from the 1997 National Longitudinal Study of Youth, Bisakha Sen concluded that alcohol consumption, especially at levels low enough for mild intoxication, was associated with increased probability of sexual intercourse and increased probability of unprotected sexual intercourse among adolescents (2002), which increases the likelihood of acquiring an STD. Floyd & Latimer, in their study of the influence of alcohol and marijuana use on the sexual behaviors of Midwestern adolescents, reported that the odds of being sexually active increased as the frequency of alcohol and marijuana use increased. However, the frequency of substance use did not increase the odds of unprotected sexual intercourse in their sample. In addition, use of marijuana was also associated with having more than one lifetime sexual partner (Floyd & Latimer, 2010). In another study which followed the STD status of teens at baseline and follow up, teens who tested STD positive at follow up were significantly more likely to be female, African American, experienced impregnation, have drank to the point of intoxication, have used marijuana at least once or twice a week, and have had a sexual relationship with a partner who was at least four years older or African American (Boyer, Sebro, Wibbelsman, & Shafer, 2006).

Studies on the influence of alcohol on sexual behavior and acquisition of STDs among African American adolescents have yielded similar results. In a sample of juvenile detainees, duPlessis, Holliday, Robillard, & Braithwaite found an association between the number of times respondents had unprotected sex and the number of times they consumed alcohol as well as an association between using marijuana before having

unprotected sex. A greater effect on sexual risk was detected for marijuana compared to alcohol (2009). The results of another study of African American adolescent females living in an area characterized by high unemployment, substance abuse, violence, high rates of teen pregnancy and STDs, identified use of marijuana, having sexual partners that were at least 5 years older, sex with non-steady partners and a history of delinquency as the strongest psychosocial predictors of T. vaginalis infection (Crosby, DiClemente, Wingood, Harrington, Davies, Hook & Oh, 2002). Low-income African American youths who are sexually active and involved in drugs (alcohol use, drug use, drug trafficking), have also been found to be more likely to engage in high-risk sexual behavior, such as having unprotected sex and having multiple sexual partners (Li, Stanton, Cottrell, Burns, Pack, & Kaljee, 2001).

2.5 Condom Use

Numerous studies have illustrated the value of condom use in protecting against STD acquisition. Crosby, DiClemente, Wingood & Harrington found that consistent condom use among teenagers offers substantial protection against STD pathogens such as *C. trachomatis*, *N. gonorrhoeae*, *T. vaginalis*, when used properly from start to finish during sexual intercourse (2003). However, many adolescents who reported consistent condom use still acquired an STD prompting the authors to hypothesize that they do not use condoms for every sexual act during intercourse or do not use condoms properly (ibid). Adolescents' adoption of the behavior can be influenced by a myriad of factors including the perception that peers use condoms (Romer & Stanton, 2003) and positive or

negative attitudes about condom use (Manlove, Ikramullah & Terry-Humen, 2008; Romer & Stanton, 2003).

The results of a prospective study of Midwestern African American adolescents from 9th to 12thgrade at-risk youth indicated that inconsistent condom use increased across the high school years, especially if participants also reported greater sexual intercourse frequency (Bauermeister, Zimmerman & Caldwell, 2011). In this study, inconsistent condom use decreased when adolescents reported a greater number of partners and pregnancy concerns. Contrary to expectations based on social disorganization theory, youth who lived in neighborhoods with more economic disadvantage were more likely to report using condoms if they were sexually active at 9th grade. The authors hypothesized that youth in disadvantaged neighborhood used condoms because they are exposed to the outcomes of unprotected sex (STDs, HIV/AIDS, pregnancy, etc.) and are aware of their risk. In addition, neighborhood disadvantage was not found to be associated with changes in inconsistent condom use across the high school years (ibid).

Adolescents' perspective of the desirability of condom use is associated with prevention of HIV and pregnancy but not as a method to prevent other STDs (Kennedy, Nolen, Applewhite & Waiter, 2007; Manlove et al., 2008). Studies of pregnant African American adolescents indicate that condom use decreases significantly among this population leaving young women at risk of acquiring an STD from a sexual partner during pregnancy (Crosby, DiClemente, Wingood, Sionean, Harrington, Davies, Oh & Hook, 2002; Crosby, DiClemente, Wingood, Rose & Lang, 2003). Equally important is

young women's ability to negotiate condom use with their partners, as males express that men, not women, are responsible for the decision (Kennedy, et al., 2007).

In a qualitative study of African American teens' perceptions of condom failure, Sznitman and colleagues found that teens are aware that condom failure is a possible risk related to their sexual behavior, that it is used as an excuse when unprotected sex occurs intentionally or unintentionally, and that is also used as an excuse for boys to trick partners into having unprotected sex. Participants demonstrated knowledge that condoms are highly reliable and that a condom breaking is likely due to user error leading the authors to conclude that at least some teens recognize that unprotected sex is socially unacceptable as it leads to undesirable outcomes such as acquiring STDs, including HIV, and pregnancy (Sznitman, Horner, Salazar, Romer, Vanable, et al., 2009).

2.6 Being Diagnosed with an STD

Research indicates a positive association between STD diagnosis and subsequent sexual risk and STD incidence among adolescents. Adolescents diagnosed with an STD are more likely to adopt protective practices such as abstinence and consistent condom use (Crosby, DiClemente, Wingood, Salazar, Rose, et al., 2004; Fortenberry, Brizendine, Katz, & Orr 2002; and Sznitman, Carey, Vanable, DiClemente, Brown, et al., 2010). In the study conducted by Sznitman and colleagues, youths who tested positive for an STD reported reducing their number of vaginal and oral sex partners as well as their probability of unprotected sex while the control group exhibited no change (2010). Similarly Fortenberry and colleagues found that after being diagnosed with an STD (gonorrhea, chlamydia, trichomonas or non-gonococcal urethritis) or being a sexual

contact of an infected partner, 26% and 19% of participants reported practicing abstinence at the 1 month and 3 month visits, respectively. Condom use increased from 45% at enrollment to 64% after 1 month and 58% at 3 months following treatment (Fortenberry, et al., 2002).

The sample population examined by Crosby et al. had more mixed results. While participants diagnosed with as STD reported adopting protective practices following diagnosis, they were also more likely to report having multiple sex partners and also more likely to test positive for trichomonas and chlamydia (2004). As in previously mentioned studies, the authors hypothesized that the results may indicate that those who tested positive did not stringently practice protective sexual behaviors, for example, condoms were not used correctly and consistently. In a different study by Crosby and colleagues, diagnosis of HSV-2 also did not lead to the adoption of protective sexual behaviors (Crosby, Head, DiClemente, Meyerson & Troutman, 2008). There were no differences for participants testing positive and testing negative at baseline for frequency of sex, frequency of condom use, avoiding sex, and number of sex partners. Among participants who tested positive, the only significant change was reporting greater frequency of condom use with steady and non-steady partners at follow up. Surprisingly, persons who tested negative, compared to those who tested positive, reported a greater increase in condom use frequency with steady partners (ibid).

2.7 Sexual debut and number of sex partners

Early sexual activity is associated with higher rates of childbearing and increased sexual risk (Upchurch, Mason, Kusunoki & Kriechbaum, 2004; Smith, 1997). Younger

age at the time of the first sexual encounter elevates the risk for contracting an STD among adolescents (Upchurch, Mason, Kusunoki & Kriechbaum, 2004). Early initiators, those who began having sex before the age of 13, are more likely to have unprotected sex and to have multiple partners than adolescents who delay their sexual debut (Sneed, 2009; Santelli, Brener, Lowry, Bhatt & Zabin, 1998; Smith, 1997; and Durbin, DiClemente, Siegel, Krasnovsky, Lazarus & Camacho, 1993). Durbin, DiClemente and colleagues found that adolescents who reported that their sexual debut occurred before the age of 13 were nine times more likely to have three or more sex partners compared to adolescents who delayed sexual intercourse until age 15 or 16 (1993). In a more recent study, Sneed found that early initiators of sexual intercourse were significantly more likely to report having four or more sexual partners in their lifetime (2009).

Having more sexual partners increases the risk of exposure to STDs and is an important risk factor for contracting an infection. Adolescents who report having multiple sex partners are significantly more likely to test positive for an STD (DiClemente, Crosby, Wingood, Lang, Salazar & Broadwell, 2005). Teenagers usually have multiple sequential partners rather than concurrent partners because adolescent relationships are short-lived (Santelli, Brener, Lowry, Bhatt & Zabin, 1998) thereby increasing their exposure to STDs.

2.8 Differences in the sexual risk of younger and older adolescents

Research that has specifically addressed the differences in the sexual risks of younger and older adolescents is limited in that age groups for study include a broad age range, often including participants 13- to 24-years-old. Studies that do address the

differences in sexual risk across a narrower age range compare changes across the continuum of this range rather than subdividing into smaller groups for comparison (CDC, 2010c; Elkington, Bauermeister & Zimmerman, 2010; Fortenberry, Schick, Herbenick, Sanders, Dodge, & Reece, 2010). A study that examined the link between psychological distress, substance use, and STD risk found that from younger (14-years-old) to older (18-years-old) adolescence: condom use increased among males and decreased among females; sexual intercourse frequency increased; and the reported number of sexual partners in the last year decreased (Elkington, Bauermeister & Zimmerman, 2010). In a separate study, which observed the changes in sexual behavior from age 14 to 17, Fortenberry and colleagues concluded that as adolescents approach the age of legal majority, the frequency and range of sexual behaviors, such as giving and receiving oral sex and penile-vaginal intercourse, increases between the ages of 16 and 17 for males and between the ages of 15 and 16 for females (Fortenberry, Schick, Herbenick, Sanders, Dodge & Reece, 2010).

The results of the 2009 Youth Risk Behavior Survey support most of the conclusions of the above-mentioned studies. In general, compared to younger adolescents, a greater proportion of older adolescents reported engaging in a variety of risky behaviors. Compared to 9th graders, a greater proportion of 12th graders reported ever using substances like alcohol, marijuana and cigarettes; as well as ever having intercourse, having four or more lifetime sexual partners and being sexually active. Notably, the proportion of females who reported using condoms was lower in 12th grade than 9th grade, while the proportion remained constant for males of all grade levels (CDC, 2010c).

2.9 Summary

Adolescents make up only a quarter of the sexually active population yet acquire nearly half of all new STD infections in the U.S. (Weinstock, Berman & Cates, 2004). Preventing STDs among adolescents is of the utmost importance due to the overwhelming social and economic costs associated with treating these infections (Chesson, Blandford, Gift, Tao & Irwin, 2004; Kaiser Family Foundation, 1998). Studies focused on the sexual health problems of African American teens are especially needed to understand and address the disparities in STD prevalence among black adolescents.

A myriad of social, behavioral and environmental factors influence adolescents' STD risk. Protective factors include parental involvement, school enrollment and safe sex practices, such as using condoms. Factors that increase the risk of STD acquisition include being arrested or incarcerated, substance use, multiple sexual partners, and early sexual debut, which increase the likelihood of engaging in unsafe sexual practices and increase exposure to STDs. Having a history of unsafe sexual behaviors, including being pregnant and being diagnosed with an STD, also increase teens' STD risk.

Although there is a rich literature about the associations between a variety of risk factors and STDs among adolescents and young adults, there is a lack of studies that aim to identify the point at which adolescents begin to engage in these risks, especially during the period between 15 and 18 years of age. Studies like these could inform more targeted and relevant interventions for STD prevention as well as guide public health policy to address these needs.

CHAPTER III

METHODOLOGY

3.1 Data Sources

This study utilizes primary data collected between 1999 and 2003 by Dr. Rothenberg and colleagues for a community-based network study of low-income African American adolescents living in a working class neighborhood in Southwest Atlanta, known as "the Swats" (Rothenberg, Hoang, Muth & Crosby, 2007). They used a targeted sampling approach in which they enrolled persons aged 15 to 18 by approaching them directly in the community. The field staff approached young people whom they regularly observed at 6 venues within the neighborhood. Most of the people who participated in the study lived in the area.

Informed consent from parents and assent from subjects were obtained for persons under 18 years of age. Participants completed a baseline survey and were contacted at 6-month intervals up to 3 times for follow-up evaluations. Surveys contained questions related to health, demographic characteristics and living situation, as well as their risk behaviors, both sexual and drug-related. For each assessment, paper-and-pencil interviews were conducted face-to-face with the participants, privately, at a location away from the home. Participants were also tested for eight sexually transmitted diseases, including HIV. In addition, participants were asked to name friends and contacts with whom they had sex, socialized or did drugs during the previous six months; consent was obtained to recruit their contacts. The accumulated data was assembled into a single data set for analysis purposes at the time of the study.

3.2 Study Population

For the present study, the population under analysis included 178 male and 171 female participants who were 15 to 18 years of age when the study began, which includes both the original participants recruited and the contacts they named (N=349). For the period analysis, the study population included all participants who had completed interviews 1, 2 or 3. The cohort analysis included only participants who had completed all three interviews, 36 males and 42 females (n=78).

3.3 Study Measures

Most of the dichotomous variables observed in this study were taken directly from the original survey, which asked participants to give "Yes" or "No" answers. The following questions were included in this study:

- Have you lived with parent in the last six months?
- Are you presently enrolled in school?
- Have you ever been expelled from school?
- Have you ever been pregnant? (Females)
- Have you ever gotten someone pregnant? (Males)
- Do you have children of your own?
- Have you ever spent time in a jail, detention center or prison?
- Have you ever smoked a cigarette… even just a few puffs?
- Have you ever had sex with a man?
- Have you ever had sex with a woman?
- Have you ever used condoms for protection during sex?

- Have you used condoms in the last six months?
- Did you use condoms the last time you had sex?
- Have you ever used alcohol?
- Have you ever used marijuana?

In addition, four new variables were created:

Perceived risk of contracting an STD as "medium" or "high"

Participants were asked to rate their perceived risk of contracting each of the following STDs: gonorrhea, chlamydia, genital herpes (HSV), genital warts (HPV), hepatitis (Hep A, Hep B, Hep C, jaundice), HIV/AIDS, chancroid, syphilis, and "other STD or VD". They could rate their risk as low, medium or high. For this study, "low" was assigned a value of zero and "medium" or "high" a value of 1. Their total perceived risk was the sum of their perceived risk for all diseases listed. If the total was equal to or greater than 1, it was assigned a value of 1= "perceived risk of acquiring one or more STDs as medium or high". A value of "0" indicated that the participant did not perceive their risk of contracting any of the above-mentioned STDs as "medium" or "high".

Diagnosed with one or more STDs

At the time of each interview, participants were tested for hepatitis B and C, herpes 1 and 2, HIV, syphilis, chlamydia, gonorrhea and trichomonas. Results were coded as negative (0) or positive (1). If the sum of the diagnoses was equal to or greater than "1", the participant was categorized as being diagnosed with one or more STDs.

Had first sexual intercourse before age 13

Participants were asked, "How old were you the first time you had sex?" Answers less than 12-years-old were assigned a value of 1, indicating that they had sex before the age of 13. Answers equal to and greater than 13 were assigned a value of zero.

Had more than four sex partners in lifetime

Numerical answers to the question, "How many sex partners have you had in your lifetime?" were assigned a value of "1" if they were equal to or greater than 4, and a value of zero, if the answer was less than 3.

3.4 Analysis

The analysis for this study was conducted using IBM SPSS Statistics Version 19. Univariate analysis was used to describe each variable and the resulting frequencies and percentages were reported. Period and cohort analyses were conducted. The period analysis described all participants ages 15 to 18. The sample was separated by gender into two groups: younger adolescents (ages 15 and 16) and older adolescents (ages 17 and 18). The cohort analysis followed a subset of male and female participants who completed all three interviews. First, the sample was separated by gender and age at the time the study began, 15, 16, 17 or 18, and analyzed individually. Then the sample was combined into groups of younger adolescents and older adolescents, by gender.

CHAPTER IV

RESULTS

Two analyses were conducted to observe changes in adolescent behavior: a period analysis and a cohort analysis. The period analysis included all participants 15 to 18 year of age, separated into two groups, younger adolescents (15- and 16-year-olds) and older adolescent (17- and 18- year-olds). The cohort analysis followed a subset of participants who completed all three interviews and who were 15-, 16-, 17- or 18-years-old when the study began. Gender differences were compared, as well as differences between age groups.

4.1 Period Analysis

Males

The percentages of most variables did not change across interviews in the period analysis, neither for males aged 15- and 16-year-old (Table 4.1) nor for males aged 17- and 18-years-old (Table 4.2). One exception, the percentage of 15- and 16-year-old participants who reported living with a parent in the last 6 months decreased from 89.1% to 23.1%. Also, among 17- and 18-year-olds, a decreasing percentage of participants reported using a condom in the past six months, 95.3% at baseline and 73.3% at the last interview. Both the younger and older groups experienced a decrease in the proportion of participants diagnosed with one or more STDs at the time of each interview.

Older males reported greater percentages of having been expelled from school, getting someone pregnant, having children, ever being in jail, having sex with a female,

ever using condoms, using a condom in the last 6 months, ever using alcohol, ever using marijuana, perceiving their risk of acquiring an STD as “medium” or “high”, and having 4 or more sex partners in their lifetime, compared to 15- and 16-year-olds. Younger males reported greater percentages of being currently enrolled in school at the time of the study and using a condom at their last sexual encounter. In addition, a greater percentage of 15- and 16-year-old participants were diagnosed with one or more STDs at baseline compared to 17- and 18-year-olds, 71.7% and 62.8%, respectively.

Table 4.1 Period Analysis Males Ages 15 & 16

Variable	Interview 1 (N=92) % (n)	Interview 2 (N=36) % (n)	Interview 3 (N=13) % (n)
Lived with a parent in the last 6 months	66.3 (61)	44.4 (16)	23.1 (3)
Currently enrolled in school	89.1 (82)	86.1 (31)	92.3 (12)
Ever been expelled from school	30.4 (28)	33.3 (12)	38.5 (5)
Ever gotten someone pregnant	5.4 (5)	5.6 (2)	7.7 (1)
Have children	2.2 (2)	2.8 (1)	0
Ever spent time in jail	29.3 (27)	22.2 (8)	23.1 (3)
Ever smoked a cigarette	63.0 (58)	63.9 (23)	76.9 (10)
Ever had sex with a female	85.9 (79)	88.9 (32)	84.6 (11)
Ever used condoms	83.7 (77)	88.9 (32)	84.6 (11)
Used condoms in the last 6 months	67.4 (62)	69.4 (25)	69.2 (9)
Used condom at last sexual encounter	72.8 (67)	77.8 (28)	84.6 (11)
Ever used alcohol	65.2 (60)	63.9 (23)	53.8 (7)
Ever used marijuana	59.8 (55)	61.1 (22)	69.2 (9)
Perceived risk of contracting an STD as medium or high	13.0 (12)	16.7 (6)	0
Diagnosed with one or more STDs	71.7 (66)	50.0 (18)	53.8 (7)
Had first sexual encounter before age 13	30.4 (28)	44.4 (16)	46.2 (6)
Had 4 or more sex partners in lifetime	46.7 (43)	72.2 (26)	69.2 (9)

Table 4.2 Period Analysis Males Ages 17 & 18

Variable	Interview 1 (N=86) % (n)	Interview 2 (N=29) % (n)	Interview 3 (N=15) % (n)
Lived with a parent in the last 6 months	65.1 (56)	44.8 (13)	46.7 (7)
Currently enrolled in school	54.7 (47)	51.7 (15)	40.0 (6)
Ever been expelled from school	40.7 (35)	48.3 (14)	60.0 (9)
Ever gotten someone pregnant	34.9 (30)	41.4 (12)	33.3 (8)
Have children	14.0 (12)	3.4 (1)	13.3 (2)
Ever spent time in jail	61.6 (53)	27.6 (8)	53.3 (5)
Ever smoked a cigarette	73.3 (63)	75.9 (22)	66.7 (10)
Ever had sex with a female	98.8 (85)	100.0 (29)	100.0 (15)
Ever used condoms	97.7 (84)	96.6 (28)	93.3 (14)
Used condoms in the last 6 months	95.3 (82)	86.2 (25)	73.3 (11)
Used condom at last sexual encounter	65.1 (56)	72.4 (21)	66.7 (10)
Ever used alcohol	93.0 (80)	82.8 (24)	73.3 (11)
Ever used marijuana	91.9 (79)	86.2 (25)	73.3 (11)
Perceived risk of contracting an STD as medium or high	24.4 (21)	13.8 (4)	33.3 (5)
Diagnosed with one or more STDs	62.8 (54)	55.2 (16)	40.0 (6)
Had first sexual encounter before age 13	41.9 (36)	44.8 (13)	33.3 (5)
Had 4 or more sex partners in lifetime	82.6 (71)	93.1 (27)	86.7 (13)

Females

Among 15- and 16-year-old females most variables did not change across interviews (Table 4.3). Within this group, there was an increase in the percentage of females who reported ever being pregnant from the first to the second interview, 18.4% to 30.0% respectively, and also in the percentage of those who reported having children, from 8% to 20.0% in the same time period. Older females, ages 17- and 18-years-old, reported increases for ever using alcohol, and perceiving their risk of acquiring an STD as "medium" or "high" (Table 4.4). Across interviews, there was a slight decrease in the proportion of those that reported living with a parent in the last six months, ever having sex with a male, and using condoms in the last six months.

Compared to 17- and 18-year-olds, younger participants reported higher percentages of being currently enrolled in school. Older participants reported greater percentages of ever being expelled from school, ever being pregnant, having children, ever being in jail, ever having sex with a male, ever using condoms, ever using alcohol, ever using marijuana, perceiving their risk of acquiring an STD as "medium" or "high", being diagnosed with one or more STDs, and having four or more sex partners in their lifetime. Both groups experienced decreases in the percentage that were diagnosed with one or more STDs.

Table 4.3 Period Analysis Females Ages 15 & 16

Variable	Interview 1 (N=87) % (n)	Interview 2 (N=30) % (n)	Interview 3 (N=5) % (n)
Lived with a parent in the last 6 months	64.4 (56)	46.7 (14)	0
Currently enrolled in school	90.8 (79)	83.3 (25)	80.0 (4)
Ever been expelled from school	13.8 (12)	20.0 (6)	0
Ever been pregnant	18.4 (16)	30.0 (9)	20.0 (1)
Have children	8.0 (7)	20.0 (6)	20.0 (1)
Ever spent time in jail	10.3 (9)	10.0 (3)	0
Ever smoked a cigarette	46.0 (40)	40.0 (12)	40.0 (2)
Ever had sex with a male	69.0 (60)	73.3 (22)	60.0 (3)
Ever used condoms	65.5 (57)	70.0 (21)	60.0 (3)
Used condoms in the last 6 months	56.3 (49)	66.7 (20)	60.0 (3)
Used condom at last sexual encounter	48.3 (42)	53.3 (16)	60.0 (3)
Ever used alcohol	74.7 (65)	73.3 (22)	20.0 (1)
Ever used marijuana	52.9 (46)	46.7 (14)	60.0 (3)
Perceived risk of contracting an STD as medium or high	13.8 (12)	20.0 (6)	40.0 (2)
Diagnosed with one or more STDs	69.0 (60)	50.0 (15)	0
Had first sexual encounter before age 13	8.0 (7)	6.7 (2)	0
Had 4 or more sex partners in lifetime	20.8 (18)	23.3 (7)	40.0 (2)

Table 4.4 Period Analysis Females Ages 17 & 18

Variable	Interview 1 (N=84) % (n)	Interview 2 (N=34) % (n)	Interview 3 (N=25) % (n)
Lived with a parent in the last 6 months	70.2 (59)	38.2 (13)	40.0 (10)
Currently enrolled in school	59.5 (50)	50.0 (17)	52.0 (13)
Ever been expelled from school	32.1 (27)	32.4 (11)	24.0 (6)
Ever been pregnant	41.7 (35)	44.1 (15)	56.0 (14)
Have children	33.3 (28)	29.4 (10)	24.0 (6)
Ever spent time in jail	33.3 (28)	14.7 (5)	12.0 (3)
Ever smoked a cigarette	53.6 (45)	58.8 (20)	52.0 (13)
Ever had sex with a male	88.1 (74)	76.5 (26)	76.0 (19)
Ever used condoms	85.7 (72)	79.4 (27)	72.0 (18)
Used condoms in the last 6 months	61.9 (52)	55.9 (19)	44.0 (11)
Used condom at last sexual encounter	54.8 (46)	44.1 (15)	40.0 (10)
Ever used alcohol	72.6 (61)	88.2 (30)	92.0 (23)
Ever used marijuana	65.5 (55)	70.6 (24)	72.0 (18)
Perceived risk of contracting an STD as medium or high	21.4 (18)	20.6 (7)	36.0 (9)
Diagnosed with one or more STDs	77.4 (65)	73.5 (25)	56.0 (14)
Had first sexual encounter before age 13	8.3 (7)	8.8 (3)	4.0 (1)
Had 4 or more sex partners in lifetime	47.6 (40)	44.1 (15)	40.0 (10)

4.2 Cohort Analysis

Males Age 15

Participants did not report changes in most variables. The percentage of 15-year-old males who were enrolled in school, ever expelled from school, ever gotten someone pregnant, have children, spent time in jail, ever had sex with a female, and ever used condoms was stable. From one interview to the next, a greater percentage of participants reported: smoking cigarettes, using condoms during the last 6 months, using condoms at the last sexual encounter, and having 4 or more sex partners in their lifetime. A decreasing percentage of participants reported living with a parent, perceiving their risk of contracting an STD as medium or high, and fewer participants tested positive for one or more STDs. Overall, the percentage of participants reporting that they ever used alcohol and marijuana increased, as well as the percentage of participants who reported having had their first sexual encounter before the age of 13 (Table 4.5).

Males Age 16

Within a small sample of 16-year-old boys who completed 3 interviews in the study (N=8), there was an increase in the number of participants who reported ever having smoked a cigarette and having 4 or more lifetime sex partners. The number of participants who were diagnosed with one or more STDs decreased across three interviews. All other variables remained stable over time (Table 4.6).

Males Age 17

All participants aged 17-years-old (N=12) reported ever having sex with a woman, ever having used a condom, ever using alcohol and marijuana, and having had 4 or more sexual partners in their lifetime. An increasing number of participants across interviews reported ever getting someone pregnant and also perceiving their risk of contracting an STD as "medium" or "high". A decreasing number of participants reported being enrolled in school, using condoms in the last 6 months, and using a condom at their last sexual encounter (Table 4.7).

Males Age 18

The sample size of 18-year-old males who completed three interviews was too small (N=3) to observe any meaningful changes (Table 4.8).

Table 4.5 Cohort Analysis, Males Age 15 (N=13)

Variable	Interview 1 % (n)	Interview 2 % (n)	Interview 3 % (n)
Lived with a parent in the last 6 months	38.5 (5)	23.1 (3)	15.4 (2)
Currently enrolled in school	84.6 (11)	92.3 (12)	92.3 (12)
Ever been expelled from school	30.8 (4)	30.8 (4)	30.8 (4)
Ever gotten someone pregnant	0	0	0
Have children	0	0	7.7 (1)
Ever spent time in jail	15.4 (2)	15.4 (2)	15.4 (2)
Ever smoked a cigarette	46.2 (6)	61.5 (8)	76.9 (10)
Ever had sex with a female	76.9 (10)	84.6 (11)	84.6 (11)
Ever used condoms	76.9 (10)	84.6 (11)	84.6 (11)
Used condoms in the last 6 months	53.8 (7)	69.2 (9)	69.2 (9)
Used condom at last sexual encounter	69.2 (9)	69.2 (9)	84.6 (11)
Ever used alcohol	46.2 (6)	69.2 (9)	53.8 (7)
Ever used marijuana	30.8 (4)	92.3 (12)	69.2 (9)
Perceived risk of contracting an STD as medium or high	15.4 (2)	15.4 (2)	0
Diagnosed with one or more STDs	76.9 (10)	69.2 (9)	38.5 (5)
Had first sexual encounter before age 13	23.1 (3)	53.8 (7)	38.5 (5)
Had 4 or more sex partners in lifetime	38.5 (5)	76.9 (10)	69.2 (9)

Table 4.6 Cohort Analysis Males Age 16 (N=8)

Variable	Interview 1 % (n)	Interview 2 % (n)	Interview 3 % (n)
Lived with a parent in the last 6 months	50.0 (4)	75.0 (6)	50.0 (4)
Currently enrolled in school	62.5 (5)	62.5 (5)	37.5 (3)
Ever been expelled from school	50.0 (4)	75.0 (6)	75.0 (6)
Ever gotten someone pregnant	25.0 (2)	25.0 (2)	12.5 (1)
Have children	0	0	0
Ever spent time in jail	50.0 (4)	37.5 (3)	62.5 (5)
Ever smoked a cigarette	50.0 (4)	87.5 (7)	75.0 (6)
Ever had sex with a female	100.0 (8)	100.0 (8)	100.0 (8)
Ever used condoms	100.0 (8)	100.0 (8)	87.5 (7)
Used condoms in the last 6 months	87.5 (7)	87.5 (7)	75.0 (6)
Used condom at last sexual encounter	87.5 (7)	87.5 (7)	75.0 (6)
Ever used alcohol	62.5 (5)	75.0 (6)	62.5 (5)
Ever used marijuana	75.0 (6)	62.5 (5)	62.5 (5)
Perceived risk of contracting an STD as medium or high	25.0 (2)	12.5 (1)	25.0 (2)
Diagnosed with one or more STDs	87.5 (7)	75.0 (6)	37.5 (3)
Had first sexual encounter before age 13	25.0 (2)	37.5 (3)	37.5 (3)
Had 4 or more sex partners in lifetime	37.5 (3)	87.5 (7)	75.0 (6)

Table 4.7 Cohort Analysis Males Age 17 (N=12)

Variable	Interview 1 % (n)	Interview 2 % (n)	Interview 3 % (n)
Lived with a parent in the last 6 months	50.0 (6)	25.0 (3)	41.7 (5)
Currently enrolled in school	50.0 (6)	25.0 (3)	16.7 (2)
Ever been expelled from school	58.3 (7)	50.0 (6)	58.3 (7)
Ever gotten someone pregnant	33.3 (4)	58.3 (7)	66.7 (8)
Have children	16.7 (2)	25.0 (3)	16.7 (2)
Ever spent time in jail	58.3 (7)	33.3 (4)	41.7(5)
Ever smoked a cigarette	66.7 (8)	75.0 (9)	66.7 (8)
Ever had sex with a female	100.0 (12)	100.0 (12)	100.0 (12)
Ever used condoms	100.0 (12)	100.0 (12)	100.0 (12)
Used condoms in the last 6 months	100.0 (12)	91.7 (11)	75.0 (9)
Used condom at last sexual encounter	83.3 (10)	83.3 (10)	66.7 (8)
Ever used alcohol	91.7 (11)	91.7 (11)	100.0 (12)
Ever used marijuana	91.7 (11)	91.7 (11)	100.0 (12)
Perceived risk of contracting an STD as medium or high	25.0 (3)	25.0 (3)	50.0 (6)
Diagnosed with one or more STDs	75.0 (9)	75.0 (9)	66.7 (8)
Had first sexual encounter before age 13	33.3 (4)	33.3 (4)	41.7 (5)
Had 4 or more sex partners in lifetime	91.7 (11)	100.0 (12)	100.0 (12)

Table 4.8 Cohort Analysis Males Age 18 (N=3)

Variable	Interview 1 (n)	Interview 2 (n)	Interview 3 (n)
Lived with a parent in the last 6 months	1	2	0
Currently enrolled in school	1	3	3
Ever been expelled from school	0	1	2
Ever gotten someone pregnant	1	1	2
Have children	1	1	0
Ever spent time in jail	3	2	0
Ever smoked a cigarette	2	2	1
Ever had sex with a female	3	3	3
Ever used condoms	3	3	3
Used condoms in the last 6 months	3	3	3
Used condom at last sexual encounter	3	3	3
Ever used alcohol	3	3	3
Ever used marijuana	3	3	3
Perceived risk of contracting an STD as medium or high	2	1	0
Diagnosed with one or more STDs	2	2	2
Had first sexual encounter before age 13	0	0	2
Had 4 or more sex partners in lifetime	2	3	3

4.3 Differences between younger and older cohorts, males.

Compared to 15 and 16-year-olds, a greater percentage of 17- and 18-year-olds reported ever getting someone pregnant, having children, using condoms in the last six months, ever using alcohol and marijuana, perceiving their risk of acquiring an STD as "medium" or "high", and having 4 or more lifetime sex partners. The percentage of participants who were diagnosed with an STD at each interview decreased for both groups. However, the percentage of 15- and 16-year-olds who were diagnosed with an STD decreased more than for 17- and 18-year-olds.

At baseline, a greater percentage of 17- and 18-year-olds than 15- and 16-year-olds reported that they had ever been in jail but by the third interview the percentage was identical. Similarly, a greater percentage of 17-and 18-year-olds reported ever smoking a cigarette but at the third interview, the percentage of 15- and 16-year-olds that reported ever having smoked a cigarette was greater. Finally, school enrollment for 15- and 16-year-olds remained stable over time, but decreased for 17- and 18-year-olds. For all other variables, both cohorts reported comparable percentages (Table 4.9).

Table 4.9 Comparison of younger and older cohorts, males.

Variable	**Age 15 & 16 (N=21)**			**Age 17 & 18 (N=15)**		
	1	2	3	1	2	3
Lived with a parent in the last 6 months	42.9 (9)	42.9 (9)	28.6 (6)	46.7 (7)	33.3 (5)	33.3 (5)
Currently enrolled in school	76.2 (16)	81.0 (17)	71.4 (15)	46.7 (7)	20.0 (3)	13.3 (2)
Ever been expelled from school	38.1 (8)	47.6 (10)	47.6 (10)	46.7 (7)	46.7 (7)	60.0 (9)
Ever gotten someone pregnant	9.5 (2)	9.5 (2)	4.8 (1)	33.3 (5)	53.3 (8)	66.7 (10)
Have children	0	0	4.8 (1)	20.0 (3)	26.7 (4)	13.3 (2)
Ever spent time in jail	28.6 (6)	23.8 (5)	33.3 (7)	66.7 (10)	40.0 (6)	33.3 (5)
Ever smoked a cigarette	47.6 (10)	71.4 (15)	76.2 (16)	66.7 (10)	73.3 (11)	60.0 (9)
Ever had sex with a woman	87.5 (18)	90.5 (19)	90.5 (19)	100 (15)	100 (15)	100 (15)
Ever used condoms	85.7 (18)	90.5 (19)	87.5 (18)	100 (15)	100 (15)	100 (15)
Used condoms in the last 6 months	66.7 (14)	76.2 (16)	71.4 (15)	100 (15)	93.3 (14)	80.0 (12)
Used condom at last sexual encounter	76.2 (16)	76.2 (16)	81.0 (17)	86.7 (13)	86.7 (13)	73.3 (11)
Ever used alcohol	52.5 (11)	71.4 (15)	57.1 (12)	93.3 (14)	93.3 (14)	100 (15)
Ever used marijuana	47.6 (10)	47.6 (10)	81.0 (17)	93.3 (14)	93.3 (14)	100 (15)
Perceived risk of contracting an STD as medium or high	19.0 (4)	14.3 (3)	9.5 (2)	33.3 (5)	26.7 (4)	40.0 (6)
Diagnosed with one or more STDs	81.0 (17)	71.4 (15)	38.1 (8)	73.3 (11)	73.3 (11)	66.7 (10)
Had first sexual encounter before age 13	23.8 (5)	47.6 (10)	38.1 (8)	40.0 (6)	26.7 (4)	33.3 (5)
Had 4 or more sex partners in lifetime	38.1 (8)	81.0 (17)	71.4 (15)	86.7 (13)	100 (15)	100 (15)

Females Age 15

Across interviews, the percentage of 15-year-old females (N=10) that reported living with a parent and being enrolled in school decreased. In addition, the percentage of participants that were diagnosed with an STD at the time of each interview also decreased. In contrast, the percentage of participants who reported ever using marijuana increased, as did the percentage of participants who reported perceiving their risk of acquiring as STD as "medium" or "high", and the percentage of participants who reported having 4 or more lifetime sexual partners (Table 4.10).

Females Age 16

Among 16-year-old females who completed three surveys (N=10), an increasing percentage of participants reported ever being pregnant, having children, ever being in jail, ever using a condom, ever using alcohol, perceiving their risk of acquiring an STD as "medium" or "high", and having 4 or more sex partners in their lifetime. Across three interviews, the percentage of participants who reported having lived with a parent in the last 6 months and being currently enrolled in school decreased. In addition, a decreasing percentage of participants were diagnosed with one or more STDs at the time of each interview. Although, the percentage should have increased or remained the same, a decreasing number of participants reported having had their first sexual encounter before the age of 13 (Table 4.11). There were no changes observed in other variables.

Females Age 17

Over the time of the study, a decreasing number of females aged 17 who completed three interviews (N=16) reported living with a parent, being enrolled in school, ever using condoms, using condoms during the last 6 months, and using condoms at their last sexual encounter. Furthermore, at each interview fewer participants were diagnosed with one or more STDs. However, a greater percentage of participants reported ever being expelled from school and ever using substances such as cigarettes, alcohol and marijuana. The percentage of participants who reported ever being pregnant, having sex with a male, and perceiving their risk of acquiring an STD as "medium" or "high" remained unchanged (Table 4.12).

Females Age 18

Six 18-year-old females completed three interviews and some of their answers were inconsistent over the course of the study but most variables remained stable. Fewer participants were diagnosed with an STD at the time of each interview, and the number of participants who reported that they perceived their risk of acquiring an STD increased from 1 to 3 (Table 4.13).

Table 4.10 Cohort Analysis Females Age 15 (N=10)

Variable	Interview 1 (n)	Interview 2 (n)	Interview 3 (n)
Lived with a parent in the last 6 months	70.0 (7)	30.0 (3)	20.0 (2)
Currently enrolled in school	100.0 (10)	90.0 (9)	60.0 (6)
Ever been expelled from school	0	0	0
Ever been pregnant	30.0 (3)	40.0 (4)	40.0 (4)
Have children	10.0 (1)	40.0 (4)	10.0 (1)
Ever spent time in jail	0	0	10.0 (1)
Ever smoked a cigarette	40.0 (4)	30.0 (3)	40.0 (4)
Ever had sex with a male	80.0 (8)	80.0 (8)	80.0 (8)
Ever used condoms	80.0 (8)	80.0 (8)	80.0 (8)
Used condoms in the last 6 months	60.0 (6)	70.0 (7)	60.0 (6)
Used condom at last sexual encounter	70.0 (7)	60.0 (6)	50.0 (5)
Ever used alcohol	80.0 (8)	60.0 (6)	70.0 (7)
Ever used marijuana	30.0 (3)	40.0 (4)	50.0 (5)
Perceived risk of contracting an STD as medium or high	20.0 (2)	30.0 (3)	50.0 (5)
Diagnosed with one or more STDs	70.0 (7)	60.0 (6)	30.0 (3)
Had first sexual encounter before age 13	20.0 (2)	20.0 (2)	20.0 (2)
Had 4 or more sex partners in lifetime	10.0 (1)	20.0 (2)	30.0 (3)

Table 4.11 Cohort Analysis Females Age 16 (N=10)

Variable	Interview 1 (n)	Interview 2 (n)	Interview 3 (n)
Lived with a parent in the last 6 months	70.0 (7)	50.0 (5)	40.0 (4)
Currently enrolled in school	80.0 (8)	50.0 (5)	50.0 (5)
Ever been expelled from school	40.0 (4)	40.0 (4)	40.0 (4)
Ever been pregnant	10.0 (1)	40.0 (4)	50.0 (5)
Have children	10.0 (1)	10.0 (1)	30.0 (3)
Ever spent time in jail	10.0 (1)	20.0 (2)	30.0 (3)
Ever smoked a cigarette	60.0 (6)	60.0 (6)	60.0 (6)
Ever had sex with a male	70.0 (7)	70.0 (7)	80.0 (8)
Ever used condoms	50.0 (5)	80.0 (8)	80.0 (8)
Used condoms in the last 6 months	50.0 (5)	70.0 (7)	50.0 (5)
Used condom at last sexual encounter	40.0 (4)	30.0 (3)	50.0 (5)
Ever used alcohol	60.0 (6)	70.0 (7)	80.0 (8)
Ever used marijuana	70.0 (7)	80.0 (8)	80.0 (8)
Perceived risk of contracting an STD as medium or high	10.0 (1)	50.0 (5)	50.0 (5)
Diagnosed with one or more STDs	80.0 (8)	70.0 (7)	40.0 (4)
Had first sexual encounter before age 13	30.0 (3)	10.0 (1)	10.0 (1)
Had 4 or more sex partners in lifetime	10.0 (1)	30.0 (3)	60.0 (6)

Table 4.12 Cohort Analysis Females Age 17 (N=16)

Variable	Interview 1 (n)	Interview 2 (n)	Interview 3 (n)
Lived with a parent in the last 6 months	68.8 (11)	37.5 (5)	43.8 (7)
Currently enrolled in school	81.3 (13)	43.8 (7)	50.0 (8)
Ever been expelled from school	25.0 (4)	25.0 (4)	37.5 (6)
Ever been pregnant	50.0 (8)	50.0 (8)	56.3 (9)
Have children	25.0 (4)	43.8 (7)	25.0 (4)
Ever spent time in jail	18.8 (3)	6.3 (1)	6.3 (1)
Ever smoked a cigarette	43.8 (7)	62.5 (10)	56.3 (9)
Ever had sex with a male	81.3 (13)	81.3 (13)	75.0 (12)
Ever used condoms	81.3 (13)	81.3 (13)	68.8 (11)
Used condoms in the last 6 months	62.5 (10)	56.3 (9)	43.8 (7)
Used condom at last sexual encounter	62.5 (10)	50.0 (8)	37.5 (6)
Ever used alcohol	62.5 (10)	81.3 (13)	75.0 (12)
Ever used marijuana	56.3 (9)	75.0 (12)	75.0 (12)
Perceived risk of contracting an STD as medium or high	6.3 (1)	12.5 (2)	6.3 (1)
Diagnosed with one or more STDs	93.8 (15)	68.8 (11)	56.3 (9)
Had first sexual encounter before age 13	1 (6.3)	0	0
Had 4 or more sex partners in lifetime	37.5 (6)	50.0 (8)	56.3 (9)

Table 4.13 Cohort Analysis Females Age 18 (N=6)

Variable	Interview 1 (n)	Interview 2 (n)	Interview 3 (n)
Lived with a parent in the last 6 months	50.0 (3)	66.7 (4)	0
Currently enrolled in school	16.7 (1)	16.7 (1)	0
Ever been expelled from school	0	16.7 (1)	0
Ever been pregnant	33.3 (2)	33.3 (2)	33.3 (2)
Have children	33.3 (2)	33.3 (2)	33.3 (2)
Ever spent time in jail	0	33.3 (2)	16.7 (1)
Ever smoked a cigarette	16.7 (1)	50.0 (3)	33.3 (2)
Ever had sex with a male	83.3 (5)	83.3 (5)	100.0 (6)
Ever used condoms	83.3 (5)	66.7 (4)	100.0 (6)
Used condoms in the last 6 months	66.7 (4)	50.0 (3)	50.0 (3)
Used condom at last sexual encounter	33.3 (2)	16.7 (1)	50.0 (3)
Ever used alcohol	50.0 (3)	83.3 (5)	66.7 (4)
Ever used marijuana	83.3 (5)	83.3 (5)	50.0 (3)
Perceived risk of contracting an STD as medium or high	16.7 (1)	33.3 (2)	50.0 (3)
Diagnosed with one or more STDs	50.0 (3)	66.7 (4)	16.7 (1)
Had first sexual encounter before age 13	16.7 (1)	0	0
Had 4 or more sex partners in lifetime	33.3 (2)	66.7 (4)	50.0 (3)

4.4 Differences between younger and older cohorts, females.

Compared to 17- and 18- year-olds, a greater percentage of 15- and 16-year-olds reported being currently enrolled in school. The percentage of 15- and 16-year-olds that reported ever being expelled from school remained unchanged throughout the study, while the percentage of 17- and 18-year-olds that reported ever being expelled increased slightly. The percentage of 15- and 16-year-olds that reported ever spending time in jail increased from 5% to 20%; however, for 17- and 18-year-olds it remained unchanged. In addition, the percentage of 15- and 16-year-old females who reported ever being pregnant increased from 20% to 45% while at baseline half of the sample of 17 & 18-year-olds had already experienced a pregnancy. Fifteen and 16-year-olds also reported increasing percentages of ever using a condom and perceiving their risk of acquiring an STD as "medium" or "high". Both groups experienced decreasing percentages in STD diagnoses at the time of each interview. Finally, 15- and 16-year-olds also reported an increasing percentage of having 4 or more lifetime sex partners during the course of the study (Table 4.14).

Table 4.14 Comparison of younger and older cohorts, females

Variable	**Age 15 & 16 (N=20)**			**Age 17 & 18 (N=22)**		
	1	2	3	1	2	3
Lived with a parent in the last 6 months	70.0 (14)	40.0 (8)	30.0 (6)	63.6 (14)	45.5 (10)	31.8 (7)
Currently enrolled in school	90.0 (18)	70.0 (14)	55.0 (11)	77.3 (17)	36.4 (8)	40.9 (9)
Ever been expelled from school	20.0 (4)	20.0 (4)	20.0 (4)	18.2 (4)	22.7 (5)	27.3 (6)
Ever been pregnant	20.0 (4)	40.0 (8)	45.0 (9)	45.5 (10)	45.5 (10)	50.0 (11)
Have children	10.0 (2)	25.0 (5)	20.0 (4)	27.3 (6)	40.9 (9)	27.3 (6)
Ever spent time in jail	5.0 (1)	10.0 (2)	20.0 (4)	13.6 (3)	13.6 (3)	9.1 (2)
Ever smoked a cigarette	50.0 (10)	45.0 (9)	50.0 (5)	36.4 (8)	59.1 (13)	50.0 (11)
Ever had sex with a male	75.0 (15)	75.0 (15)	80.0 (16)	81.8 (18)	81.8 (18)	81.8 (18)
Ever used condoms	65.0 (13)	80.0 (16)	80.0 (16)	81.8 (18)	77.3 (17)	77.3 (17)
Used condoms in the last 6 months	55.0 (11)	70.0 (14)	55.0 (11)	63.6 (14)	54.5 (12)	45.5 (10)
Used condom at last sexual encounter	55.0 (11)	45.0 (9)	50.0 (10)	54.5 (12)	40.9 (9)	40.9 (9)
Ever used alcohol	70.0 (14)	65.0 (13)	75.0 (15)	59.1 (13)	81.8 (18)	72.7 (16)
Ever used marijuana	50.0 (10)	60.0 (12)	65.0 (13)	63.6 (14)	77.3 (17)	68.2 (15)
Perceived risk of contracting an STD as medium or high	15.0 (3)	40.0 (8)	50.0 (10)	9.1 (2)	18.2 (4)	18.2 (4)
Diagnosed with one or more STDs	75.0 (15)	65.0 (13)	35.0 (7)	81.8 (18)	68.2 (15)	45.5 (10)
Had first sexual encounter before age 13	15.0 (3)	5.0 (1)	5.0 (1)	9.1 (2)	0	0
Had 4 or more sex partners in lifetime	10.0 (2)	25.0 (5)	45.0 (9)	36.4 (8)	54.4 (12)	54.5 (12)

4.5 Differences between male and female cohorts

Compared to females in both age groups, a greater percentage of males reported ever being expelled from school, ever spending time in jail and ever smoking a cigarette. More males also reported ever having sex with a partner of the opposite sex, ever using a condom, having used condoms in the last six months and at their last sexual encounter, having their first sexual encounter before the age of 13, and having 4 or more sex partners in their lifetime. A greater percentage of females than males in both age cohorts reported that they have children.

At baseline, more 15- and 16- year-old females than males in the same age group reported being currently enrolled in school but by the third interview the trend was reversed. For the 17- and 18-year-old cohort, more females reported being currently enrolled in school than males. In the 15- and 16-year-old cohort, more females also reported having been pregnant than males in the same age category reported getting someone pregnant. The younger female cohort also reported a greater percentage having ever used alcohol and perceiving their risk of acquiring an STD as “medium” or “high”, compared to males in the same age group.

Males in the 17- and 18-year-old group also reported greater percentages of ever using alcohol, ever using marijuana, and perceiving their risk of acquiring an STD as “medium” or “high” compared to females in the same age group. All groups experienced a decrease in the percentage of participants being diagnosed with one or more STDs at the time of each interview.

4.6 Summary of Differences between Younger and Older Adolescents

Higher proportions of older adolescents reported ever getting someone pregnant (males) or ever being pregnant (females); having children; ever using condoms; ever using alcohol; ever using marijuana; and having 4 or more lifetime sex partners. Among males, higher proportions of older adolescents reported using condoms in the last six months. Older adolescent males reported higher percentages of perceiving their risk of contracting an STD as "medium" or "high". In contrast, in the female cohort, a higher proportion of younger adolescents reported perceiving their risk of contracting an STD as "medium" or "high". Finally, compared to older adolescents, higher proportions of younger adolescents reported being currently enrolled in school.

Table 4.15 Summary of variables demonstrating differences between younger and older adolescents in the cohort analysis.

Males	Females
• Currently enrolled in school • Ever gotten someone pregnant • Have children • Ever used condoms • Used condoms in the last 6 months • Ever used alcohol • Ever used marijuana • Perceived risk of contracting an STD as "medium" or "high" • Had 4 or more sex partners in lifetime	• Currently enrolled in school • Ever been pregnant • Have children • Ever used condoms • Ever used alcohol • Perceived risk of contracting an STD as "medium" or "high" • Had 4 or more sex partners in lifetime

4.7 Data validation

In the cohort analysis, several variables described whether or not participants had experienced a particular event or engaged in a certain behavior, which should not have varied once the participant responded affirmatively. Examples of this type of variable include: “Ever spent time in jail?”, “Ever had sex with a female/male?”, and “Ever used condoms?” However, there were discrepancies in the number of participants reporting having experienced an event or engaged in an activity from one interview to the next. The following is an examination of a few of the variables in which this discrepancy was found.

Males Ages 15- and 16-years-old

Participants in this age group reported discrepant numbers for the variables “Had first sexual encounter before age 13”, “Had more than 4 sex partners in lifetime”, and “Ever gotten someone pregnant?” Five male participants aged 15- and 16- years-old reported the same answer for all three interviews to the question “How old were you the first time you had sex?” (Table 4.16). Two participants who reported that they had not yet had sex with a female did not give an answer to that question. Participants 195 and 3573 consistently reported an age below 13-years-old. The discrepancy in the percentage of participants who had their first sexual intercourse before the age of 13 comes from interview 2, in which seven participants (12, 46, 72, 117, 147, 219 and 5023) changed their previous answers to an age below 13. However, most participants reported an age range that varied by only one or two years.

The number of 15- and 16-year-old participants who reported having had more than four sexual partners in their lifetime increased from 8 to 17 in interview 2, and decreased to 15 by interview 3. For the most part, the number of sexual partners reported across interviews is consistent, with a few exceptions. The discrepancy in the results occurred because participants 83 and 180 reported having four or more sexual partners in interview 2 and fewer than four in interview 3. However, the numbers reported do not vary widely and other answers by the same participants appear to be consistent. Finally, one participant (145) responded affirmatively in interview 1 and 2 to the question "Have you ever gotten someone pregnant?" but at interview 3, responded negatively. In general, answers to other variables from this participant appear to be consistent.

Table 4.16 Validation of variables "Had first sexual encounter before the age of 13", "Had more than 4 sex partners in lifetime", and "Ever gotten someone pregnant?" for males age 15- and 16-years-old.

No.	Ever had sex with a female?			Age at first sexual encounter			Number of sex partners in lifetime			Ever gotten someone pregnant?		
	1	2	3	1	2	3	1	2	3	1	2	3
12	Yes	Yes	Yes	13	12	12	3	6	8	No	No	No
46	Yes	Yes	Yes	13	12	14	4	6	6	No	No	No
56	Yes	Yes	Yes	9	14	14	100	20	40	Yes	Yes	Yes
72	Yes	Yes	Yes	13	12	12	7	8	17	No	No	No
76	Yes	Yes	Yes	15	15	15	4	5	10	No	No	No
83	Yes	Yes	Yes	11	12	13	5	5	2	No	No	No
117	Yes	Yes	Yes	14	12	13	3	10	20	No	No	No
142	Yes	Yes	Yes	13	13	13	6	10	8	No	No	No
145	Yes	Yes	Yes	8	13	11	20	25	30	Yes	Yes	No
147	Yes	Yes	Yes	14	12	12	2	9	5	No	No	No
148	Yes	Yes	Yes	15	15	15	1	4	9	No	No	No
153	Yes	Yes	Yes	15	14	15	2	2	3	No	No	No
163	No	No	No							No	No	No
180	Yes	Yes	Yes	15	13	14	1	4	3	No	No	No
185	Yes	Yes	Yes	14	14	14	2	4	20	No	No	No
195	Yes	Yes	Yes	10	12	11	2	1	2	No	No	No
196	No	No	No							No	No	No
219	Yes	Yes	Yes	13	11	12	3	5	4	No	No	No
1840	Yes	Yes	Yes	13	14	14	5	6	6	No	No	No
3573	Yes	Yes	Yes	12	12	12	1	25	5	No	No	No
5023	No	Yes	Yes		10	12		10	10	No	No	No

Males Ages 17- and 18-years-old

Males aged 17- and 18-years-old also reported discrepant percentages in the variables "Have children?", "Ever spent time in jail?", and "Had first sexual encounter before the age of 13", among others. Three participants gave inconsistent answers to the survey question, "Do you have children of your own?" (Table 4.17). Assuming that the first affirmative answer given in the survey is correct, the number of participants who reported having a child by interview three is 5 out 15. Alternatively, if the two answers that are consistent are correct, the number of participants who had a child by interview three is 4 out of 15.

At interview one, 10 participants reported having ever been in jail. However, in subsequent interviews, 7 of these participants changed their answer to "No". Once more assuming that the answer that was repeated is the correct one, 6 out of 15 participants had ever been in jail at the time of the first interview, and 8 out of 15 participants had ever been in jail by interview three.

Within this age group, only one participant gave consistent answers to the question "How old were you the first time you had sex?" for all three interviews. However, except for two participants (22 and 29), most other participants gave answers that varied by one or two years. Participants 21, 29 and 94 consistently reported ages below 13 for their age at first intercourse. The changes in the percentage of those who had their first sexual intercourse before the age of 13 in subsequent interviews is the result of participants 13, 22, and 62 changing their first answer to an age above 12 and participants 152 and 146 to an age below 12.

Table 4.17 Validation of variables “Have children”, “Ever spent time in jail”, and “Had first sexual encounter before the age of 13” for males ages 17- and 18-years-old.

No.	Ever gotten someone pregnant?			Have children of your own?			Age at first sexual encounter			Ever been in jail?		
	1	2	3	1	2	3	1	2	3	1	2	3
13	No	No	No	No	No	No	12	14	13	Yes	Yes	No
21	No	No	No	No	No	No	11	11	10	No	No	Yes
22	No	No	No	No	No	No	9	15	14	Yes	No	No
29	Yes	Yes	Yes	Yes	Yes	Yes	11	9	12	Yes	Yes	No
62	No	No	Yes	No	No	No	12	14	15	Yes	Yes	No
67	Yes	Yes	Yes	No	No	Yes	14	13	13	No	No	No
94	Yes	Yes	Yes	No	Yes	No	11	11	12	Yes	Yes	Yes
106	No	No	No	No	No	No	15	14	16	No	No	No
123	No	Yes	Yes	No	No	No	13	13	13	Yes	Yes	Yes
128	Yes	Yes	Yes	Yes	Yes	No	13	14	15	Yes	No	No
146	No	Yes	Yes	No	No	No	13	14	12	No	No	Yes
151	No	No	Yes	No	No	No	14	14	15	Yes	Yes	Yes
152	No	No	Yes	No	No	No	14	12	12	Yes	No	No
1118	No	Yes	No	No	No	No	15	14	15	No	No	No
2160	Yes	Yes	Yes	Yes	Yes	No	15	16	16	Yes	No	No

Females Ages 15- and 16-years-old

Discrepancies in participant responses were also found in the female cohorts. Younger females reported varying percentages of having had their first sexual intercourse before age 13 and having children, among others. At the first interview, three participants reported having had their first sexual encounter before age 13 (111, 135 and 144) (Table 4.18). Participant 111 gave consistent answers for that question throughout the study. However, the data entry for participant 135 may contain an error since the age of first intercourse was entered as 5-years-old but in later interviews the responses are more congruent, 16- and 15-years-old. Participant 144 changed her answer after the first interview but answers to other questions appear to be consisted. In general, most participants reported a range of answers that varied by one or two years from one another. Based on this evidence, it is likely that only one participant (111) had her first sexual intercourse before the age of 13.

Participants also changed their answers to the question "Do you have children of your own?" At baseline, two participants reported having a child of their own (111 and 149). However, these same participants reported not having a child at interview 3. It is possible that by interview 3, the child had not been living with the mother and thus participants replied that they did not have a child. By the third interview, participant 111 reported that two of her children were living with a different parent (not shown). Participants 103 and 205 also reported having a child at interview 2 but changed their answer at interview 3. They did not indicate that they had children who lived with a different parent. At the time of the third interview, only participants 133, 135, 156 and 2091 report that they have children of their own. It should be noted that participant 135

reported that she had not had sex with a man and that she had not been pregnant for all three interviews, which raises questions as to how participants defined the term "having a child of your own".

4.18 Validation of variables "Had first sexual encounter before the age of 13" and "Have children" for females ages 15- and 16-years-old.

No.	Ever had sex with a man?			Age at first sexual encounter			Ever been pregnant?			Have children of your own?		
	1	2	3	1	2	3	1	2	3	1	2	3
16	Yes	Yes	Yes	13	14	14	No	No	No	No	No	No
63	Yes	Yes	Yes	15	14	14	No	No	No	No	No	No
65	Yes	Yes	Yes	15	15	15	No	No	No	No	No	No
96	Yes	Yes	Yes	15	14	13	No	No	No	No	No	No
103	Yes	Yes	Yes	13	14	13	Yes	Yes	Yes	No	Yes	No
111	Yes	Yes	Yes	12	12	12	Yes	Yes	Yes	Yes	Yes	No
121	No	No	Yes			15	No	No	No	No	No	No
131	Yes	Yes	Yes	15	15	15	No	Yes	Yes	No	No	No
133	Yes	Yes	Yes	14	14	14	Yes	Yes	Yes	No	Yes	Yes
*135	No	No	No	5	16	15	No	No	No	No	No	Yes
138	Yes	Yes	Yes	15	13	16	No	Yes	Yes	No	No	No
144	Yes	Yes	Yes	12	15	15	No	No	Yes	No	No	No
149	Yes	Yes	Yes	14	14	14	Yes	Yes	Yes	Yes	Yes	No
156	No	No	No				No	No	No	No	No	Yes
177	Yes	Yes	Yes	15	15	16	No	No	No	No	No	No
181	No	No	No				No	No	No	No	No	No
205	Yes	Yes	Yes	14	13	14	No	Yes	Yes	No	Yes	No
213	Yes	Yes	Yes	14	15	15	No	No	No	No	No	No
1772	No	No	No				No	No	No	No	No	No
2091	Yes	Yes	Yes	15	16	15	No	Yes	Yes	No	No	Yes

*Participant number 135 responded "No" to the question "Ever had sex with a female?" at interview 1, but "Yes" to the same question at interviews 2 and 3.

Females Ages 17- and 18-years-old

Among older female adolescents, discrepant answers were given for the questions "Had first sexual encounter before age 13?" and "Have children?" Two participants reported having had their first sexual intercourse before age 13, participant 18 and 87 (Table 4.19). Participant 18 reported an age of 7-years-old, perhaps suggesting that the encounter may not have been consensual and thus the answer may have been later recanted. Participant 87 first reported an age of 12-years-old and later of 13-years-old. As seen in previous cases, participants usually reported a range of ages for first sexual intercourse that differed by 1 or 2 years and is consistent with this participant's answers.

For the question, "Do you have children of your own?" participants 87, 112, 115, and 126 changed their answers. Participants 87, 115 and 126 indicated that they had children who lived with a different parent, suggesting that the change of answers may have reflected a change in living arrangements, such that the child did not live with the participants at the time of interview three.

4.19 Validation of variables “Had first sexual encounter before the age of 13”, “Have children”, and “Ever use alcohol” for females ages 17- and 18-years-old.

No.	Ever had sex with a man?			Age at first sexual encounter			Have children of your own?			No. children living w/ diff. parent		
	1	2	3	1	2	3	1	2	3	1	2	3
8	Yes	Yes	Yes		13	13	No	Yes	Yes		0	0
17	No	No	No				No	No	No			
18	Yes	Yes	Yes	7	14	15	No	No	No			
25	Yes	Yes	Yes	15	15	15	No	No	No			
28	Yes	Yes	Yes	16	16	16	No	No	No			
49	Yes	Yes	Yes	16	15	16	No	No	No			
75	Yes	Yes	Yes	16	18	16	No	No	No			
85	Yes	Yes	Yes	16	15	15	Yes	Yes	Yes	0	0	2
87	Yes	Yes	Yes	12	13	13	Yes	Yes	No	0	0	2
95	Yes	Yes	Yes	15	15	14	Yes	Yes	Yes	0	0	2
104	No	No	Yes	15	16	16	No	No	No			
112	Yes	Yes	No	15	15		No	Yes	No		0	0
114	Yes	Yes	Yes	16	16	16	No	No	Yes			0
115	Yes	Yes	Yes	13	15	14	Yes	Yes	No	1	0	0
118	Yes	Yes	Yes	13	15	13	No	Yes	Yes			1
125	Yes	Yes	Yes	15	16	16	No	No	No			0
126	Yes	Yes	Yes	14	14	14	Yes	Yes	No	2	2	2
134	Yes	Yes	Yes	16	16	16	No	No	No	0		0
140	No	No	No				No	No	No			
143	No	No	No				No	No	No			
1620	Yes	Yes	Yes	15	15	15	No	No	No			
1768	Yes	Yes	Yes	16	16	16	Yes	Yes	Yes	1	0	1

CHAPTER V

DISCUSSION AND CONCLUSION

5.1 Discussion

This study examined the changes in the sexual behavior of urban African American adolescents as well as changes in some of the risk factors that influence that behavior. Two analyses were conducted to observe these changes, a period and a cohort analysis. For the period analysis, the hypothesis was that there would be no change in the percentages of participants who reported experiences or behaviors that are known risk factors for STDs. For the cohort analysis, change was expected in all variables, with more participants reporting engaging in a behavior or experience as the study progressed. It was also expected for the cohort analysis that the proportion of participants who perceived their risk of acquiring an STD as "medium" or "high" would increase, and the percentage of participants who tested positive for one or more STDs would decrease. The results of the study generally confirmed these hypotheses.

Period Analysis

As expected, little to no change was observed in the proportion of participants who engaged in risky behaviors at the time of each interview in the period analysis for both males and females. Compared to younger adolescents (15- & 16-year-olds), older adolescents (17- & 18-year-olds) reported greater proportions of engaging in risky behaviors, such as ever using alcohol or marijuana, ever being in jail, ever being expelled from school, ever having sex and having 4 or more sex partners in their lifetime, which is

consistent with the literature (CDC, 2010c; Elkington, Bauermeister & Zimmerman, 2010; Fortenberry, Schick, Herbenick, Sanders, Dodge & Reece, 2010).

Notably, among younger female adolescents, there was an increase in the percentage of younger teens that reported being pregnant and having a child between interviews one and two. However, among males of the same age, the proportion of males who reported getting someone pregnant and having a child remained unchanged. Furthermore, a greater proportion of younger males reported ever having had intercourse with a woman compared to the proportion of younger females who reported ever having had intercourse with a man. A smaller proportion of females reported having four or more sexual partners compared to males, 21% and 47% respectively. In addition, younger females also reported smaller proportions of condom use and virtually no use of birth control pills (not shown). A possible explanation of this difference is that younger females have fewer partners with whom they have unprotected intercourse, which may result in pregnancy, while younger males have more partners and use condoms more frequently. In this study, a greater proportion of males in both the younger and older groups reported ever using condoms, using condoms in the last six months and using condoms at the last sexual encounter, compared to females. Other studies have reported similar findings regarding the condom use differences between male and female adolescents (CDC, 2010c, Elkington, Bauermeister & Zimmerman, 2010; Fortenberry, Schick, Herbenick, Sanders, Dodge & Reece, 2010).

The proportion of both adolescent males and females who reported perceiving their sexual risk as “medium” or “high” increased for older males and for females of both age groups. Other studies have shown that the majority of adolescents who are at risk for

STDs underestimate that risk (Ford, Jacard, Millstein, Bardsley & Miller, 2005; Kershaw, Ethier, Niccolai, Lewis, Ickovics, 2003). The increase in risk perception may be related to the decrease in the proportion of STD diagnoses among both males and females. In a study of the association between STD diagnosis and risk perception, those who had received a diagnosis of chlamydia or gonorrhea in the past year and those who had current symptoms also had increased odds of perceiving themselves at risk of infection (Kershaw, Ethier, Niccolai, Lewis, Ickovics, 2003). In the present study, 72% of 15- and 16-year-old males, 63% of 17- and 18- year-old males, 69% of 15- and 16-year-old females, and 77% of 17- and 18-year-old females were diagnosed with one or more STDs at baseline, making this a plausible explanation.

The proportion of STD diagnoses decreased for both groups. However, it is uncertain whether this was a result of changes in the reduction of risky sexual behaviors from one interview to the next since many subjects in the period analysis completed only one interview. Various studies have shown that STD screening results in a reduction in the numbers of oral and vaginal sex partners and decreased probability of unprotected sex (Crosby, DiClemente, Wingood, Salazar, Rose, et al., 2004; Fortenberry, Brizendine, Katz, & Orr 2002; and Sznitman, Carey, Vanable, DiClemente, Brown, et al., 2010). In fact, the mean number of sex partners increased for both boys and girls in this study (Table 5.1). A closer observation of other variables that were not part of this study, such as the type of sex that participants engaged in and whether they used protection during that activity, is needed. In addition, this study is limited due to attrition from one interview to the next.

Table 5.1 Changes in the mean number of sex partners in the last month for males and females in the period analysis.

Age Group		Males			Females		
		1	2	3	1	2	3
15& 16	Range	0-5	0-10	0-4	0-4	0-4	1-16*
	Mean	1.03	2.24	1.10	0.73	1.04	6.33*
17 & 18	Range	0-15	0-10	0-9	0-2	0-2	0-2
	Mean	1.92	2.24	2.53	0.82	0.86	0.95

*Only 5 participants completed interview 3

Another important difference between younger and older male adolescents in the period analysis was the proportion of adolescents who were diagnosed with one or more STDs. At baseline, 72% of 15- and 16-years-olds and 63% of 17- and 18- year-olds tested positive for one or more STDs. The results are interesting considering that a greater proportion of older adolescents reported engaging in risky behaviors and younger adolescents reported a greater proportion of protective behaviors such as living with a parent and being currently enrolled in school. It was hypothesized that condom use may be related to the difference in the proportion of STDs between both groups.

Compared to younger adolescents, older adolescents reported a greater proportion of ever using condoms and using condoms in the last six months. However, younger adolescents reported a greater proportion of using condoms at their last sexual encounter, which is a valid proxy measure for estimating the frequency and consistency of condom use over the past 14 days and the past 60 days but may not be for more extended time periods (Younge, Salazar, Crosby, DiClemente, Wingood, Rose, 2008). Furthermore, in this sample 51% of younger adolescents and 26.7% of older adolescents reported *always* using condoms (not shown). These finding are consistent to those of Manlove, Ikramullah

and Terry-Humen's study of black male teens ages 15 to 19, in which males who were older at most recent sex had reduced odds of condom use (2008). Possibly, the increased STD rates among younger male adolescents may be related to a failure to use condoms correctly, which is a frequent occurrence among adolescents (Crosby, DiClemente, Wingood, Salazar, Rose, et al., 2005). Considering that older adolescents in this study engaged in more risky behaviors than younger adolescents, the proportion of those diagnosed with one or more STDs was expected to be higher. Condom use alone does not account for the discrepancy, yet the results are difficult to explain with the available data.

For females, the percentage of those diagnosed with one or more STDs was 60% for 15- and 16-year-olds and 77% for 17- and 18-year-olds (Tables 4.3 and 4.4), which is more consistent with expectations as older females engaged in more risky behaviors than younger females. The proportion of younger females who reported *always* using condoms was 33% and 26% for older females at baseline (not shown), which is consistent with findings from other studies where younger adolescent females had a higher proportion of condom use compared to older adolescents (CDC, 2010c; Elkington, Bauermeister & Zimmerman, 2010). The findings also concur with studies that have found female gender to be associated with STD diagnosis (Boyer, Sebro, Wibbelsman, & Shafer, 2006).

Cohort Analysis

The cohort analysis followed a subset of male and female participants who completed all three interviews.

Males

As in the period analysis, higher proportions of older males reported engaging in more risky behaviors than males in the younger cohort. All males in the older cohort reported using alcohol and marijuana, ever having sex with a woman and having 4 or more sex partners, which is consistent with the literature. Overall, the older male cohort reported a higher proportion of ever using a condom, using a condom in the past 6 months, and using a condom at their last sexual encounter compared to younger male adolescents, except at the time of interview 3 when younger teens had a higher rate of condom use at the last encounter. Similarly to the period analysis, a higher proportion of younger adolescents tested positive for one or more STDs compared to older adolescents at baseline. However, the proportion of younger adolescents diagnosed with an STD decreased from 81.0% (n=17) at interview one to 38.1% (n=8) at interview three, while the percentage of older adolescents who tested positive remained almost unchanged (Table 4.9).

Compared to older adolescents, younger adolescents in the cohort analysis reported a higher proportion of *always* using a condom (not shown). Among the younger cohort, 80% at interview one, 67% at interview two and 63% at interview three reported *always* using a condom during sexual intercourse. Every participant in the older cohort

reported having had sex with a female but only 33% at interview one, 53% at interview two, and 27% at interview three reported *always* using a condom. Although frequency of condom use decreased for both groups, the younger cohort consistently used condoms more frequently than the older cohort, which may explain the decrease in STD rates among younger teens. In addition, STD screening has been associated with decreased probability of unprotected sex (Crosby, DiClemente, Wingood, Salazar, Rose, et al., 2004; Fortenberry, Brizendine, Katz, & Orr 2002; and Sznitman, Carey, Vanable, DiClemente, Brown, et al., 2010). The findings suggest that younger male adolescents may be more amenable to interventions that aim to increase frequency of condom use and STD screening to prevent STDs but further research is needed.

Both the younger and the older male cohorts reported high proportions of having had sexual intercourse before the age of 13 and having had 4 or more lifetime sexual partners compared to teens in the period analysis. The reported percentages were higher than those reported in the 2001 YRBS survey results, which is the latest survey collected near the time when the data was collected. Although there were discrepancies in the proportions of participants who reported having had sex before age 13, both the younger and older cohorts reported percentages that ranged between 24% and 48%. In comparison, 25.7% of black male teens in the YRBS survey reported the same (CDC, 2002). Having four or more sexual partners is associated with increased risk for STDs (DiClemente, Crosby, Wingood, Lang, Salazar & Broadwell, 2005), which in part explains the high proportion of participants who were diagnosed with one or more STDs in this study.

In addition, both cohorts in this study reported increasing proportions of having had 4 or more lifetime sexual partners, especially the younger cohort, which reported 38% at interview one, 81% at interview two, and 71.4% at interview three. In comparison, in the YRBS survey, 38.7% of black males reported having 4 or more lifetime sex partners. Early sexual debut has been linked to increased sexual risk among adolescents (Upchurch, Mason, Kusunoki & Kriechbaum, 2004; Smith, 1997). Undoubtedly, this also contributed to the elevated proportions of STD diagnoses among adolescent males in both cohorts.

Finally, the percentage of younger participants who ever used marijuana increased from 48% (n=10) to 81% (n=17) and the percentage of older participants who reported ever using alcohol and marijuana was 100% (n=15). Other studies have also found that as adolescents mature, they engage in riskier sexual behaviors (CDC, 2010c; CDC, 2002). Furthermore, alcohol and marijuana use have been linked to elevated risk of STDs among adolescents (Floyd & Latimer, 2010; duPlessis, Holliday, Robillard, & Braithwaite, 2009; Boyer, Sebro, Wibbelsman, & Shafer, 2006; Sen, 2002), yet another contributor to the high percentages of STD diagnoses seen among males in this study.

Females

In the cohort analysis, older adolescent females reported higher proportions of being pregnant, having children and having 4 or more lifetime sex partners compared to younger females. In addition, a higher percentage of the older cohort was diagnosed with one or more STDs which is consistent with findings that associate having a history of risky sexual behavior with being diagnosed with an STD (DiClemente, Crosby, Wingood,

Lang, Salazar & Broadwell, 2005; Crosby, DiClemente, Wingood, Salazar, Rose, et al., 2004; Crosby, DiClemente, Wingood, Rose & Lang, 2003; Niccolai, Ethier, Kershaw, Lewis & Ickovics, 2003; Crosby, DiClemente, Wingood, Sionean, Harrington, et al., 2002).

Although older females had higher proportions of risky behaviors at baseline, younger females exhibited greater change between interviews one and two for variables such as ever being pregnant, ever having children, ever using marijuana, and ever being in jail. By the second interview, the proportion of younger adolescents who reported these experiences was equal to the proportions reported by older adolescents suggesting that, among females, behavioral changes occur in earlier adolescence. Other studies have found that between the ages of 15 and 16, the frequency and variety of sexual behaviors increase for females (Fortenberry, Schick, Herbenick, Sanders, Dodge & Reece, 2010). Perhaps this is accompanied by changes in other risk-taking behaviors but further research is needed.

Younger females also reported a higher proportion of ever using alcohol at baseline compared to older adolescents. However, by the third interview the rates of alcohol use were comparable between the two groups. The higher proportion of adolescents ever using alcohol may have had an impact on the high rate of STDs found at the beginning of the study, as alcohol consumption is associated with STD diagnosis (Floyd & Latimer, 2010; duPlessis, Holliday, Robillard, & Braithwaite, 2009; Boyer, Sebro, Wibbelsman, & Shafer, 2006; Sen, 2002). Even low levels of alcohol intoxication have been found to increase the probability of sexual intercourse and unprotected sexual

intercourse among adolescents (Sen, 2002), making this a plausible explanation for the results in this study.

The proportion of younger females diagnosed with one or more STDs was lower than for older females. Younger teens reported lower proportions of having four or more lifetime sexual partners, as well as higher proportions of protective factors such as more condom use and being currently enrolled in school compared to the older cohort. The percentage of younger participants who perceived their risk of acquiring an STD as "medium" or "high" increased more than for older adolescents, possibly leading to more protective behaviors like condom use and fewer partners than the older cohort. There have been various studies which have suggested an association between risk perception and an increase in protective sexual behaviors following positive STD diagnoses (Kershaw, Ethier, Niccolai, Lewis & Ickovics, 2003) and STD screening (Crosby, DiClemente, Wingood, Salazar, Rose, et al., 2004; Fortenberry, Brizendine, Katz, & Orr 2002; and Sznitman, Carey, Vanable, DiClemente, Brown, et al., 2010).

Condom use increased among younger adolescents. The percentage of younger teens reporting ever using condoms increased while the percentage of older adolescents remained the same. Condom use in the last six months increased for younger females between interviews one and two, but then decreased between interviews two and three. In contrast, the proportion of older females who reported using condom in the last six months decreased across interviews, as did the proportion reporting using a condom at their last sexual encounter. Younger females reported a steady percentage of using condoms at their last sexual encounter throughout the duration of the study. The results concur with those of studies that have found an association between decreased condom

use and older age among females (CDC, 2010c; Elkington, Bauermeister & Zimmerman, 2010; CDC, 2002). In comparison, younger females in the period analysis had less condom use than older females. Possibly, STD screening had an influence on the results of the cohort analysis.

Both younger and older adolescents reported higher percentages of having had their first sexual intercourse before age 13 compared to females in the period analysis. However, there were issues with recanting and the percentages decreased by the third interview. Nonetheless, the percentages reported at baseline in the cohort analysis, 15% (n=3) and 9.1% (n=2) were higher than those reported in the 2001 YRBS for black females (7.6%) while the percentages reported in the period analysis were comparable to the survey's results.

At baseline, both younger and older cohorts had lower percentages of having had four or more sexual partners compared to female respondents in the period analysis. Although teens in the cohort analysis exhibited increases in their perceived risk of STD acquisition and decreases in their diagnoses, as the study progressed, the percentage of participants who reported having had four or more sexual partners in both cohorts increased to 45% for younger teens, and 54.5% for older teens. The results suggest that as adolescent females in the cohort matured, they engaged in more risky behaviors. Like male participants, females in the cohort analysis reported higher proportions of having had four or more lifetime sexual partners than the proportion reported for black adolescents (15.6%) in the 2001 YRBS survey.

Differences between genders

The proportion of positive STD diagnoses decreased in both male cohorts even though at each interview fewer male teens reported perceiving their risk as "medium" or "high". Furthermore, there was only slight change in the number of older males who reported perceiving their risk as "medium" or "high" at each interview, a result that was contrary to this study's hypothesis. In contrast, the proportion of females who perceived their risk for STDs as "medium" or "high" increased and the proportion of females diagnosed with one or more STDs decreased in both age cohorts, which is consistent with studies finding an association between increases in risk awareness and STD screening (Crosby, DiClemente, Wingood, Salazar, Rose, et al., 2004; Fortenberry, Brizendine, Katz, & Orr 2002; Sznitman, Carey, Vanable, DiClemente, Brown, et al., 2010), and increased risk awareness and positive STD diagnoses (Kershaw, Ethier, Niccolai, Lewis, Ickovics, 2003). These findings suggest that males may be less likely to perceive themselves at risk for STDs than females.

Overall, a higher proportion of males tested positive for one or more STDs. compared to females. This result contradicts the literature, which finds that being female is associated with positive STD diagnosis (Boyer, Sebro, Wibbelsman, & Shafer, 2006). Males did report more condom use (ever using condoms, used condoms in the last six months and used condoms at last sexual encounter) compared to females but also reported more partners and more risk behaviors for STDs such as ever using alcohol, ever using marijuana, ever being in jail, and ever being expelled from school. As in the period analysis, condom use was high among males but condoms may have been used incorrectly, explaining the higher rate of STDs among males (Crosby, DiClemente,

Wingood, Salazar, Rose, et al., 2005). Females also reported higher proportions of being enrolled in school and lower proportions of ever having sex with an opposite sex partner, which may also partly account for the disparity in STD diagnoses in this study.

Overall, these results are similar to those of another study in which males were more likely to engage in high-risk sexual behaviors, such as higher use of alcohol and other drugs and incorrect condom use, while females were more likely to have fewer partners and use condoms inconsistently, both are situations which lead to increased risk of contracting an STD (Newman & Zimmerman, 2000).

5.2 Study Limitations

One of the major limitations of this study was participant attrition, which considerably reduced the sample size after the baseline interview. The findings are also limited by the accuracy and honesty of adolescents' responses. In addition, the results may not be generalizable to the general population of U.S. adolescents, as the teens in this study lived in an urban setting and exhibited many high-risk behaviors that were higher than those reported in the YRBS survey. Finally, the original study used a nonprobability sample, which also precludes generalization.

5.3 Recommendations

The findings of this study highlight the need for strategies to reduce the risky behaviors in which adolescents engage as they grow up, including early sexual debut, having multiple sex partners, drinking alcohol, and using marijuana. Effective programs to encourage youth to stay in school, may offer one alternative as being currently in

school has been linked to a reduction in risky behaviors, improved self-esteem, and better condom negotiating abilities (Crosby, DiClemente, Wingood, Salazar, Rose & Sales, 2007; Kirby, 2002). Likewise, effective programs are needed to increase correct and consistent condom use among adolescent males and females to reduce pregnancies and STD rates in the community. Although it was encouraging that adolescent males reported high percentages of condom use, the high STD rates confirm the need for condom use education in this population.

STD testing may have had a positive influence on the adolescents who completed three interviews. The proportion of participants who were diagnosed with STDs decreased and the proportion of those who perceived their STD risk as "medium" or "high" increased, possibly as a result of STD testing. Pilot programs that promote and provide STD screening may be needed to test the effectiveness of this approach in the community studied. The findings of previous studies suggest that it may be a successful strategy in increasing risk awareness and decreasing STD rates (Crosby, DiClemente, Wingood, Salazar, Rose, et al., 2004; Kershaw, Ethier, Niccolai, Lewis, Ickovics, 2003; Fortenberry, Brizendine, Katz, & Orr 2002; and Sznitman, Carey, Vanable, DiClemente, Brown, et al., 2010).

Younger adolescents should be targeted for risk prevention interventions early, before they begin engaging in risky behaviors. Interventions of this nature would prevent the increase in risk behaviors and negative sexual health outcomes associated with those behaviors among younger adolescents, which may also impact their sexual health in young adulthood. In a study of the early risk behaviors of young adults, Scott and colleagues found that cumulative risk in adolescence was positively associated with the

number of sexual partners, an increased risk of STD diagnosis, and unwanted pregnancy (Scott, Wildsmith, Welti, Ryan, Schelar, Steward-Streng, 2011).

Although extensive research has been done in the area of STDs among African American adolescents, the literature is missing studies that examine the changes in the risk behaviors and risk factors in this population during the period between 15 and 18 years of age and the association between these changes and STD prevalence. Future studies could use data from the YRBS survey, which draws from a nationally representative sample of adolescents and may yield results that are more generalizable to the African American population. Undoubtedly, as sexual health disparities persist especially among low-income, urban populations, more studies focused on these communities are also needed.

5.4 Conclusion

Despite the limitations of this study, the results contribute to the growing body of work linking adolescent maturation and STD risk behaviors. The findings suggest that as adolescents mature they engage in a greater variety of risky behaviors known to have a positive association to STD diagnosis including drinking alcohol, using marijuana, having sex and having multiple sexual partners. Gender differences were also found, as males engaged in more risk behaviors and had a greater proportion of STD diagnoses but also reported more condom use compared to females. In this study, there is not sufficient evidence to determine whether there is a specific point in time at which adolescents rapidly change their behavior. However, compared to younger adolescents, older

adolescents generally engage in more sexual risk behaviors and have fewer protective factors.

One of the most important conclusions of this study is that period analyses, which have usually been done to study the sexual behaviors of adolescents, may give aberrant results that are clearer when the population is studied as a cohort. Cohort analyses may be able to uncover patterns that are not readily noticeable in period analyses, such as patterns associated with aging. Only when individuals are observed as they age, can behavioral changes be observed. For example, in the present study changes in condom use which may have led to differential percentages of STD diagnoses between younger and older male adolescents were difficult to interpret in the period analysis but more readily discernable in the cohort analysis.

Finally, younger adolescents may be more amenable to interventions that aim to prevent STDs by increasing protective risk behaviors such as condom use and by reducing risk factors such as early onset of sexual debut, having multiple partners, and substance use. STD screening could be part of an effective strategy to increase teens' awareness of STD risk and reduce STD prevalence. Future research is needed to more precisely identify the period during which adolescents experience rapid changes in their risk behaviors as well as the specific behaviors that should be targeted during that important developmental milestone.

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