

AN EXAMINATION OF THE RELATIONSHIPS BETWEEN  
SOCIAL SUPPORT AND SEXUAL RISK TAKING BEHAVIOURS  
IN ADOLESCENTS IN NORTHERN NOVA SCOTIA

by

Lisa Jensen

Submitted in partial fulfilment of the requirements  
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at

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DALHOUSIE UNIVERSITY

DEPARTMENT OF COMMUNITY HEALTH AND EPIDEMIOLOGY

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Dated: August 23, 2011

Supervisor:

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Readers:

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AUTHOR: Lisa Jensen

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## **ABSTRACT**

The goals of sexual health programming in youth populations frequently focus on reducing sexual risk taking, as these behaviours can lead to sexually transmitted infections and unplanned pregnancies. A focus on enhancing distal factors such as social support is starting to be considered of greater importance in adolescent sexual health programming. The purpose of this thesis was to examine the relationship between social support and sexual risk taking behaviours in school age youth in Northern Nova Scotia in 2000. Social support was found to be a factor in some sexual risk taking behaviours, with different relationships seen for males and females. Depression and self-esteem also influence the relationship between social support and some sexual risk taking behaviours. Health programming with a wholistic approach, including a focus the role of support and psycho-social variables, may be a positive way to reduce sexual risk taking behaviours and support healthy adolescent sexuality.

## **LIST OF ABBREVIATIONS USED**

95% CI	95% confidence interval
ASSIS	Arizona Social Support Interview Schedule
CES-D	Centre of Epidemiologic Studies – Depression Scale
HIV	Human Immunodeficiency Virus
HPV	Human Papilloma Virus
OR	Odds Ratio
SAS	Statistical Analysis Software
SES	Socio-economic status
STIs	Sexually transmitted infections
US	United States of America

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## **CHAPTER ONE: INTRODUCTION**

Though several decades of research, social support has been repeatedly linked to a wide range of mental and physical health outcomes, and social support networks are recognized as a key determinant of health by Health Canada<sup>1</sup> and the World Health Organization.<sup>2</sup> Social support has been defined as “information that leads people to believe that they are cared for,”<sup>3</sup> and as the information, advice, role modeling and emotional infrastructure that individuals have available to them.<sup>4</sup> Social support can be considered to be the functional aspect of social relationships, and can be further understood as those social contacts that offer emotional support and advice, care giving, and provide help and a sense of belonging.<sup>4</sup> While the evidence contributing to the body of knowledge as to how social support influences health status is building slowly, social support is increasingly being recognized as a critical indicator of overall physical and mental well-being.<sup>5</sup>

Most research on social support has focused on adult populations, but a growing numbers of researchers are exploring social support as an important factor in many aspects of adolescent health, including sexual health.<sup>6,7,8</sup> While sexual experimentation is a normal and healthy part of adolescence, risky sexual behaviour can have detrimental physical, psychological, social and economic impacts. Sexual risk taking leads to an increased possibility of early and unintended pregnancy, contracting of sexually transmitted infections such as human immunodeficiency virus (HIV), human papilloma virus (HPV) or chlamydia, and subsequently experiencing other health outcomes such as infertility or disability that can negatively influence life course development.<sup>9,10</sup> Teen pregnancy may reduce educational and employment

opportunities for young mothers, increasing the likelihood of poverty.<sup>11</sup> Engaging in early intercourse, having unprotected vaginal or anal sex, and having multiple partners are all considered potentially risky behaviours, and participating in several risky behaviours increases the chance of negative outcomes.<sup>12</sup>

A growing body of research supports the examination of distal factors such as social support to greater inform the development of effective health promotion and education efforts among adolescents.<sup>12,13</sup> Health education campaigns that focus solely on the promotion of desirable behaviours, such as abstinence only campaigns, have generally demonstrated poor results,<sup>14,15,16</sup> as have campaigns that attempt to use fear of negative outcomes to motivate behaviours.<sup>17,18</sup> Social ecology theorists argue that it is greater understanding of the scope and complexity of personal, community and systemic environments that surround the individual that are helpful in both understanding and influencing behaviours such as sexual risk taking.<sup>19</sup>

Researchers have become more interested in the study of social support in adolescent health and are examining the roles of diverse sources of social support such as family members, friends, teachers, health professionals and significant others on a range health behaviours, including sexual risk taking.<sup>20,21,22,23,24</sup> Adolescence is an age where many health related patterns of behaviour, including sexual decision making, are being established, and it is important to have understanding of the role that social support plays as a factor in youth sexual decision-making and risk taking.

Some researchers theorize that social support influences health related behaviours via indirect pathways such as influencing psychosocial variables such as self-esteem and depression.<sup>25,26</sup> They hypothesize that strong social support may

increase self-esteem and lower the likelihood of depressive symptoms, which then influences an individual's sexual health decision making.<sup>25,26</sup> Examining the interconnectedness of the concepts of social support, self-esteem and depression in the context of sexual risk taking behaviour in adolescence strengthens the body of knowledge, and increases our understanding of the relationship between social context, social environment, and behaviour.

While studies confirm the important role that social support plays in relation to a wide variety of mental and physical markers of health, little research has been focused on the role of social support in relation to sexual risk taking in adolescence. This research provides insight into the levels of social support assessed and desired by adolescents in northern Nova Scotia with emphasis placed on the relationship between social support and sexual risk taking behaviours in sexually active youth, and an exploration of the possible mediating effects of depression and self-esteem.

## **1.1 STUDY OVERVIEW**

The objectives of this research are to examine social support as a determinant of sexual risk taking behaviour in adolescents in northern Nova Scotia, and to offer insights into those psychosocial characteristics and demographic variables connected with social support in this context. It is hoped that this will contribute to more informed policy and programming related to sexual health education for youth.

The primary study questions are:

1. What is the relationship between social support and sexual risk taking behaviours in adolescents in northern Nova Scotia?

2. Do depression and self-esteem mediate the relationship between social support and sexual risk taking behaviours in this population?

A further methodological question concerns the utility of a proposed summed sexual risk taking measure:

3. Is a summed scale of sexual risk taking behaviours a useful measure of sexual risk?

## **1.2 SOCIAL SUPPORT**

Social support can be defined as the information, advice, role modeling and emotional infrastructure that individuals have available to them as they negotiate their lives.<sup>4</sup> Social support is but one outcome of having a social network and “is provided through the behaviours or actions of members of a network and communicated through the network’s structure.”<sup>27</sup> The existence of strong social support is thought to be positively related to higher self-esteem,<sup>28,29</sup> increased self worth,<sup>30</sup> good mental health,<sup>30</sup> a health-promoting lifestyle,<sup>31</sup> and result in stronger health outcomes overall, while a lack of social support is thought to be related to depression,<sup>32</sup> stress,<sup>33,34</sup> negative health behaviours, including smoking,<sup>35,36</sup> and using alcohol,<sup>37</sup> and ultimately with increased mortality.<sup>38</sup> While the directional pathways between social support and health behaviours are difficult to ascertain, theory suggests that social support is either directly or indirectly predictive of health behaviours, and it is rarely explored as a dependent variable.<sup>5,24,25,39,40,41</sup>

### **1.2.1 Aspects Of Social Support**

Researchers hypothesize that different types of social support exist, and that different individuals or networks may provide discrete aspects of the total support that an individual experiences.<sup>42</sup>

For adolescents, it is thought that risk taking behaviours are increasingly influenced by the behaviours of their peers and close social network and, to a lesser degree their parents as they mature, assert their autonomy and engage in more relationships outside their home.<sup>10,60,43</sup> This may reflect the characterization of what constitutes a “close” relationship as one ages, as research also suggests that ultimately those whom we feel close to are seen as sources for all types of support.<sup>44</sup>

In the literature, social support is generally categorized as falling into the following four groups:<sup>40,44</sup>

1. Informational social support is the provision of information that aids the individual in decision making. In the context of adolescent sexual health, this could mean information on where to obtain condoms, how to protect against sexually transmitted infections, or the modeling of positive relationship behaviours. Researchers propose that those providing positive social support both share information about health practices such as condom usage and avoiding unintended pregnancy, while actively encouraging healthy behaviours in youth, thus directly and indirectly influencing health practices.
2. Functional/instrumental support can be characterized as practical and tangible help from others in one’s life. In the realm of adolescent sexual health, this could be economic support to pay for birth control, or receiving contraception at no cost from a health centre.
3. Emotional support can be described as having confidants; someone whom one can speak with when troubled. Access to counselling, professional advice from health professionals, good communication with family members, a close relationship with



a teacher or mentor, or a trusted group of friends can all provide needed emotional support to adolescents.

4. Appraisal support can be described as feeling valued by others in your social network. Appraisal can provide confirmation of one's importance in a group or community.

The types of support received (informational, functional, emotional and appraisal) have been examined separately in various studies for influences on health related practices.<sup>4,45,46,47</sup> It is thought that each aspect of social support may take on greater or lesser importance at different times in the lives of individuals depending upon context or circumstance. Measures of general social support incorporate questions that relate to all of the theoretical areas, and support the interconnectedness and wholistic nature of different aspects of social support.<sup>4,48,59</sup>

It has been hypothesized that health outcomes are better predicted by perception of support available rather than actual support received or by an individual's evaluation of the adequacy of support available.<sup>44,49,50,51,52,53</sup> Other studies have not found strong correlations between perceived social support and social support received when needed.<sup>62</sup> Perceived social support measures may more accurately capture the resources that the individual feels that they have available to them, especially in times of crisis as this measure is likely to be based on their previous experience with receiving support from their network.<sup>44,60,62</sup> Assessment of adequacy of the quantity and/or quality of support received or perceived as accessible to the individual is a measure that can be greatly influenced by the manner or environment in which social support is offered or must be solicited.<sup>44</sup> Schorevers et al. note that, "there exists great variability in the

conceptualisation of social support regarding (a) the type of support (e.g. emotional, instrumental or informational), (b) perceived availability (i.e. expectancies) versus actual received support, and (c) amount versus satisfaction with actual received support.”<sup>54</sup>

For the purposes of this research, the source of the social support (i.e., family, peers, teachers etc.) is not identified. Social support in the context of this research is defined as the adolescents’ generally perceived need for, and satisfaction with (assessment of) social support received globally from unidentified sources across an array of defined needs. In this context, satisfaction with social support available captures what the individual evaluates to be the adequacy of the social support generally available to her in her daily life. Self assessed need for social support is what the individual determines to be his or her need for the types of support that others can offer in their lives. This measure is such that it reflects what respondents would consider to be their unmet need for social support. The two measures are thought to contain discrete information about the different aspects of social support (functional, informational, emotional and appraisal), and, explored as two distinct measurements, may provide more information about the level of social support both perceived and needed by individuals.<sup>5, 41,55,56,57</sup>

### **1.2.2 Theoretical Pathways - Social Support And Health**

There are several dominant theories concerning the mechanisms by which social support may operate to influence health. Firstly, in the most straightforward pathway, those who provide functional social support may directly “contribute advice about health practices and disease prevention and encourage the practice of healthy

behaviours.”<sup>58</sup> That is, through linkages in a social network, there may be direct discussions of health related topics and the guidance of individuals in the social network may lead the individual to follow healthy behaviours.

Secondly, social relationships may function as a cultural context to support and encourage lifestyle practices and behaviours, be they positive or negative.<sup>31</sup> The influence of one’s peer group shapes and determines what is immediately and contextually appropriate by the creation of a “culture.” It is thought that having meaningful social relationships may influence one’s self-esteem or self-worth, leading to enhanced health related behaviours and stronger health outcomes.<sup>58,59</sup> While much research has focused on the positive impact of strong social support, it is important to note that a strong social support network does not necessarily result in positive health behaviours for members. A study which looked at the effect of gang participation, a type of social support network, on adolescent African American girls’ sexual risk factors showed increased likelihood of having an STD and having a non-monogamous partner as well as other substance abuse and behavioural problems.<sup>59</sup> Strong support received within conflicted relationships, such as from an abusive or controlling partner, may also negatively impact self-esteem, and negatively influence health practices.<sup>5</sup>

Thirdly, it is hypothesized that the presence of strong social supports can mediate stress by serving as a buffer in difficult situations and functioning as a coping mechanism to maintain strong mental health.<sup>30,60,61</sup> In this situation, the relationship between stress and health is stronger for those with lower levels of social support. This theory has largely dominated social support research since the 1980s but evidence to support it has been inconsistent.<sup>5,40,60</sup> As adolescence is “a potentially stressful time

characterized by immense change in school environment, social relationships, academic activities, and physiological development,<sup>29</sup> social support may be more meaningful as a buffer in times of greater stress or during disturbing times in a young person's life.<sup>26,61,62</sup> When things are difficult, youth can draw on the social support that they receive from others to help them through emotionally stressful times. In an article reviewing social support concepts, Gottlieb and Bergen note that it is perceived social support that seems to be related to the buffering of stress with individuals who have a sense of being strongly supported coping better with difficult situations than those who feel less sense of support.<sup>44</sup>

### **1.3 SEXUAL RISK TAKING**

Sexual risk taking is an area of concern for researchers studying adolescent health and for practitioners designing health interventions and programming to improve adolescent health. While sexual experimentation is considered both normal and healthy during adolescence, there are sexual behaviours that can lead to greater risk for sexually transmitted infections, greater risk of unplanned adolescent pregnancy and other negative health outcomes for youth. Sexually risky decisions can also have a huge impact over the life course of an individual as it may lead to untreated sexually transmitted infections such as chlamydia and HPV resulting in infertility or cervical cancer, or the possibility of contracting HIV at an early age and subsequent illness. Teen pregnancy reduces the educational and employment opportunities that youth may have in later life. Sexual risk taking by adolescents can also lead to an increase in health care utilization and an increase in associated health care costs.

It is these sexual risk taking behaviours that are of concern to educators and health officials and are the focus of many school based public health interventions. In 2005, the Office of Health Promotion in the Nova Scotia Government identified the following target “health sexuality” indicators for programming, policy and action:

1. Age of onset of sexual activity
2. Percentage of sexually active youth
3. Rate of youth engaging in “risky” sexual behaviour.<sup>63</sup>

### **1.3.1 Measures Of Sexual Risk Taking**

The measurement of sexual risk taking behaviours in research include critical decisions such as whether to look at counts (absolute frequency) or scale measures (i.e. sometimes, always, never etc.) or both.<sup>64</sup> Sexual risk taking variables frequently measured in adolescent health research include: condom or contraceptive use at first or latest intercourse,<sup>12,65,66,67,68,69,70,71,72,73,74</sup> early initiation or early sexual debut (the age of which is defined variously),<sup>13,67,71,73,75,76,77,79</sup> and multiple partners (also widely defined).<sup>12,65,67,69,70,71,73,79</sup> Other, less frequent measures of sexual risk are intercourse under the influence of alcohol and drugs,<sup>65,74,78</sup> oral sex,<sup>71</sup> anal sex,<sup>71</sup> frequency of sex,<sup>79</sup> sex with an older partner (for females),<sup>80,81,82,83</sup> reported sexually transmitted infections (STIs),<sup>68,71,73,84</sup> prior abortion,<sup>71</sup> first date intercourse<sup>71</sup> and prior pregnancy.<sup>67,68,71,84</sup>

The sexual risk taking measures of interest for this research are: non use of effective contraception at last intercourse, non use of condoms at last intercourse, early initiation of sexual activity (before age 15), multiple partners (more than one) in the previous twelve months, unplanned intercourse under the influence of alcohol or drugs

in previous twelve months, intercourse with an older partner (for females only), and anal sex without a condom at last intercourse. Each measure is reviewed briefly below.

### **1.3.1.1 Use Of Contraception**

Use of contraception by adolescents is a frequently used measure in research on sexual risk taking. Correct use of condoms reduces the risk of sexually transmitted infections and pregnancy. Condoms are inexpensive and do not require interaction with the health care system to obtain, which may make them an attractive and accessible option for youth. Research with adolescents often focuses on condom use at last intercourse as a proxy for regular contraceptive behaviour, but researchers may also ask about “usual” condom use or more specific questions about contraception.

Condom use in the adolescent population is described as “erratic.”<sup>85</sup> Analysis from the Canadian Community Health Survey found that adolescent females were less likely to use condoms at last intercourse than males but also that the usage rates rose between 2003 and 2005 from 65% to approximately 70% for females.<sup>85,86</sup> Use in adolescent males remained the same at approximately 80%.<sup>86</sup> This may reflect less use of condoms among females who feel that they are protected from unwanted pregnancy by concurrent use of a birth control pill or other methods such as a diaphragm.<sup>86,87</sup> Findings about condom use were echoed in a large American study of public high school students which found that of the sexual active youth, only 25% of males and about 47% of females reported condom use as a primary form of birth control.<sup>104</sup> Analysis from the Adolescent Health Study in northern Nova Scotia found that about 50% of young women used condoms at last intercourse, and that 13% used no effective contraception whatsoever.<sup>74</sup>

### **1.3.1.2 Early Sexual Debut**

The age at which initiation of intercourse can be considered “early” is inconsistently defined in the literature and may depend upon community specific norms. Early sexual debut may be considered as engaging in sexual activity from as young as 12 years of age or up to 16 years of age, but much of the body of literature focuses on intercourse by age 14 or 15.<sup>75,76,88</sup> Initiation of intercourse in the early teen years means longer exposure and therefore greater risk over time for sexually transmitted infections. A study from the US found that those who experienced early sexual debut had an increased likelihood of having had multiple sex partners, having had sex while under the influence of drugs or alcohol, being the victim of forced sex and having been pregnant (or having had a pregnant sexual partner).<sup>89</sup> Another American study found that having sexual debut before the age of 15 was associated with increased risk of multiple unplanned pregnancies over the lifetime of the individual.<sup>90</sup>

A 2005 Statistics Canada publication found higher odds of early initiation of intercourse for girls in Atlantic Canada, compared to Ontario, with about 15% of girls living in Atlantic Canada having initiated intercourse by age 15.<sup>76</sup> The average age of sexual initiation for Canadian youth is 16.5 years.<sup>85</sup> Analysis of the 2001 Youth Risk Behavior Survey in the United States found that about one third of grade nine students (generally 14 to 15 years old) had initiated sexual activity.<sup>91,102</sup>

### **1.3.1.3 Multiple Sexual Partners**

An individual defined as having had multiple sexual partners in the literature generally has had two or more sexual partners over the previous year.<sup>12,65,67,69,70,71,73,79</sup>

Having multiple partners may increase exposure to sexually transmitted infections, especially when condoms are not used regularly.

The National 2001 Youth Risk Behavior Survey from the US found that approximately 22% of 12<sup>th</sup> graders and 10% of 9<sup>th</sup> graders reported four or more sex partners.<sup>91</sup> Analysis from the 2003 Canadian Community Health Survey found that a greater proportion of youth aged 15 to 19 had had intercourse with multiple partners over the past year compared to 20 to 24 year olds.<sup>85</sup> This may reflect a tendency towards longer term monogamous relationships over time and given increasing age.<sup>87</sup>

#### **1.3.1.4 Unplanned Intercourse Under The Influence Of Alcohol Or Drugs**

While having unplanned intercourse under the influence of alcohol or drugs does not always increase the direct risk of pregnancy or sexually transmitted infections, the use of alcohol or drugs prior to spontaneous intercourse is seen as likely to impair the individual's ability to make conscious decisions about sex, including intentional use of contraception.

Analysis from the 2003 Canadian Community Health Survey found that reporting "having (had) too much alcohol or drugs" was a reported factor in lack of condom use by 17% of grade 9 males.<sup>87</sup> In the same survey, 50% of females reported condom use at recent intercourse when drugs and/or alcohol were consumed beforehand as opposed to the 63% who reported condom use when drugs and/or alcohol use was not reported.<sup>87</sup> The 2002 Nova Scotia Student Drug Use Survey found that unplanned sexual intercourse under the influence of drugs or alcohol was associated with irregular condom use and having multiple sexual partners.<sup>78</sup> Analysis of Youth Risk Behaviour Surveillance System data from the United States found that as use of



cigarettes, marijuana and alcohol increased, so did the number of sexual partners reported.<sup>92</sup>

There is also some evidence that alcohol use may not significantly influence the use of condoms. A 2003 study from the US found that whether a youth was drinking before sex or how much alcohol was consumed was not associated with the odds of using a condom.<sup>93</sup> Another study that looked at drinking and condom use found that results were inconsistent and subject to error, with adolescents more likely to overestimate the negative impact of alcohol on condom use.<sup>94</sup>

#### **1.3.1.5 Sex With An Older Partner**

For female adolescents, a sexual relationship with an older partner may be related to sexual risk taking, especially lack of condom use with the older partner.<sup>95</sup> Disproportionate power in a relationship with an older man, who is more likely to have had more sexual partners and thus greater exposure to sexually transmitted infections, is thought to impact sexual risk taking behaviours by young women in these relationships.<sup>95,96</sup>

An American study found that adolescents who had sexual partners two or more years older than themselves were more likely to have a sexual transmitted infection<sup>81,97</sup> or to be at higher risk of contracting one.<sup>98</sup> A second study found a higher pregnancy rate among adolescents whose partners were two or more years older.<sup>80</sup>

#### **1.3.1.6 Anal Sex Without A Condom**

Anal sex without a condom is considered sexually risky to health as the tissues of the rectum tear easily, and thus facilitate the transmission of sexually transmitted infections. Anal sex has been explored very infrequently in adolescent populations,

likely due to societal taboos, and ensuing parental or school administrator concern about its inclusion into health education research with young people.

Analysis from the 2002 cycle of the National Survey of Family Growth in the US found that about 11% of youth surveyed had ever engaged in anal sex with rates rising to about 28% after three years from the initiation of vaginal sex.<sup>99</sup> A Swedish study of 17 year old females found that anal sex was relatively common (ranging from 8% to 19%, depending upon the population group), and condom use irregular, although anal sex without a condom was not measured specifically.<sup>71</sup> An American study using on-line sex diaries with adolescent women found that anal sex was a relatively infrequent event and that about 30% of anal sex was condom protected.<sup>100</sup> Among incarcerated American adolescent males and females, a very high risk group, anal sex was reported by 18% of survey participants with only 10% of anal sex events condom protected.<sup>101</sup>

### **1.3.2 Multiple Sexual Risk Taking Behaviours**

The “clustering” of multiple sexual risk taking behaviours is well documented in adolescent health research.<sup>71,72,76,78,85,92,102</sup> Researchers emphasize that it is engaging in a multiplicity of risk behaviours that identifies those at greater risk and that each additional risky behaviour is thought to increase the possibility of poorer health related outcomes.<sup>103</sup> A Canadian study found that youth who had experienced sexual debut by age 13 were significantly more likely to have had multiple partners in the previous year.<sup>85</sup> The same study found that about 60% of females who had had intercourse by age 13 had not used a condom at last intercourse.<sup>85</sup> An American study using the research questions validated in the Youth Risk Behaviour Survey, found that condom

use declined with as number of partners increased.<sup>104</sup> The same study found a correlation between alcohol use and the likelihood of not using condoms and having multiple sexual partners.<sup>104</sup>

The clustering of a wide variety of broader health compromising risk behaviours include alcohol consumption, drug use, smoking, dieting practices and sexual risk taking have been explored in previous research.<sup>12,75,78,92</sup> Again, it is thought that multiple risk taking behaviours are often seen together and likely spring from common underlying risk factors. Canadian analysis from the National Population Health Survey found that 33% of female adolescents and 43% of males reported two or more risk taking behaviours (smoking, binge drinking, multiple partners and non condom use).<sup>12</sup> An American study found that teens who used alcohol or drugs were also likely to have had multiple sexual partners.<sup>92</sup>

Sexual risk taking behaviours such as not using a condom or having multiple partners may have very different contexts and risk factors depending on community or in-group norms, gender, culture, or age. Researchers agree however, that risk taking behaviours are related and that clustering of risky behaviours, including sexual ones, increases overall risk to the individual.<sup>12,</sup>

### **1.3.3 Adolescent Sexual Health In Canada**

Public Health Agency of Canada statistics on sexually transmitted infections report high rates of gonorrhea and chlamydia for teens aged 15 to 19 and that these rates have been increasing in recent years. In the Canadian Sexually Transmitted Diseases Surveillance report for 2008, females aged 15-19 years old had the highest rate of gonorrhea infection among females at 186.6 per 100,000 while males aged 15 to

19 had an infection rate of 70.7 per 100,000 population.<sup>105</sup> Data from the same report indicate that the chlamydia infection rate in Canadian females aged 15 to 19 is 1651.9 per 100,000 while males in the same age group have a rate of 358.1 per 100,000.<sup>105</sup> Between 1999 and 2008, rates of chlamydia infection in Nova Scotia have risen by 49.6%, and gonorrhoea rates have climbed by 126.9%.<sup>105</sup>

Teen pregnancy rates in Canada have been declining since the mid 1990s but further reduction of unwanted pregnancies in this age group is a focus for public health action. While teen pregnancy rates in Nova Scotia are lower than other parts of the country, the numbers are still a cause for concern. In 2005 (the most recent date for which information is available), the pregnancy rate in Nova Scotia was 24.0 per 1000 population (Canadian average 29.2 per 1000 population).<sup>106</sup> Reflecting previous provincial trends, of the 728 pregnancies in Nova Scotia youth ages 15 to 19 in 2005 approximately half are carried to term and the other half end in abortion.<sup>106</sup>

#### **1.4 SOCIAL SUPPORT AND SEXUAL RISK TAKING**

Most frequently in social support research, studies have explored the relationship between various types of social support and the person or group from whom that person receives the support with specific behavioural markers. However, a general sense of social support and its relationship to sexual risk taking in adolescence has not often been explored.

Support from family members is more often correlated with positive sexual health decision making by adolescents but not always and not for all behaviours.<sup>107,108,109</sup> Various studies demonstrate that the influence of family social support appears to decline through adolescence, as the influence of peers grows.<sup>32</sup> The

sexual behaviours of friends and peers have been strongly associated with sexual decisions of the adolescent across numerous studies.<sup>9,10,110</sup> Related concepts, such as membership in a peer group that is involved in risk taking across a broad range of areas such as drug use, smoking and delinquency, has been associated with sexual risk taking.<sup>9,12</sup> Depending on the context, it is hypothesized that membership in “positive” peer groups, such as sports groups, may also offer support that is protective and discourage sexual practices that are considered risky, although the pathways by which this may happen are not well understood.<sup>12, 111</sup>

### **1.5 SOCIAL SUPPORT, SEXUAL RISK TAKING AND GENDER**

Males and females experience different needs for social support.<sup>3</sup> Adolescent females are thought to be more influenced by external sources of support such as family, friends and peer group.<sup>36</sup> Research has also shown that female youth are more likely to perceive higher levels of social support from their networks than males.<sup>32,60,112,113</sup> Males and females may also respond differently to different sources of social support, depending upon the outcome studied. In a study of self perception, the support perceived from family, friends and significant others differentially influenced males and females, with support from significant others negatively impacting the body image of males but not females.<sup>24</sup>

Gender differences are also linked to sexual decision making. In a meta-analysis of adolescent sexual risk behaviour, the majority of the studies that examined gender specific differences in sexual risk practices reported that gender was a significant determining factor.<sup>9</sup> For example, male adolescents are more likely to report greater participation in sexually risky activities,<sup>13</sup> while female adolescents are less likely to

report regular use of condoms.<sup>85</sup> A Nova Scotia based study, the “Buddy Study,” explored the role of young heterosexual men in sexual decision making.<sup>114</sup> The researchers found that young men were less likely to seek out information about sex, that young women were more likely to take responsibility for safe sex practices than their partners, and that both sexes were unlikely to use condoms regularly.<sup>114</sup>

Males and females both experience support in their social networks, but the meaning and influence of different types of social support seems to differ by gender. Both sexes are engaged in sexual risk taking but the socio-cultural dynamics and the type and nature of sexual risk taking behaviours seem to also vary by gender. These findings underline the need to examine the gender-specific support contexts that surround sexual decision making.

## **1.6 SELF-ESTEEM AND DEPRESSION**

Self-esteem and depression are psychosocial constructs that may be potential mediators between sexual behaviours and social support in the adolescent population.<sup>25,28</sup> Self-esteem and depression are frequently studied in the adolescent population. While the relationship between them is not always consistent, there appears to be strong evidence that high self-esteem is related to low levels of depression, and that the two variables are strongly inversely correlated.<sup>138,115,116,117,118</sup>

### **1.6.1 Self-Esteem**

Self-esteem is defined as “the individual’s assessment of self-worth.”<sup>112</sup> Health promoting practices are thought to be an outcome of high self-esteem, as those individuals may be more likely to engage in healthy behaviours.<sup>112</sup> Social networks provide an opportunity for interaction with others and the formation of relationships

that may influence the adolescent's self-esteem. Several studies have found that self-esteem and support received from family and friends are positively correlated.<sup>25,45</sup> Individuals with high self-esteem may be more likely to be satisfied with their relationships in general, and thus perceive higher levels of social support to be available.<sup>41,54</sup> Strong self-esteem may also serve to strengthen relationships and contribute to strong perceived social support. A study of adolescents in Montreal found that lower levels of self-esteem were associated with lower levels of social support received from parents, teachers, classmates and close friends.<sup>29</sup>

Self-esteem is also correlated with sexual behaviours in adolescents, with gender differences found in some research. Sexual risk taking behaviour has been associated with low self-esteem in adolescent girls,<sup>119,120,121,122</sup> and with high self-esteem in adolescent boys.<sup>119</sup> A longitudinal American study found that girls with low self-esteem measures were three times more likely to engage in early intercourse and that boys with high self-esteem scores were 2.4 times more likely to initiate sexual activity.<sup>119</sup> Canadian data concurs with apparent gender differences in the relationship between self-esteem and sexual risk taking. An analysis of Canadian data from the National Longitudinal Survey of Children and Youth which measured "self-concept," a term capturing concepts similar to self-esteem measures, found that weak self concept in adolescent females was related to a greater likelihood of having sex by 14 or 15 (early sexual debut) while the opposite association was found to be true for adolescent males.<sup>76</sup> However, a large systematic review found little evidence for an association between self-esteem and sex risk behaviours in either male or female adolescents.<sup>123</sup>

### **1.6.2 Depression**

Depression is hypothesized to be a result of complex interactions between biological, socio-cultural and psychological factors.<sup>124</sup> Depression is common in adolescents with estimated lifetime prevalence rates for major depressive disorder ranging from approximately 8 to 10% in those aged 15 to 25.<sup>125</sup> Negative life events (environmental variables) and dysfunctional attitudes, developed from early life experiences (individual level variables) are frequently examined in depression research.

Social support may be an important factor in preventing or alleviating depression during adolescence.<sup>126,127</sup> Strong social support may serve as a stress buffer and increase the capacity of individuals to cope in positive ways with negative events.<sup>5,44,128,129</sup> A study examining social support and depression in the context of negative life events in Taiwanese adolescents suggested that high social support from peers and family may decrease depressive symptoms and support adolescents during stressful times.<sup>32</sup> Similarly, a study examining depression in Canada from the National Population Health Survey data found that a lack of emotional support was significantly associated with a later major depressive episode in women.<sup>124</sup>

The support deterioration model of depression hypothesizes that stress contributes to the decreased availability or decreased perception of social support and that contributes to the onset of depression.<sup>130</sup> Other studies suggest that depressed subjects might perceive less social support than their non-depressed peers, thus the directional relationship between social support and depression can not be clearly articulated.<sup>32, 41,54</sup> There also is evidence that being depressed and the subsequent withdrawal from those in one's social network (a frequent symptom) results in less



social support. An American randomized intervention trial found that reducing depressive symptoms through cognitive behaviour intervention in youth resulted in increased social support from peers and friends compared to the loss of social support experienced in a control group.<sup>131</sup>

In contrast to studies showing an inverse relationship between high social support and incidence of depressive symptoms, Barnett and Gotlib studied the impact of stressful life events and social support on the depressive symptoms of college students in the United States, and found a relationship between high social support and increased depressive symptoms.<sup>132</sup> The findings suggested that depressed people may maintain their self-esteem through dependent relationships with others, and that low social support for those who show a tendency to depression may result in more severe depression. These findings are repeated in a Canadian study of seventh graders that found that children with high social support and high self-esteem had greater vulnerability to depression following negative events.<sup>29</sup>

The relationship between depression and social support may thus be somewhat circular with social support (or a lack thereof) influencing the development of depressive symptoms, and depression influencing an individual's ability or need to maintain a strong social support network.

Depression has also been shown to be associated with risky sexual behaviour.<sup>73,133,134</sup> A longitudinal study from New Zealand found that adolescents with depression were more likely than non depressed subjects to report risky sexual intercourse (defined as multiple partners in the past years or infrequent use of condoms).<sup>73</sup> Depressed individuals in this study were also more likely to report a

history of sexually transmitted disease and sexual intercourse before the age of 16.<sup>73</sup> A large school-based study in Finland found that having multiple sexual partners and not using contraception was associated with depression for both genders.<sup>135</sup> Evidence from a 2003 study of school based youth in Nova Scotia found that being at risk for depression was associated with unplanned sex due to use of alcohol or drugs and lack of effective contraception at last intercourse in females, and with unplanned sex due to the use of alcohol or drugs and with multiple partners in males.<sup>134</sup>

### **1.6.3 Theoretical Pathways (Social Support, Depression And Self-Esteem)**

The causal pathways between social support and depression and self-esteem are unclear and perhaps somewhat controversial in the literature. It is hypothesized in this study that social support influences self-esteem and/or depression, which then influence sexual behaviour.<sup>136</sup> In this scenario, the perception of strong social support leads to increased self-esteem, and higher self-esteem then influences the kinds of sexual risks an individual may take. It is also possible that depression or self-esteem may influence social support, which then impacts sexual risk taking behaviours.<sup>137</sup> In this case, an individual with depression may be unable to maintain relationships that would lead to having a strong social support available from their network, and thus make sexual health decisions influenced by this lack of social support.

In this study, depression and self-esteem will be explored as mediators in the hypothesized pathway between social support and sexual risk taking behaviour in adolescents. As this is a cross-sectional survey, directionality of the relationships between variables can not be determined. Nevertheless, drawing on the previous literature in this field of inquiry, the argument will be made for the social support as an

influence on sexual risk taking behaviours, and that that influence may be fully or partially mediated by the effects of self-esteem and/or depression.<sup>4,5,6,19,26,27,28,32,33,38,40,</sup>

<sup>112</sup> While the complexities of these pathways are recognized in the literature, theory supports the exploration of depression and self-esteem measures as potential mediators of the effect of social support on sexual risk taking behaviours.<sup>112,138</sup> That is, the effects of social support on sexual risk taking will be at least partially mediated through the mechanisms of self-esteem and depression. Social support is thus hypothesized to be directly associated with sexual risk taking behaviours and also to function indirectly through the influence of social support on depression and self-esteem.

Both self-esteem and depression have been shown to be associated with gender, with girls more likely to report lower self-esteem and higher rates of depression than boys.<sup>139</sup> The 1999 National Population Health Survey found that Canadian women were almost twice as likely as men to report being depressed, and that Nova Scotia had the highest reported rates of depression in the country for both men and women.<sup>124</sup> Results from the Canadian Community Health Survey: Mental Health and Well-Being in 2002 concur with these results with the estimates of the annual prevalence of a major depressive disorder for women as 5.0% and for men as 2.9%.<sup>125</sup> A three country comparison of gender differences in depression noted that the gender gap in depression seems to begin at about age 14, accelerate through the teenage years, and continue to menopause.<sup>140,141</sup>

Very few studies have explored the relationships between social support, depression and self-esteem in adolescents. The published research in this area has usually explored depression (clinical, subclinical and normative) as the outcome

variable. Abela and Sullivan studied Canadian seventh grade students and noted that high self-esteem and high levels of social support can serve as buffers against the onset of depressive symptoms following negative life events in youth vulnerable to depression.<sup>142</sup> They hypothesized that youth with high levels of social support and self-esteem are more likely to communicate with their support network following adverse events and find ways of coping positively with difficult outcomes.<sup>142</sup>

Sexual risk taking has also been examined infrequently as an outcome variable in conjunction with both measures of self-esteem and depression. An American study that used data from the National Longitudinal Survey of Adolescent Health, found that depressive symptoms were associated with ever having had a sexually transmitted infection for both genders, and for non-use of condoms by males.<sup>143</sup> In the same study, self-esteem measures were found to be not significantly associated with sexual risk taking once depression was included in the analysis.<sup>143</sup>

## **1.7 SUMMARY**

In summary, a review of literature on social support, sexual risk taking, self-esteem and depression in adolescence outlines a complex web of interactions. Gender is strongly related to all four variables. Social support is considered to be a potentially strong distal influence on sexual risk taking behaviours. Self-esteem and depression are likely related to both social support and sexual risk taking, and may conceivably act as mediators in the pathway between the two. This research explores some of the complexities of these relationships and offers further insight into the pathways that may link these factors.

## **CHAPTER TWO: OBJECTIVES AND HYPOTHESES**

The objectives of this research are to examine social support as a determinant of sexual risk taking behaviour by youth in northern Nova Scotia, and to offer insights into those psychosocial characteristics and demographic variables connected with social support in this context.

Drawing widely on the literature related to social support, sexual risk taking, depression, self-esteem and gender, the following hypotheses will be addressed in this research:

1. There is a direct relationship between measures of social support and sexual risk taking behaviours, and this will differ by gender.
2. Self-esteem and/or depression will mediate the relationship between social support and sexual risk taking behaviours.

A further methodological question concerns the utility of the summed sexual risk taking measure:

3. A summed scale of sexual risk taking behaviours is a useful measure of sexual risk.

## **CHAPTER THREE: METHODS**

### **3.1 SETTING**

Northern Nova Scotia, as defined in this study, is the area covered by the Chignecto-Central Regional school division which reaches from the New Brunswick border to the edges of Antigonish County in the east and Halifax County in the south and west. It includes the entire counties of Cumberland, Colchester, Pictou, and the eastern portion of Hants County. The Chignecto-Central Regional school division is the second largest school board in the province, and the region is roughly half the size of Prince Edward Island.<sup>144</sup> According to 2001 Canadian census data, the region has a population of about 87,500 (about 10% of the total population of Nova Scotia) of which about 98.3% are white.<sup>145</sup> There were about 6,025 youth aged 15 to 19 living in this area in 2001.<sup>145</sup> The average family income is about \$5,000.00 less than the provincial average, and the unemployment rate for the region is slightly higher than the provincial average.<sup>145</sup>

### **3.2 DATA SOURCE**

The Chignecto-Central Regional School District and Dalhousie University partnered to do research on student health services usage starting in 1999. Ethics approval was obtained for the Adolescents and Health Related Services Research Study in 1999 from the Research Ethics Board at Dalhousie University, Halifax, Nova Scotia.

Four schools were selected for inclusion in the research programme: Cobequid Education Centre, Amherst Regional High School, New Glasgow High School and West Pictou District High School. The Adolescents and Health Related Services Research Study included 2,372 students in grades nine to twelve in the year 2000,

representing about 40% of the total number of high school students in northern Nova Scotia. The cross-sectional survey was repeated in 2003, with smaller cohorts completing surveys in 2001 and 2002 to form two longitudinal follow up groups.

The first wave of the survey was administered in May and June of 2000. Research team members provided support and training to teachers, who administered the survey during class time at the four schools. Informed consent was obtained and students were assured of confidentiality in all replies. The students completed the self-administered questionnaires used in this study in May-June of 2000.

The survey collected data on demographics, sexual behaviours, substance use, weight perception and control, suicide, depression, violence and social support and self-esteem. The Adolescent Health Survey gathered data from 2372 of the 2624 students who attended school the day the survey was conducted, a 90.4% response rate. Three thousand and thirty-five students in total were registered at the four schools, so the survey represents a 78.2% overall response rate. Students ranged in ages from 14 to 20 years old, with very small numbers at either end of the age distribution. For the purposes of this analysis, only data from the 2,182 students who were between the ages of 15 and 18 (inclusive) and in grades 10, 11 and 12 will be included.

The subsequent analyses of the Adolescent Health Survey offered valuable insight into the health decision-making and health status of students in rural Nova Scotia.<sup>72,74,146</sup> The study was built on strong partnerships, effective communication and established and well validated survey techniques and methodologies. Little analysis has been performed on the 2000 social support data, providing an excellent opportunity to

nest this secondary analysis of the cross-sectional data within the larger context of the study.

### **3.3 VARIABLES AND MEASURES**

The instrumentation used in the Adolescent Health Survey was based on previously established tools, scales and questionnaires. (Appendix A) The following sections outline the specific measures of interest in this research.

#### **3.3.1 Social Support**

The primary independent variables of interest are the two aspects of social support measured in this study; identified need for social support and satisfaction with social support received.

Social support in this study was measured through the use of a modified Arizona Social Support Interview Schedule (ASSIS scale),<sup>147</sup> a previously validated measure, to ascertain satisfaction with social support received and self-described unmet need for social support. The modified scale includes 12 questions which ask about two aspects of social support: satisfaction with support received in six areas, and perceived need for the support in those same areas. The six areas are: private feelings, material need, advice, positive feedback, physical assistance, and social participation.<sup>147</sup>

Respondents were not asked to indicate from whom they received social support so the two aspects of the scale capture overall (as opposed to directed) measures of satisfaction with, and the need for, social support. Respondents chose an answer on a three-point scale and scores were summed to provide an overall measure of social support for a total possible measurement of 18 on each of the two measurements.



For the variable need for social support, a higher score indicated that the respondent assessed him or herself as requiring greater support across the six areas examined. This measurement can be seen as an indication of unmet need from the social support available. Higher measures of the variable satisfaction with social support, indicated the individual's qualitative evaluation of the social support received across the six social support areas measured.

This method of measurement has been performed in other studies with adolescents with high validity and reliability.<sup>34,35</sup> The reliability coefficient (Cronbach's Alpha) for social support satisfaction is reported as 0.69, and 0.80 for support need. (Appendix B)

In preliminary analysis, the two aspects of social support measured in this study (perceived need for social support, and satisfaction with support received) were examined for multicollinearity. As they were not highly collinear, indicating that they are likely capturing different information about social support, there were separate analyses conducted with each social support variable.

### **3.3.2 Sexual Risk Taking**

As this research focuses on sexually risky behaviours, the analysis will be conducted only on the cohort of sexually active youth who answered "yes" to the question "have you ever had vaginal sex?"

In this study, 14 questions about sexual behaviours for males and females were included, with one three-part question on effective contraceptive use answered only by females. The study questions covered vaginal intercourse, number of partners, the use of effective birth control, including condom use, vaginal sex without a condom, anal

sex without a condom, age of partner, and the use of drugs or alcohol preceding unplanned intercourse. A total of six sexual risk taking behaviours for males and eight for females were examined separately in analysis with the social support variables.

1. Non use of condom at last intercourse
2. Intercourse at younger than 15 years of age
3. Greater than one partner in the previous twelve months
4. Anal intercourse without a condom at last anal intercourse
5. Unplanned intercourse under the influence of drugs in the previous twelve months
6. Unplanned intercourse under the influence of alcohol in the previous twelve months
7. Intercourse with a partner three or more years older (females only)
8. Ineffective contraception at last intercourse (females only)

The questions related to sexual activity were taken from a sexual health survey developed by the principal investigator for the Amherst Initiative for Healthy Adolescent Sexuality Project. All questions underwent review by an expert panel, and were tested and re-tested with adolescents from another school district. Kappa statistics for all questions were greater than 0.76. (Appendix C)

### **3.3.3 Construction Of A Summed Sexual Risk Score**

The individual sexual risk taking behaviours were summed into a scale measure with each variable above contributing one point to the summed sexual risk taking score, giving a maximum value of six for males and eight for females.

The construction of scale scores for health risk behaviour for adolescents is seen elsewhere in the literature.<sup>133,146,154</sup> In exploring data from the same survey as this research, Langille et al. constructed a six point sum score for risk behaviours that included smoking, marijuana use, binge drinking, drinking and driving, early intercourse and attempted suicide in the past year.<sup>146</sup> Tuinstra et al. compiled a simple linear sum score for 4 adverse health behaviours (smoking, alcohol use, soft drug use and no exercise) to examine differences between Dutch youth engaged in multiple risk behaviours.<sup>154</sup> In a secondary analysis of the 1992 Massachusetts Adolescent Health Survey, Brooks et al. constructed a 4 level sexual risk variable that ranged from “never sexually active” to “sexually active and never used birth control,” to examine the variables associated with increasing risk.<sup>133</sup> In these studies, as in the proposed research, the summed scale measure provides important information about multiple risk taking behaviours in adolescents, and offers insight into the variables that are associated with increasing overall sexual risk.

In preliminary analyses, a Kuder Richardson 20 test was calculated to estimate the reliability and construct validity of the overall summed sexual risk taking score for each gender. The Kuder Richardson 20 test is similar to Cronbach’s alpha, but is used for dichotomous outcomes such as are seen in the questions related to sexual risk taking in this study. The Kuder Richardson 20 test gives the average of all possible split-half reliabilities of a constructed scale. The measure depends on both the magnitude of the correlation and on the number of items in the scale. A Kuder Richardson 20 should ideally fall between 0.70 and 0.90.<sup>148</sup> A Kuder Richardson 20 test result that is above 0.90 may indicate that some items are unnecessary and that the scale may be too

narrow. If the summed scale measure meets the criteria for a Kuder Richardson 20 test, it is to be treated as continuous data which assumes linearity. The residuals would be examined and linearity confirmed before proceeding with analysis. If the summed sexual risk taking measure meets the above criteria in the analysis, the models built to explore the relationship of social support and individual sexual risk taking scores, including the mediating effects of depression and self-esteem, will be used to explore the utility of the summed sexual risk taking measure of multiple sexual behaviours.

The use of individual sexual risk taking variables combined with a summed score, rather than the use of a single dichotomous “ever had intercourse” variable, allows the exploration of a continuum of sexual risk behaviours and will provide a more sensitive measure, and a broader picture of the complexities and multidimensionality of sexual risk behaviours in this population.<sup>9,60</sup> Used with the individual measures of sexual risk taking, this summed sexual risk taking score may provide rich information and support a more complex exploration and concise summary of the results obtained.

### **3.3.4 Socio-Economic And Demographic Variables**

Controlling for other risk factors in the multivariable analysis permits the effect and strength of association of the primary variable of interest (social support) with the sexual risk taking variables to be examined more accurately. The following socio-economic and demographic variables were adjusted in final models: socio-economic status (SES) (mother’s education as proxy), family status, grade, and school.

### **3.3.4.1 Socio-Economic Status**

The socio-economic gradient in health status is well established in the literature with those in situations of lower socio-economic status experiencing poorer health outcomes. Research evidence has found that this relationship persists in Nova Scotia.<sup>149</sup>

In the resiliency literature, it is hypothesized that, on a simplistic level, strong social support may help bridge gaps in access to resources caused by socio-economic deprivation. A more complex examination of the role of social support as a moderator between socio-economic status and health status found differences by age group and types of social relations.<sup>150</sup> An American study of children living in poverty found that social support moderated the relationship between low socio-economic status and academic achievement.<sup>151</sup> A longitudinal study from Finland that examined the role of social support in mediating the relationship between low socio-economic status in childhood and risk of depression in adulthood found supporting evidence that social support had a greater impact on depression for those in lower socio-economic groups.<sup>152</sup> Researchers also suggest that the individuals with lower socio-economic status may experience less social support overall as they may be unable to mobilize their social support effectively as they are more likely to experience more frequent stressful life events where social relationships may be disrupted.<sup>153</sup>

Research on the influence of socio-economic status and sexual risk taking is often contradictory. The relationship to other risk taking behaviours such as smoking, substance abuse and injuries, seem to reflect a gradient in socio-economic status in adolescents, reflecting what is usually seen for adults. Depending on the socio-economic measurement chosen and the design of the study, socio-economic status may

explain very small amounts of the variation when looking at specific health risk behaviours, including sexual ones in adolescents.<sup>12,154</sup> However other research shows a stronger correlation between socio-economic factors and health risk behaviours, indicating that lower socio-economic status may be associated greater likelihood of sexual risk taking.<sup>71,146</sup>

The measures of socio-economic status measured in this study were the highest level of parental education and parents' current employment status. The educational status questions inquired as to the highest level of education completed by both parents (elementary, junior high school, high school, community college, university, other, and don't know). The employment status questions inquired as to whether both parents were currently employed and six choices were available. These questions were previously developed for the Amherst Initiative for Healthy Adolescent Sexuality project.

Educational attainment of one or both parents is commonly used as a marker of socio-economic status.<sup>70,155,156</sup> Multicollinearity is often found between mother's and father's educational levels and thus only one measure is often included in the regression models. An argument for using mother's education status is that she is assumed to be the primary caregiver and thus may have more influence on the adolescent's development.<sup>155</sup> If there is no measure for mother's highest educational achievement available, or the mother does not reside with the adolescent, father's educational status was used. The measure was dichotomized into high school completion or less, and more than high school for the purposes of the study.

### **3.3.4.2 Family Status**

Family status was measured by looking at whether the adolescent reports living in an intact (two parent) family. Living in an intact family has been shown to be a protective factor in such sexually related decisions as later onset of sexual intercourse.<sup>103,157</sup> The resiliency literature also hypothesizes that having two parents in the household may lead to greater social support from parents through greater participation in, and monitoring of, the lives of adolescents.<sup>70,103,158</sup>

A single question from the survey asked the adolescent to identify with whom they resided, and 11 options (including an “other” category) were available. For the purposes of this research, a two parent family measure includes the categories of mother and father, mother and stepfather, and father and stepmother, and the remaining options form the “other” category. The reliability of these questions was tested using a test-retest approach with a group of students at a school not participating in the study.

### **3.3.4.3 Grade**

As grade closely approximates age in the high school population, age was not entered into the models. As older students are “more likely to report health-risk behaviors,”<sup>13</sup> and to have different patterns of sexual decision making generally, controlling for age related effects through forcing grade into the model is an important step in the analysis. Note that due to small numbers, grade nine students were excluded from the overall analysis. Students aged 14 or younger, or 19 or older, regardless of grade, are also excluded from analysis. There were only 41 adolescents aged 14 or younger who completed this survey; all of them registered in grade 9. There were 106 students (less than 5% of the total respondents) who identified themselves as being 19

years old or older at the time of the survey. They were excluded from the analysis as they are more likely to be living independently and experiencing a different type of living and relational environment.

#### **3.3.4.4 School**

Including a school variable into the analysis provided the ability to control for the systematic differences that being from different schools might have on the experiences of students. Students at different schools may experience different cultures and norms around social support and sexual risk taking due to school environment, community experiences, and the social history of the community and school. A specific example is that the presence of a teen sexual health centre at one of the schools may influence the sexual risk taking variable through increased access to condoms, counselling and sexual health information. In adjusting for a school variable in multivariate analysis, the likelihood of this factor influencing the data analysis is decreased. There were four different schools represented in the original study, and the data from all schools were aggregated for the purposes of analysis.

#### **3.3.5 Mediating Variables**

In the Dictionary of Epidemiology, Last succinctly defines a mediating variable as “a variable that occurs in the causal pathway from an independent to a dependent variable. It causes variation in the dependent variable, and itself is caused to vary by the independent variable. Such a variable is statistically associated with both the independent and dependent variables.”<sup>159</sup>

Baron and Kenny outlined conditions for demonstrating mediation effects.<sup>160</sup>

There are four conditions that must be met for mediation to be confirmed:



1. The independent variable must significantly predict the dependent variable.
2. Second, the independent variable must significantly predict the potential mediating variable(s).
3. Third, the potential mediators must significantly predict the dependent variable.
4. Fourth, the relationship between the independent variable and the dependent variable must no longer be significant when the effects of the potential mediators are entered in the model for the effect of the independent variable on the dependent variable to be mediated completely.

The models explored the role of depression and/or self-esteem as potential psychosocial mediators in the relationship between social support and sexual risk taking behaviour. In preliminary analysis, these two variables were examined for multicollinearity but a tolerance of greater than 0.1 was found, so both variables were examined in the mediation model.

### **3.3.5.1 Depression**

In this study, depression is measured through the use of the Centre of Epidemiologic Studies – Depression Scale (CES-D).<sup>161</sup> The use of this scale is appropriate for assessing the frequency of depressive symptoms in the general population, but is not a tool for clinical diagnosis of depression. Twenty questions concerning a range of depressive symptoms were asked with adolescents indicating the frequency that they had experienced such feelings and behaviours in the previous week. A score of 0-60 is possible, with higher scores indicating greater risk for depression. This scale has been used reliably in adolescent populations with alpha coefficients of 0.8 to 0.9.<sup>147</sup>

As used elsewhere, a CES-D score of 22 in males and 24 in females was used as cut off points to classify an adolescent as at risk for depression.<sup>143</sup> A score below 22 was classified as “low,” and 22 or higher as “high” for males, with 24 serving as the high-low demarcation for females.

### **3.3.5.2 Self-Esteem**

In this study, self-esteem was measured by the Rosenberg Self-Esteem Scale, a widely used assessment tool.<sup>209</sup> Ten questions measured the respondents’ feelings of self worth. The scale ranges from ten to a maximum of fifty with higher scores equating to higher measured self-esteem. The measure was used as a continuous variable in analyses.

## **3.4 DATA ANALYSIS**

This analysis of the data from the 2000 Adolescents and Health Related Services Research Study focused primarily on measures of social support and individual sexual risk taking behaviours. Only sexually active students (those who reported ever having had vaginal intercourse on the survey) were included in the analysis. Secondary analysis centered on the mediating role of self-esteem and/or depression in this relationship, concurrently controlling for selected socio-demographic variables. The third stage of the analysis explored the utility of a constructed summed sexual risk taking score in describing the relationship between social support and multiple sexual risk taking behaviours.

The analysis was conducted using SAS version 9.1 software. Descriptive statistics are given for all relevant variables, providing a broad snapshot of the data. Means and standard deviations are presented for continuous and ordinal data, and

proportions for binary and nominal data. Preliminary exploration, construction and analysis of the independent, dependent and potential mediator variables inform the exact composition and structure of the proposed models.

### **3.4.1 Stratification By Gender**

Reflecting what was found in the literature about sexual risk taking and social support, and gender differences in the potential mediating variables (depression and self-esteem), the data was stratified for analysis by gender. Structurally there were strong reasons for exploring social support stratified by gender in this study. Females participating in this study answered a unique set of gender-differentiated questions about their sexual decision making and their sexual behaviours (e.g. questions about contraception). Stratification reduces the systematic bias that may occur if questions are consistently answered differently by females and males. The literature also provided strong support for stratification based upon differing male and female situations with regards to social support, depression and self-esteem.<sup>36</sup> Researchers have also noted previously that sexual activities such as condom use may mean different things for males and females.<sup>162</sup> As a result, the relationship between social support and sexual risk taking were analysed separately for each gender.

### **3.4.2 Inclusion And Exclusion Criteria**

Grade 9 students, and those students age 14 and under and 19 or older were excluded from analysis as they formed a very small group of respondents. Respondents must have indicated a gender to be included in analysis as the analyses were stratified by gender. As the research focused on sexual risk taking, only students who reported ever having had vaginal intercourse were included in the analysis.

### 3.4.3 Power Calculation

A power calculation using EpiInfo version 6 was conducted to calculate the minimum sample size required to detect an effect of a given effect size. This calculation allows us to ascertain the least detectable difference in odds ratios for various measures in the study given the sample size of the study. This was calculated for the non use of condoms in both males and females to provide a range of estimates for this study.

Given that 2182 respondents met the inclusion criteria for the study, an estimate is required as to the number of sexual active youth in the sample as they form the core group for analysis. Given the age range (15 to 18 inclusive) and gender division (1138 females and 1044 males), a conservative estimate that between 40 to 50% of youth in this cohort have initiated sexual activity is realistic. For females this means that an estimated 455 to 569 study participants are sexually active, and for males, an estimated 417 to 522 individuals are sexually active.

An estimate of the social support experience in the student population is required for this calculation. From a review of the social support literature, it is anticipated that the many of youth perceive a relatively high level of social support with a significant minority experiencing a lack of social support in their day to day environments.<sup>30,33,34,36,39,40,41,58,60,61</sup> Given the literature, an estimate of a ratio of 1:3 for low social support (unexposed) to high social support (exposed) among students would be realistic and conservative for both males and females.

Usual parameters of an alpha of 0.05 and a power of 80% were used for the following calculations.

Use of condoms in adolescent female population is low relative to males and it is hypothesized that it is even lower among those with low social support.<sup>74,85,86,87</sup> From a review of the literature, a conservative estimate that non-use of condoms at last intercourse for females is approximately 60% for those with low social support with greater use of condoms by those with higher social support. For males, a conservative estimate of non use of condoms at last intercourse is approximately 50% for those with low social support and higher use of condoms by those with higher social support.

For females, the calculation is based on the following parameters: a conservative estimate of non-use of condoms at last intercourse of about 60% among adolescent females with low social support, a ratio of 1:3 for low social support to high social support among students, and a sample size of approximately 455 to 569 sexually active young women in the survey data. The least detectable odds ratio for non use of a condom among those with high social support which could be detected with 95% confidence and 80% power was 0.57, based on a sample of 567 sexually active young women. A sample size of 495 sexually active women (the lower end of the estimate) gives a least detectable odds ratio of 0.55.

For males, the calculation is based on the following parameters: a conservative estimate of non-use of condoms at last intercourse of about 65% among adolescent males with low social support, a ratio of 1:3 for low social support to high social support among students, and a sample size of approximately 417 to 522 sexually active males in the survey data. The least detectable odds ratio for non use of a condom among those with high social support which could be detected with 95% confidence and 80% power was 0.54, based on a sample of 480 sexually active males. A sample

size of 421 sexually active males (the lower end of the estimate) gives a least detectable odds ratio of 0.52.

### 3.4.4 Part One: Bivariate Logistic Regression

Bivariate logistic regression was conducted to test the effects of the social support variables on the individual measures of sexual risk taking.

Figure 1: List of independent and dependent variables

Independent variable	Dependent variable
Gender	Sexual risk taking variables
Social Support	
Female	Satisfaction with social support received
and	and/or
Male	Need for social support
	Non use of condom at last intercourse
	Early intercourse (younger than 15)
	Multiple partners in the past year (greater than 1)
	Anal intercourse without a condom
	Unplanned intercourse under the influence of drugs
	Unplanned intercourse under the influence of alcohol
	Older partner (3+ years older)*
	Effective contraception at last intercourse*

\* females only

### 3.4.5 Part Two: Mediation Models

Building upon suspected pathways as presented in the literature, a series of logistic regression analyses were used to explore the possible mediation role of self-esteem and depression in the relationship between social support and sexual risk taking.

Mediation is defined as “the generative mechanism through which the focal independent variable is able to influence the dependent variable of interest.”<sup>160</sup>

As per the conditions for mediation outlined by Baron and Kenny,<sup>160</sup> four methodological steps to test for the mediating effects of depression and self-esteem were taken in the construction of the models.

1. The first condition for mediation is met if the social support measure(s) (the independent variable) is (are) shown to be associated with the individual measures of sexual risk taking (the dependent variable) in bivariate logistic regression.

2. Second, social support (the independent variable) must significantly predict self-esteem and depression (the potential mediating variables) in bivariate logistic regression.

3. Third, self-esteem and depression (potential mediators) must significantly predict individual sexual risk behaviours (the dependent variable) in bivariate logistic regression.

4. Fourth, the relationship between social support (independent variable) and sexual risk taking behaviours (dependent variable) must no longer be significant when the mediating effects of self-esteem and depression are entered in the model, for self-esteem and depression to fully mediate the effect of social support on sexual risk taking.

**Figure 2: Schematic of Mediation model as per Baron and Kenny**

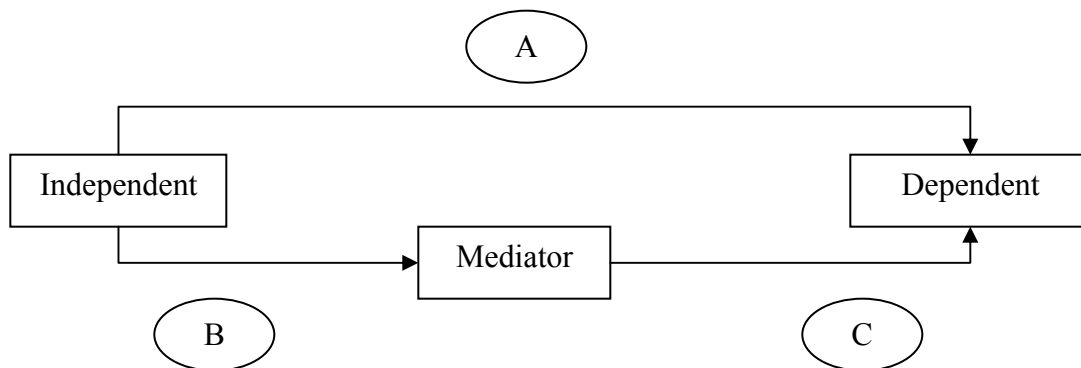


Figure 1 shows the model to be tested, where each directional arrow represents a direct effect pathway (labelled A, B and C). The indirect effect is the pathway through the mediator (combination of pathways B and C), and represents the portion of the relationship between the independent and dependent variable that is mediated by the mediator variable.

#### **3.4.6 Part Three: Multiple Logistic Regression**

The final multivariate logistic regression model regressed the social support measures on the individual sexual risk taking variables while controlling for mother's education, family status, school, grade, and depression or self-esteem as possible mediators. The outcomes of the models including depression and self-esteem were compared to the exploration of the conditions for mediation in unadjusted models as described by Baron and Kenny.<sup>160</sup>

#### **3.4.7 Part Four: Summed Sexual Risk Scale**

If the constructed summed sexual risk taking score is found to be a valid measure, then bivariate analyses with the social support variable(s), stratified by gender, will be explored.



## CHAPTER FOUR: RESULTS

### 4.1 DESCRIPTIVE OVERVIEW

2,182 students aged 15 to 18 (inclusive) who completed the survey met the inclusion criteria and were included in further analysis. Seven-hundred and ninety (36%) respondents were in grade ten, 716 (33%) were in grade eleven and 676 (31%) were in grade twelve at the time of the study. There were 1044 males (48%) and 1138 females (52%). Forty-nine percent of females ( $n=563$ ) and 46% of males ( $n=475$ ) reported ever having had vaginal intercourse. Vaginal intercourse was reported by 35% of the grade ten students, 52% of the grade eleven students and 59% of the grade twelve students.

Table 1 provides descriptive statistics of the total sample, stratified by gender. There were no significant gender differences found in socio-economic status, but boys in this sample were significantly more likely to live in a two-parent home than girls ( $OR=1.25$ ;  $95\%CI=1.02 - 1.55$ ). There were no gender differences with respect to ever having had sexual intercourse. In the exploration of potential mediator variables, results revealed that more females (26%) than males (17%) could be considered at risk for depression ( $OR=1.67$ ;  $95\%CI=1.36 - 2.06$ ). Males scored higher in the self-esteem measure than females (average score of 39.04 for males, 37.15 for females;  $t=5.84$ ,  $p<0.0001$ ).

In examining the social support variables measured in the study, females and males were significantly different, as was hypothesized from a review of the literature. Males reported higher levels of overall satisfaction with support received (mean = 13.37) than females (mean = 12.92) ( $t=3.43$ ,  $p<0.006$ ). In turn, females identified a

higher need for social support (mean = 12.02) than males (mean = 10.76) ( $t=-11.84$ ,  $p<0.0001$ ).

Table 2 provides descriptive results for males stratified by respondent's sexual activity. Sexual activity does not vary by school, but does vary by grade, with older students more likely to be sexually active. Male students who were sexually active were less likely to live in two parent households (OR=0.57; 95%CI=0.42 – 0.78) and were also less likely to have a mother with a post secondary education (OR=0.70; 95%CI=0.54 – 0.90). No differences were found for the social support, depression or self-esteem variables.

Table 3 similarly reports on female students with results stratified by sexual activity. As with males, the likelihood of engaging in sexual activity did not vary by school but varies by grade, with older students more likely to engage in sexual activity. Female students who were sexually active were less likely to live in a two parent household compared to their non-sexually active peers (OR=0.58; 95%CI=0.44 – 0.78), but no difference was found for mother's education status. Sexually active female students were more likely to be classified as at risk for depression than non-sexually active females (OR=1.32, 95%CI=1.01 – 1.96). Sexually active females were also more likely to be classified as having lower self-esteem ( $t=2.61$ ,  $p=0.009$ ). No differences between the sexually active females and their non-sexually active peers were found in the measurement of the social support variables.

**Table 1: Descriptive statistics for those meeting study inclusion criteria**

<b>M</b>	<b>Male</b>	<b>Female</b>	<b>Total</b>	<b>Statistics</b>
	<b># (%)</b>	<b># (%)</b>	<b># (%)</b>	<b>(modeling males)</b>
<b>Total</b>	1044 (47.85)	1138 (52.15)	2182 (100.00)	
<b>School</b>				<b>Chi square, <i>p</i> value</b>
1	153 (14.66)	211 (18.54)	364 (16.68)	
2	576 (55.17)	581 (51.05)	1157 (53.02)	
3	156 (14.94)	161 (14.15)	317 (14.53)	
4	159 (15.23)	185 (16.26)	344 (15.77)	7.27, <i>p</i> = 0.06
<b>Grade</b>				
10	403 (38.60)	387 (34.01)	790 (36.21)	
11	327 (31.32)	389 (34.18)	716 (32.81)	
12	314 (30.07)	362 (31.81)	676 (30.98)	5.06, <i>p</i> =0.08
				<b>OR (95%CI)</b>
<b>Ever had sex</b>				
yes	475 (45.50)	563 (49.47)	1038 (47.57)	
no	569 (54.50)	575 (50.53)	1144 (52.43)	0.85 ( 0.72 – 1.01)
<b>Family Status</b>				
Two parent household	848 (81.23)	882 (77.50)	1730 (79.29)	
Other	196 (18.77)	256 (22.50)	452 (20.71)	1.25 (1.02 – 1.55)*
<b>Mother's Education</b>				
High school or less	479 (45.88)	497 (43.67)	976 (44.73)	0.84 (0.71 – 0.99)
Post secondary	509 (48.75)	603 (52.99)	1112 (50.96)	
Both mother and father education				
unknown	56 (5.36)	38 (3.33)	94 (4.31)	
<b>Depression</b>				
At risk	178 (17.05)	291 (25.57)	469 (21.49)	
Not at risk	866 (82.95)	847 (74.43)	1713 (78.51)	1.67 (1.36 – 2.06) *
				<b>Mean (Std. dev)</b>
<b>Self-esteem</b>	39.04 (7.58)	37.15 (7.50)		<b><i>t</i> test, <i>p</i> value</b>
				<i>t</i> = 5.84, <i>p</i> <0.0001 *
<b>Satisfaction with social support received</b>	13.68 (3.11)	12.92 (2.87)		<i>t</i> = 3.43, <i>p</i> <0.006 *
<b>Need for social support</b>	10.76 (2.66)	12.02 (2.29)		<i>t</i> = -11.84, <i>p</i> <0.0001 *

\* statistically significant result at *p*<0.05

**Table 2: Demographic variables for sexually active and not sexually active males**

	<b>Sexually Active</b>	<b>Not Sexually Active</b>	<b>Statistics</b>
	# (%)	# (%)	(modeling sexually active)
<b>Total</b>	475 (45.50)	569 (51.63)	
<b>School</b>			<b>Chi square, <i>p</i> value</b>
1	74 (48.37)	79 (51.63)	
2	254 (44.10)	322 (55.90)	
3	71 (45.51)	85 (54.49)	
4	76 (47.80)	83 (52.20)	1.18, <i>p</i> =0.76
<b>Grade</b>			
10	130 (32.26)	273 (67.74)	
11	166 (50.76)	161 (49.24)	
12	179 (57.01)	135 (42.99)	42.93, <i>p</i> <0.0001 *
			<b>OR (95%CI)</b>
<b>Family Status</b>			
Two parent household	364 (42.92)	484 (57.08)	
other	111 (56.63)	85 (43.37)	0.57 (0.42 – 0.78) *
<b>Mother's Education</b>			
High school or less	245 (51.15)	234 (48.85)	
Post secondary	211 (42.20)	289 (57.80)	
Both mother and father education unknown	19 (33.93)	37 (66.07)	0.70 (0.54 – 0.90) *
<b>Depression</b>			
At risk	93 (52.25)	85 (47.75)	0.73 (0.53 – 1.01)
Not at risk	379 (44.54)	472 (55.46)	
	<b>Mean (Std. dev.)</b>		<b>t test, <i>p</i> value</b>
<b>Self-esteem</b>	38.88 (8.03)	39.18 (7.21)	<i>t</i> =-0.63, <i>p</i> =0.53
<b>Satisfaction with social support received</b>	13.20 (3.14)	13.48 (2.99)	<i>t</i> =-0.98, <i>p</i> =0.32
<b>Need for social support</b>	10.89 (2.77)	10.70 (2.50)	<i>t</i> =1.17, <i>p</i> =0.24

\* = statistically significant at *p*<0.05

**Table 3: Demographic variables for sexually active and not sexually active females**

	<b>Sexually Active</b>	<b>Not Sexually Active</b>	<b>Statistics</b>
	<b># (%)</b>	<b># (%)</b>	<b>(modelling sexually active)</b>
<b>Total</b>	563 (49.47%)	575 (50.53%)	
<b>School</b>			<b>Chi square, <i>p</i> value</b>
1	152 (63.07)	89 (36.93)	
2	273 (46.99)	308 (53.01)	
3	80 (49.69)	81 (50.31)	
4	88 (47.57)	97 (52.43)	7.49, <i>p</i> =0.06
<b>Grade</b>			
10	145 (37.47)	242 (62.53)	
11	201 (51.67)	188 (48.33)	
12	217 (59.94)	145 (40.06)	38.53, <i>p</i> <0.0001*
			<b>OR, (95% CI)</b>
<b>Family Status</b>			
Two parent household	410 (46.49)	472 (53.51)	0.58 (0.44 – 0.78)*
other	153 (59.77)	103 (40.23)	
<b>Mother's Education</b>			
High school or less	260 (52.31)	237 (47.69)	0.53 (0.66- 1.06)
Post secondary	288 (47.84)	314 (52.16)	
Both mother and father education unknown	15 (38.46)	24 (61.54)	
<b>Depression</b>			
At risk	159 (54.64)	132 (45.36)	1.32 (1.01 – 1.72)*
Not at risk	398 (47.78)	435 (52.22)	
	<b>Mean (Std. dev.)</b>		<b><i>t</i> test, <i>p</i>-value</b>
<b>Self-esteem</b>	36.56 (7.55)	37.72 (7.41)	<i>t</i> =2.61, <i>p</i> =0.009*
<b>Satisfaction with social support received</b>	12.79 (2.91)	13.05 (2.81)	<i>t</i> =1.54, <i>p</i> =0.12
<b>Need for social support</b>	12.11 (2.34)	11.94 (2.23)	<i>t</i> =-1.24, <i>p</i> =0.22

\* = statistically significant at *p*<0.05

Table 4 provides information on the sexual risk taking behaviours of the sexually active youth who are the focus of this study, stratified by gender. Worthy of note is the fact that significantly more females (50%) than males (36%) reported not using a condom at last intercourse (OR=0.73; 95%CI=0.64 – 0.85). Not using any contraception (condoms, birth control pills, IUD or other) or practicing the withdrawal method at last intercourse was reported by 12% of females. Approximately the same percentage of males (26%) and females (24%) reported initiating sexual intercourse before the age of 15. Having multiple partners was relatively common with about 35% of males and 32% of females reported having more than one sexual partner in the 12 months prior to the survey. Significantly more males (16%) than females (11%) reported having unplanned sex during the past year while under the influence of drugs (OR=1.76; 95%CI=1.29 – 2.41). Of the sexually active youth, approximately 22% of females and 27% of males reported not having engaged in any of the sexual risk taking behaviours examined in this study.

Tables 5 and 6 provide an outline of socio-demographic differences between those sexually active students who participate in sexual risk taking behaviours and those who do not, by gender. Females who reported one or more sexual risk taking behaviours were more likely to be in a living situation with other than with two parents (OR=2.23; 95%CI=1.33 – 3.75). No other statistically significant differences were found in the socio-demographic variables between those sexually active males and females who do and do not report engaging in sexually risky behaviour.

**Table 4: Sexual risk taking behaviours of sexually active youth (n=1038)**

	<b>Males (n=475)</b>	<b>Females (n=563)</b>	<b>OR (95% CI)</b>
	<b># (%)</b>	<b># (%)</b>	<b>(modelling male)</b>
<b>Sexual risk taking behaviours</b>			
No use of condom at last intercourse	170 (35.79)	279 (49.56)	0.73 (0.64 – 0.85)*
Early intercourse (younger than 15)	123 (25.89)	135 (23.98)	1.09 (0.88 – 1.35)
Multiple partners (greater than 1)	164 (34.53)	182 (32.33)	1.14 (0.96 – 1.35)
Anal intercourse without a condom	32 (6.74)	54 (9.59)	0.89 (0.69 – 1.56)
Unplanned intercourse under the influence of drugs	76 (16.00)	60 (10.66)	1.76 (1.29 = 2.41)*
Unplanned intercourse under the influence of alcohol	140 (29.47)	152 (27.00)	1.13 (0.86 – 1.48)
Intercourse with older partner (3+ years older) (females only)	n/a	120 (21.31)	n/a
Ineffective contraception at last intercourse (females only)	n/a	73 (12.97)	n/a
<b>No sexual risk taking behaviours</b>	129 (27.16)	123 (21.85)	0.79 (0.59 – 1.05)
<b>One or more sexual risk taking behaviours</b>	346 (72.84)	440 (79.15)	
1 sexual risk taking behaviour	143 (30.11)	148 (26.29)	
2 sexual risk taking behaviours	103 (21.68)	119 (21.14)	
3 sexual risk taking behaviours	59 (12.42)	82 (14.56)	
4 sexual risk taking behaviours	29(6.11)	48 (8.53)	
5 sexual risk taking behaviours	9 (1.89)	30 (5.33)	
6 sexual risk taking behaviours	3 (0.63)	10 (1.78)	
7 sexual risk taking behaviours	n/a	3 (0.53)	
8 sexual risk taking behaviours	n/a	0 (0.00)	

\* = statistically significant at  $p < 0.05$

**Table 5: Socio-demographic variables for sexually active males who engage in sexual risk taking behaviours and those who do not (n= 475)**

	<b>One or more risk taking behaviours</b>	<b>No risk taking behaviours</b>	<b>Statistics</b>
<b>Total</b>	# (%) 346 (72.84)	# (%) 129 (27.16)	<b>Modeling no risk</b>
<b>School</b>			<b>Chi square, <i>p</i> value</b>
1	50 (67.57)	24 (32.43)	2.34, <i>p</i> =0.50
2	192 (75.59)	62 (24.41)	
3	50 (70.42)	21 (29.57)	
4	54 (71.05)	22 (28.95)	
<b>Grade</b>			
10	97 (74.62)	33 (25.38)	2.26, <i>p</i> =0.32
11	114 (68.67)	52 (31.33)	
12	135 (75.42)	44 (24.58)	
<b>Family Status</b>			<b>OR (95%CI)</b>
Two parent household	268 (73.63)	96 (26.37)	0.85 (0.52-1.35)
other	78 (70.27)	33 (29.73)	
<b>Mother's Education</b>			
High school or less	182 (74.29)	63 (25.71)	0.87 (0.85-1.32)
Post secondary	151 (71.56)	60 (28.44)	
Both mother and father education unknown	13 (68.42)	6 (31.58)	
<b>Depression</b>			
At risk	73 (78.49)	21 (21.51)	1.45 (0.85-2.50)
Not at risk	273 (72.77)	108 (27.23)	
	<b>Mean (Std. dev.)</b>		<b><i>t</i> test, <i>p</i> value</b>
<b>Self-esteem</b>	39.48 (6.42)	39.99 (7.29)	<i>t</i> =0.54, <i>p</i> =0.46
<b>Satisfaction with social support received</b>	13.51 (2.71)	13.81(2.97)	<i>t</i> =1.06, <i>p</i> =0.30
<b>Need for social support</b>	11.27(2.42)	10.79 (2.32)	<i>t</i> =3.62, <i>p</i> =0.06

\* = statistically significant at *p*<0.05



**Table 6: Socio-demographic variables for sexually active females who engage in sexual risk taking behaviours and those who do not (n=563)**

	One or more risk taking behaviours	No risk taking behaviours	Statistics
<b>Total</b>	# (%) 440 (79.15)	# (%) 123 (21.85)	<b>Modeling no risk</b>
			<b>Chi square, <i>p</i> value</b>
<b>School</b>			
1	98 (80.33)	24 (19.67)	3.83, <i>p</i> =0.08
2	215 (78.75)	58 (21.25)	
3	56 (70.00)	24 (30.00)	
4	71 (80.68)	17 (19.32)	
<b>Grade</b>			
10	117 (80.69)	28 (19.31)	0.83, <i>p</i> =0.66
11	154 (76.62)	47 (23.38)	
12	169 (77.88)	48 (22.12)	
			<b>OR (95% CI)</b>
<b>Family Status</b>			
Two parent household	307 (74.88)	103 (25.12)	2.23 (1.33 – 3.75)*
other	133 (86.93)	20 (13.07)	
<b>Mother's Education</b>			
High school or less	213 (81.92)	47 (18.08)	0.67 (0.45 – 1.02)
Post secondary	217 (75.35)	71 (24.65)	
Both mother and father education unknown	10 (66.67)	5 (33.33)	
<b>Depression</b>			
At risk	131 (82.39)	28 (17.61)	1.47 (0.92 – 2.34)
Not at risk	303 (76.13)	95 (23.87)	
	<b>Mean (Std. dev.)</b>		<b><i>t</i> test, <i>p</i> value</b>
<b>Self-esteem</b>	36.98 (6.73)	37.46 (6.27)	<i>t</i> =0.49, <i>p</i> =0.48
<b>Satisfaction with social support received</b>	12.91 (2.80)	12.96 (2.71)	<i>t</i> =0.03, <i>p</i> =0.85
<b>Need for social support</b>	12.29(2.10)	12.23 (2.00)	<i>t</i> =0.09, <i>p</i> =0.77

\* = statistically significant at *p*<0.05

## **4.2 ANALYSES**

### **4.2.1 PART ONE: BIVARIATE LOGISTIC REGRESSION**

Bivariate logistic regression was conducted on the social support variables and the individual sexual risk taking variables, stratified by gender, to determine the effect of the social support variables on each measure of sexual risk taking. Table 7 documents the results.

Satisfaction with social support received was not a significant independent variable for any sexual risk taking variables, for either gender. Higher expressed need for social support was associated with non-use of a condom at last intercourse (OR=1.13; 95%CI=1.05 – 1.22) and having anal sex without a condom for males (OR=1.25; 95%CI=1.003 – 1.55), and with having unplanned sex under the influence of alcohol (OR=1.15; 95%CI=1.02 – 1.31) and drugs (OR=1.09; 95%CI=1.006 – 1.188) for females.

**Table 7: Bivariate regression of social support variables on each measure of sexual risk taking, by gender**

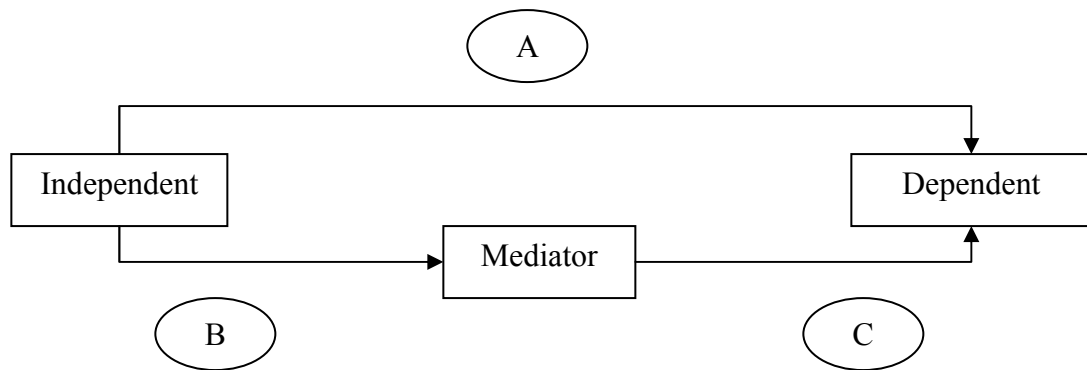
	<b>Males (n=475)</b>		<b>Females (n=563)</b>	
<b>Satisfaction with social support</b>	<b>OR</b>	<b>95%CI</b>	<b>OR</b>	<b>95%CI</b>
Use of condom at last intercourse	1.00	0.94 - 1.07	0.98	0.92 - 1.03
Early intercourse (younger than 15)	0.96	0.90 - 1.02	0.98	0.92 - 1.05
Multiple partners (greater than 1)	0.97	0.91 - 1.03	0.95	0.89 - 1.01
Anal intercourse without a condom	1.07	0.89 - 1.28	1.07	0.90 - 1.28
Unplanned intercourse under the influence of drugs	0.95	0.88 - 1.03	0.92	0.84 - 1.01
Unplanned intercourse under the influence of alcohol	0.96	0.90 - 1.03	0.96	0.90 - 1.02
Older partner (3+ years older) females only	n/a	n/a	1.03	0.96 - 1.10
Effective contraception at last intercourse (females only)	n/a	n.a	0.93	0.85 - 1.01
<b>Social support need</b>	<b>OR</b>	<b>95%CI</b>	<b>OR</b>	<b>95%CI</b>
Use of condom at last intercourse	1.13	1.05 - 1.22 *	1.03	0.96 - 1.11
Early intercourse (younger than 15)	1.00	0.92 - 1.07	1.04	0.95 - 1.27
Multiple partners (greater than 1)	0.96	0.90 - 1.04	0.98	0.91 - 1.05
Anal intercourse without a condom	1.25	1.003 - 1.55 *	1.08	0.86 - 1.36
Unplanned intercourse under the influence of drugs	1.04	0.94 - 1.14	1.15	1.02 - 1.31 *
Unplanned intercourse under the influence of alcohol	1.03	0.95 - 1.11	1.09	1.01 - 1.19 *
Older partner (3+ years older) females only	n/a	n/a	0.96	0.88 - 1.05
Effective contraception at last intercourse (females only)	n/a	n/a	1.11	0.99 - 1.24

\* = statistically significant

#### 4.2.2 PART TWO: MEDIATION MODELS

As per the conditions for mediation outlined by Baron and Kenny, four steps to test for the mediating effects of depression and self-esteem were taken in the construction of the mediation model.

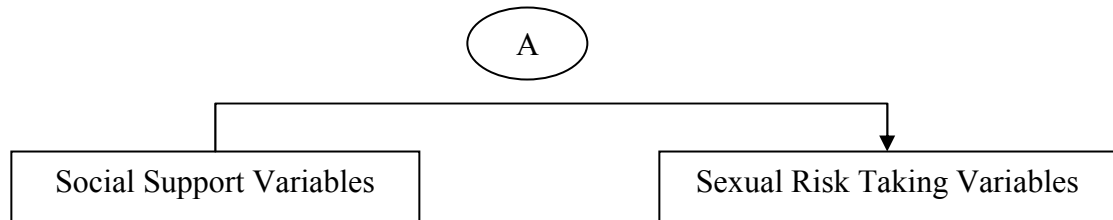
Figure 3: Schematic of mediation model



##### 4.2.2.1 Mediation Model: First Condition

The first condition for mediation is met if social support is shown to be associated with measures of sexual risk taking (pathway A below).

Figure 4: Schematic of first condition for mediation



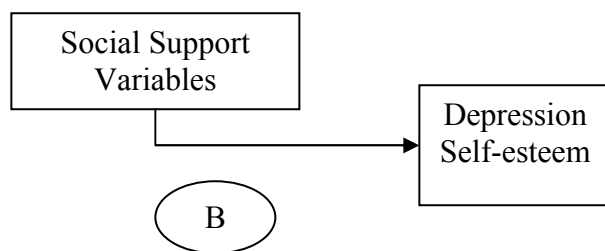
As per previous analyses (Tables 6 and 7), satisfaction with social support provided was not significantly associated with any of the sexual risk taking variables,

for either gender. Identified need for social support was associated with non-use of a condom at last intercourse and having anal sex without a condom for males (Table 6) and with having unplanned sex under the influence of alcohol and drugs for females (Table 7).

#### 4.2.2.2 Mediation Model: Second Condition

To meet the second parameter for mediation, social support (independent variable) must be significantly associated with self-esteem and depression (possible mediators) (pathway B below).

**Figure 5: Schematic of second condition for mediation**



As satisfaction with social support received was not significant in the first condition for either males or females, only need for social support was explored in conjunction with the potential mediating variables. As per the results documented in Table 8, for females, need for social support was significantly associated with both depression (OR=1.50; 95%CI=1.35 – 1.66), and self-esteem (OR=1.63; 95%CI=1.07 – 1.21). For males, both calculations were also significant with need for social support associated with both depression (OR=1.25; 95%CI=1.14 – 1.38) and self-esteem (OR=1.09; 95%CI=1.03 – 1.15).

**Table 8: Bivariate regression of need for social support on the possible mediating variables, by gender for sexually active youth**

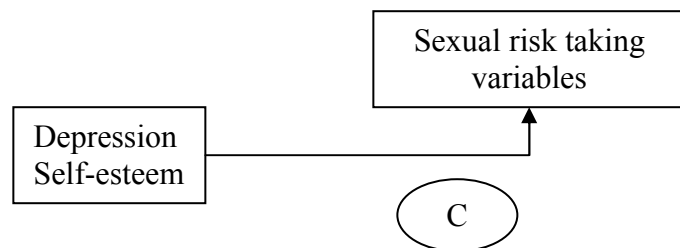
Independent variable	Mediator	Males (n=475)		Females (n=563)	
		Odds ratio	95%CI	Odds ratio	95%CI
Need for social support	depression	1.25	1.14 - 1.38 *	1.50	1.35 - 1.66 *
	self-esteem	1.09	1.03 - 1.15 *	1.63	1.07 - 1.21 *

\* = statistically significant at  $p < 0.05$

#### 4.2.2.3 Mediation Model: Third Condition

To meet the third condition for mediation, self-esteem and depression must be significantly associated with the sexual risk taking behaviours (pathway C below).

**Figure 6: Schematic of third condition for mediation**



Higher measures of self-esteem were a protective factor in having sex under the influence for drugs in both males (OR=0.97; 95%CI=0.94 - 0.99) and females (OR=0.97; 95%CI=0.94 - 0.99). Being at higher risk for depression was a risk factor for having unplanned sex under the influence of drugs in both males (OR=2.05; 95%CI=1.16 – 3.62) and females (OR=2.33; 95%CI=1.34 – 4.04). In females, being at higher risk for depression also predicted unplanned sex under the influence of alcohol (OR=1.77; 95%CI=1.19 – 2.04). (Table 9)

**Table 9: Bivariate regression of mediating variables on sexual risk taking behaviours, by gender, on sexually active youth**

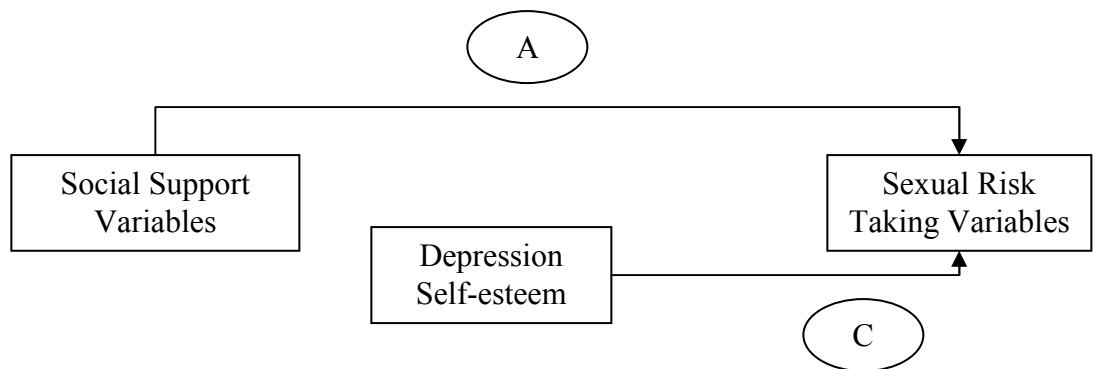
<b>Self-esteem OR</b>	<b>Males (n= 475)</b>		<b>Females (n= 563)</b>	
		<b>95%CI</b>	<b>OR</b>	<b>95%CI</b>
Use of condom at last intercourse	1.01	0.98 - 1.03	0.98	0.96 - 1.00
Early intercourse (younger than 15)	1.00	0.97 - 1.02	1.00	0.97 - 1.02
Multiple partners (greater than 1)	1.00	0.97 - 1.02	0.99	0.97 - 1.01
Anal intercourse without a condom	1.03	0.96 - 1.11	0.98	0.92 - 1.04
Unplanned intercourse under the influence of drugs	0.97	0.94 - 0.99 *	0.97	0.94 - 0.99 *
Unplanned intercourse under the influence of alcohol	0.98	0.96 - 1.01	0.98	0.96 - 1.00
Older partner (3+ years older) females only	n/a	n/a	1.02	0.97 - 1.04
Effective contraception at last intercourse (females only)	n/a	n/a	0.97	0.95 - 1.00
<b>Depression</b>	<b>OR</b>	<b>95%CI</b>	<b>OR</b>	<b>95%CI</b>
Use of condom at last intercourse	1.16	0.73 - 1.86	1.16	0.80 - 1.67
Early intercourse (younger than 15)	1.50	.091 - 2.46	1.46	.96 - 2.22
Multiple partners (greater than 1)	1.24	0.76 - 2.03	1.16	0.78 - 1.71
Anal intercourse without a condom	2.79	0.67 - 11.71	0.85	0.31 - 2.34
Unplanned intercourse under the influence of drugs	2.05	1.16 - 3.62 *	2.33	1.34 - 4.04 *
Unplanned intercourse under the influence of alcohol	1.50	0.91 - 2.47	1.77	1.19 - 2.04 *
Older partner (3+ years older) females only	n/a	n/a	1.23	0.79 - 1.91
Effective contraception at last intercourse (females only)	n/a	n/a	1.38	0.81 - 2.33

\* = statistically significant

#### 4.3.2.4 Mediation Model: Fourth Condition

To meet the fourth parameter for mediation, the relationship between social support and sexual risk taking behaviours must no longer be significant when the mediating effects of self-esteem or depression are entered in the model, for self-esteem and/or depression to fully mediate the influence of social support on sexual risk taking (pathways A and C below).

**Figure 7: Schematic of fourth condition for mediation**



The three previous steps in the mediation model do not support the testing of possible mediating role of self-esteem and depression in the relationship between social support and sexual risk taking in males and will not be explored further as mediators in this modelling activity. However, self-esteem and depression thus far meet the criteria for mediating the role of the need for social support in predicting having unplanned sex under the influence of both drugs and alcohol for females; thus mediation will be explored in the context of these two specific relationships.

Results from the fourth model are detailed in Table 10. When depression is entered into the model, the relationships between social support need and unplanned sex under the influence of drugs and unplanned sex under the influence of alcohol for



females are no longer significant. (Unplanned sex under the influence of drugs OR=1.09; 95%CI=0.96 – 1.24; unplanned sex under the influence of alcohol OR=1.06; 95%CI=0.97 – 1.16.) Having met the required criteria for mediation, we determine that depression does completely mediate the relationship between need for social support and having unplanned sex under the influence of drugs and alcohol in female respondents.

Need for social support remains a significant predictor of sex under the influence of alcohol and drugs for females when self-esteem is entered into the model, thus self-esteem is not a mediator according to the guidelines laid out in the mediation model. (Unplanned sex under the influence of drugs OR=1.15; 95%CI=1.02 – 1.28; unplanned sex under the influence of alcohol OR=1.09; 95%CI=1.005 – 1.182.)

**Table 10: Logistic regression of social support need and mediation variables on sexual risk taking variables for sexually active females.**

	Unplanned sex under the influence of drugs		Unplanned sex under the influence of alcohol	
	OR	95%CI	OR	95%CI
Social support need	1.15	1.02 – 1.31*	1.09	1.01 – 1.19*
+ depression	1.09	0.96 - 1.24	1.06	0.97 - 1.16
+ self-esteem	1.15	1.02 - 1.28*	1.09	1.01 - 1.18 *

\* = statistically significant at p<0.05

#### **4.3.2.5 Mediation Model: Summary**

Table 11 provides a summary of the methodological exploration of depression and self-esteem as possible mediators on the pathway between the social support variables and sexual risk taking variables for males. In males, depression and self-esteem do not meet the criteria for mediating the pathway between social support variables and sexual risk taking variables.

Table 12 provides a summary of the exploration of depression and self-esteem as possible mediators on the pathway between the social support variables and sexual risk taking variables for females. In females, self-esteem does not meet the criteria for mediating the pathway between social support variables and sexual risk taking variables. Depression meets the mediation criteria for two specific relationships in females: the need for social support and unplanned sex under the influence of drugs and the need for social support and unplanned sex under the influence of alcohol.

These results have tested for mediation in the context of the bivariate relationship between social support and sexual risk. The mediating effects of depression and self-esteem will be revisited in the full multivariate models in part three of the analysis.

**Table 11: Summary table for depression and self-esteem to meet mediator status (males)**

<b>Condition V</b>	<b>ariables</b>	<b>OR (95%CI)</b>	<b>Meets condition</b>
1. independent variable(s) significantly associated with dependent variable(s)	Social support need and use of a condom	1.13 (1.05 – 1.22)*	Yes
	Social support need and anal sex without a condom	1.25 (1.003 – 1.55)*	Yes
2. independent variable(s) significantly associated with possible mediators	Social support need and self-esteem	1.09 (1.03 – 1.15)*	Yes
	Social support need and depression	1.25 (1.14 – 1.38)*	Yes
3. possible mediator variable(s) must significantly predict dependent variable(s)	Self-esteem and use of condom	1.01 (0.98-1.03)	No
	Self-esteem and anal sex without a condom	1.03 (0.96-1.11)	No
	Depression and use of condom	1.16 (0.73-1.86)	No
	Depression and anal sex without a condom	2.79 (0.67-11.71)	No
4. relationship between independent variable(s) and the dependent variable(s) must no longer be significant when possible mediator variable(s) entered in model	Models do not meet condition 3. Models not further explored.		

\* = statistically significant

**Table 12: Summary table for depression and self-esteem to meet mediator status (females)**

Condition V	variables	OR (95%CI)	Meets condition
1. independent variable(s) significantly associated with dependent variable(s)	Social support need and unplanned sex under influence of drugs	1.09 (1.006 – 1.19)*	Yes
	Social support need and unplanned sex under the influence of alcohol	1.15 (1.02 – 1.31)*	Yes
2. independent variable(s) significantly associated with possible mediators	Social support need and self-esteem	1.63 (1.07 – 1.21)*	Yes
	Social support need and depression	1.50 (1.35 – 1.66)*	Yes
3. possible mediator variable(s) must significantly predict dependent variable(s)	Self-esteem and unplanned sex under the influence of drugs.	0.97 (0.94-0.99)*	Yes
	Depression and unplanned sex under the influence of drugs	2.33 (1.34 – 4.04)*	Yes
	Depression and unplanned sex under the influence of alcohol	1.77 (1.19 – 2.04)*	Yes
	Self-esteem and unplanned sex under the influence of alcohol.	0.98 (0.96-1.00)	No (no further modelling)
4. relationship between independent variable(s) and the dependent variable(s) must no longer be significant when possible mediator variable(s) entered in model	Social support need and unplanned sex under the influence of drugs (self-esteem in model)	1.15 (1.02 – 1.28)*	No (no further modelling)
	Social support need and unplanned sex under the influence of drugs (depression in model)	1.09 (0.96 – 1.24)	Yes
	Social support need and unplanned sex under the influence of alcohol (depression in model)	1.06 (0.97 – 1.16)	Yes

\* = statistically significant

### **4.2.3 PART THREE: MULTIPLE LOGISTIC REGRESSION**

The next set of models involve a multiple logistic regression of social support on individual sexual risk taking behaviours, controlling for socio-economic status, family status, grade, and school. Additional models controlling for depression and self-esteem were also constructed.

Table 13 presents the results of a full multivariate model regressing sexual risk behaviours on social support for males, controlling for other covariates and compared to the bivariate results. In the full multivariate model, satisfaction with social support received was not associated with any of the sexual risk taking variables, while need for social support is significant under two conditions for males: the non use of condom at last intercourse (OR=1.14; 95%CI=1.05 – 1.22), and anal sex without a condom (OR=1.27; 95%CI=1.00 – 1.63).

When depression was included in the model, anal sex without a condom was no longer predicted by social support need in males (OR=1.30; 95%CI=0.97 – 1.72) however, need for social support was still significant in predicting non use of a condom at last intercourse in males (OR=1.13; 95%CI=1.05 – 1.22).

When self-esteem was entered into the model non use of condom at last intercourse remained significant (OR=1.14; 95%CI=1.05 – 1.23) while anal sex without a condom was no longer significantly associated with need for social support.

To summarize, for males, need for social support was significantly associated with use of condom at last intercourse when results were adjusted for socio-economic status, family status, grade, and school and either self-esteem or depression. However, the association of social support need with these outcomes disappeared when either

depression or self-esteem were entered into multivariate models, running counter to what was expected given the outcome of the exploration of the meditation effect of either self-esteem or depression on the relationship between social support and sexual risk taking variables for males.

**Table 13: Bivariate results and adjusted models (males)**

B	Bivariate		Full Model		Full model with depression		Full model with self-esteem	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
<b>Satisfaction with social support received</b>								
Use of condom at last intercourse	1.00	0.9 - 4-1.07	0.99	0.9 - 3-1.06	1.00	0.94-1.07	0.98	0.92-1.05
Early intercourse	0.96	0.90-1.02	0.97	0.90- 1.04	0.97	0.91-1.05	0.96	0.89-1.04
Multiple partners	0.97	0.9 - 1-1.03	0.96	0.9 - 0-1.03	0.97	0.90-1.04	0.96	0.90-1.03
Anal intercourse without a condom	1.07	0.8 - 9-1.28	1.12	0.9 - 1-1.39	1.20	0.93-1.55	1.11	0.89-1.39
Unplanned intercourse - drugs	0.95	0.8 - 8-1.03	0.95	0.8 - 8-1.03	0.98	0.90-1.07	0.98	0.90-1.07
Unplanned intercourse - alcohol	0.96	0.9 - 0-1.03	0.96	0.8 - 9-1.02	0.97	0.90-1.04	0.97	0.90-1.04
<b>Need for social support</b>								
Use of condom at last intercourse	1.13	1.05-1.22*	1.14	1.05-1.22*	1.13	1.05-1.22*	1.14	1.05-1.23*
Early intercourse	1.00	0.9 - 2-1.07	1.01	0.9 - 3-1.09	1.00	0.92-1.08	1.01	0.93-1.09
Multiple partners	0.96	0.9 - 0-1.04	0.97	0.9 - 0-1.04	0.96	0.89-1.04	0.97	0.90-1.04
Anal intercourse without a condom	1.25	1.0 - 03-1.55*	1.27	1.0 - 02-1.63*	1.30	0.97-1.72	1.27	0.99-1.62
Unplanned intercourse - drugs	1.04	0.9 - 4-1.14	1.03	0.9 - 4-1.14	1.01	0.91-1.11	1.03	0.94-1.14
Unplanned intercourse - alcohol	1.03	0.95-1.11	1.03	0.95-1.12	1.02	0.94-1.11	1.03	0.96-1.12

\* = statistically significant at  $p < 0.05$

Table 14 summarizes the full range of models regressing sexual risk behaviours on social support, for females. The results from the bivariate analysis, the full multivariate model controlling for other covariates, and the full multivariate model controlling for other covariates as well as self-esteem or depression are presented side by side. In the full multivariate model, sex under the influence of drugs (OR=1.14; 95%CI=1.003 – 1.302) and alcohol (OR=1.09; 95%CI=1.003 – 1.192) were significantly associated with the need for social support in the case of females.

When depression is entered into the multiple logistic regression model, results indicate, as per the prior mediation modeling, that depression mediates the effect of need for social support on some aspects of sexual risk taking for women. Need for social support was no longer significant in predicting either sex under the influence of drugs (OR=1.09; 95%CI=0.95 – 1.25) or sex under the influence of alcohol (OR=1.06; 95%CI=0.97 – 1.17) for females, when depression was entered into the model.

When self-esteem is entered into the multiple logistic regression model along with grade, school, family status, and the SES proxy (mother's education), the results are as predicted by the mediation model. For females, need for social support is significantly associated with unplanned intercourse under the influence of alcohol (OR=1.09; 95%CI=1.001 – 1.185) and unplanned intercourse under the influence of drugs (OR=1.13; 95%CI=1.01 – 1.28) with the inclusion of self-esteem in the adjusted model.

To summarize, for females, need for social support is significantly associated with unplanned sex under the influence of alcohol and unplanned sex under the influence of drugs when results are adjusted for socio-economic status, family status,



grade, and school and self-esteem. The relationship is no longer significant when depression is entered into the model, as depression mediates the relationship between social support need and having unplanned sex under the influence of drugs/alcohol in this research. Entering self-esteem into the models did not have an impact on the associations of social support with the sexual risk taking outcomes. This is as expected given the prior exploration of the mediating effects of self-esteem and depression on the sexual risk taking variables.

**Table 14: Bivariate results and adjusted models (females)**

B	Bivariate		Full Model	Full model with depression		Full model with self-esteem						
	OR	95% CI		OR	95% CI	OR	95% CI					
<b>Social support satisfaction</b>												
Use of condom at last intercourse	0.98	0.92-1.03	0.9	7	0.91-1.03	0.9	8	0.92-1.04	0.9	9	0.93-1.05	
Early intercourse	0.98	0.92-1.05	0.9	8	0.91-1.05	1.0	0	0.92-1.08	0.9	9	0.92-1.06	
Multiple partners	0.95	0.89-1.01	0.9	4	0.89-1.01	0.9	4	0.88-1.01	0.9	5	0.89-1.02	
Anal intercourse without a condom	1.07	0.90-1.28	1.0	2	0.84-1.24	1.0	2	0.82-1.27	1.0	3	0.84-1.27	
Unplanned intercourse – drugs	0.92	0.84-1.01	0.9	4	0.85-1.03	0.9	8	0.88-1.09	0.9	6	0.87-1.06	
Unplanned intercourse – alcohol	0.96	0.90-1.02	0.9	6	0.90-1.02	0.9	9	0.92-1.06	0.9	8	0.91-1.05	
Older partner	1.03	0.96-1.10	1.0	1	0.94-1.09	1.0	3	0.95-1.12	1.0	1	0.94-1.10	
Effective contraception at last intercourse	0.93	0.85-1.01	0.9	2	0.85-1.01	0.9	2	0.84-1.01	0.9	4	0.86-1.03	
<b>Social support need</b>												
Use of condom at last intercourse	1.03	0.96-1.11	1.0	3	0.96-1.11	1.0	2	0.95-1.11	1.0	3	0.96-1.11	
Early intercourse	1.04	0.95-1.27	1.0	2	0.93-1.12	1.0	1	0.92-1.11	1.0	2	0.93-1.12	
Multiple partners	0.98	0.91-1.05	0.9	7	0.89-1.04	0.9	5	0.88-1.04	0.9	6	0.89-1.04	
Anal intercourse without a condom	1.08	0.86-1.36	1.1	1	0.86-1.44	1.1	3	0.86-1.48	1.1	1	0.86-1.44	
Unplanned intercourse – drugs	1.15	1.02-1.31	* 1.1	4	1.003-1.30	* 1.0	9	0.95-1.25	1.1	3	1.01-1.28 *	
Unplanned intercourse - alcohol	1.09	1.0	1-1.19 *	1.09	1.0	0.3 - 1.19 *	1.0	6	0.97-1.16	1.0	9	1.001-1.185 *
Older partner	0.96	0.88-1.05	0.9	6	0.88-1.05	0.9	4	0.85-1.03	0.9	6	0.88-1.05	
Effective contraception at last intercourse	1.11	0.99-1.24	1.1	1	0.99-1.24	1.1	1	0.98-1.26	1.1	0	0.99-1.23	

\* = statistically significant

#### **4.2.4 PART FOUR: SUMMED SEXUAL RISK SCALE**

A sexual risk taking scale for each gender was constructed by adding the sexual risk taking behaviours to form a single score. A Kuder-Richardson 20 test was conducted on the 6 variable scale for males and on the 8 variable scale for females. In both cases the Kuder-Richarson 20 test was found to be below the optimal range (0.70 to 0.90) to be considered as a valid scale (males = 0.47, females = 0.50).

As the Kuder-Richardson 20 test is affected by both the spread of scores and number of questions included, it is likely that the components to be summed did not reach sufficient complexity to meet the criteria for an optimal score. The summed sexual risk score was not explored further in this research.

## **CHAPTER FIVE: DISCUSSION**

The outcomes of these analyses provide information about the relationships between social support and sexual risk taking behaviours, while offering additional information about the possible mediating role of self-esteem and depression for both male and female adolescents. The hypotheses explored in this research were:

1. There is a direct relationship between measures of social support and sexual risk taking behaviours, and this will differ by gender.
2. Self-esteem and/or depression will mediate the relationship between social support and sexual risk taking behaviours.

A further methodological question concerned the utility of the summed sexual risk taking measure:

3. A summed scale of sexual risk taking behaviours is a useful measure of sexual risk.

### **5.1 FINDINGS AND POSSIBLE EXPLANATIONS**

The evidence emerging from this research indicates that aspects of social support may play a subtle, behaviour-specific role with regards to sexual risk taking behaviours in both male and female adolescents. Evidence is also found for the interplay of self-esteem and depression in the relationships between social support and sexual risk taking and this relationship differs by gender.

To summarize, for males and females, satisfaction with social support received was not associated with any sexual risk taking behaviours, while need for social support was found to be significant in specific circumstances for both males and females.

For males, higher expressed need for social support was positively associated with non-use of a condom at last intercourse and having anal sex without a condom in

models which did not include depression or self-esteem. When being at risk for depression was taken into account, need for social support was no longer associated with anal sex without a condom, indicating that being at risk for depression influences the relationship between social support and these two risk behaviours. This is counter to what was expected given the finding that depression did not mediate the relationship between social support and the sexual risk taking variables in the bivariate analysis. Given the small numbers of males who reported having had anal sex without a condom (n=32), this may be a spurious finding.

Non use of a condom at last intercourse remained significantly associated with higher expressed need for social support when depression or self-esteem was taken into account, indicating that neither psychosocial variable significantly influences the relationship between higher social support and these two risk behaviours in males.

Higher expressed need for social support was positively associated with having unplanned sex under the influence of alcohol and with having unplanned sex under the influence of drugs for females. However, being at risk for depression mediates the relationship between need for social support and having unplanned sex under the influence of drugs and/or alcohol and this follows what was logically expected after the bivariate analysis. Having higher self-esteem does not mediate the relationship, and the relationship between the need for social support and having unplanned sex under the influence of drugs and/or alcohol remains significant when higher self-esteem is accounted for in analysis.

### **5.1.1 Social Support**

Need for social support was significantly associated with several different sexual risk taking behaviours for both females and males, while the other aspect of social support measured in this study, satisfaction with social support received, was not significantly associated with sexual risk taking behaviours for either gender.

In this study, satisfaction with social support received captured what the individual feels is the social support available to him or her in their daily life, while perceived need for support is what the individual determines to be his or her need for the types of support that others can offer in their lives with an emphasis on what the individual might consider to be unmet need for social support. The two variables were not highly correlated in exploratory analysis. This research lends evidence to the validity of the modified ASSIS scale used to measure social support in this study and to the hypothesis that different aspects of social support are captured by the instrument.

Across the range of questions asked about satisfaction with or need for social support in this survey, it is possible that need may be more easily and accurately articulated than satisfaction as it is based on one's own internal assessment of support requirements.<sup>44,48,49,53,60,62</sup> Articulating satisfaction with available support requires the confidence and skill to assess and evaluate one's social network to determine if support in various areas is available. Also, as hypothesized from a review of the literature, if social support is more important as a buffer to youth experiencing difficult situations, the articulation of need may be top of mind and be reflected in reduced satisfaction with resources and social support that are generally available to an individual under less stressful circumstances.<sup>26,30,60,62</sup> Recent research offers that a different type of measure,

perceived social support, which can be defined as “the individual’s beliefs about the availability of varied types of support from network associates,” may be the critical measure to examine rather than evaluations of support adequacy or individual need for support.<sup>44</sup>

Researchers have noted that the measurement of social support variables is difficult and significant methodological and conceptual issues remain.<sup>5,53,55,163,164,165</sup> Despite the use of a well validated measurement tool in this research, it is possible that the general social support measures captured here are insufficiently specific to support analysis exploring associations with specific behaviours.<sup>44,53</sup> Research with adolescents has highlighted that family, professionals (such as teachers) and peers play different roles in providing different kinds of social support, with social support and ensuing external validation from peers gradually becoming more important to youth over the course of adolescence.<sup>10,47,60</sup> With a global, undirected measure of social support and the inability to identify support by the persons or groups from which it was received, it may be that certain aspects of the measure are “washed out” by competing or contradictory messages from the social support network.

### **5.1.2 Sexual Risk Taking**

In this research, sexual risk taking variables, while correlated sufficiently that a summed sexual risk scale was statistically unsound (see 5.1.4), were also differentiated in analysis, indicating that that some individuals measures likely captured discrete aspects of sexual risk taking. The use of individual sexual risk taking variables rather than the use of a single dichotomous “ever had intercourse” variable, allows the exploration of the diversity of sexual risk behaviours, and provides a more complex

picture of the complexities and multidimensionality of sexual risk behaviours in this population. As predicted from a review of the literature, different sexual risk taking behaviours were associated with males and females.<sup>9</sup>

#### **5.1.2.1 Males**

For males, non use of condoms at last intercourse and during anal sex were significantly associated with higher need for social support in unmediated models, although only non use of condoms (during vaginal intercourse) remained significant when depression or self-esteem was entered into the model. As noted above, there were very small numbers of youth reporting having had anal sex without a condom, thus this may be a spurious finding based on these small numbers. It is important to note that both variables address non-use of condoms for both vaginal and anal sex by males and likely capture a single health compromising behaviour.

Condom use in adolescents is often considered to be “erratic”<sup>85</sup> but more recent research has shown there may be several distinct factors that come into account when determining the use of condoms in a sexually active dyad. A recent study found that measuring the use of condoms as a partner specific activity may be more accurate than a global measure of “regular” or “usual” condom use.<sup>166</sup> A global condom use measure may also mask a small number of high risk individuals who have frequent, unprotected sex with a large number of partners.<sup>104</sup> The study found that the stability and consistency of the sexual partner and the use of hormone based birth control were both significant factors in the use of condoms.<sup>166</sup> Another American study of adolescent males found that non use of condoms was associated with being in a longer relationship, having a partner who used a method of contraception and with having a



casual first sexual partner.<sup>167</sup> We can hypothesize that social support, including the kind found in a longer term relationships, may influence condom use in male adolescents, with condom use less likely at both extremes of a relationship (in first time casual sex and in longer term relationships) although for very different reasons.

There has been relatively little research about condom use during anal sex among adolescents but the body of literature points to condom use during anal sex being tied to condom use during vaginal sex with the same partner.<sup>100</sup> This lends credence to the evidence found here that condom using behaviours, whether for vaginal sex or for anal sex, are linked activities.

#### **5.1.2.2 Females**

For females, unplanned sex under the influence of alcohol and unplanned sex under the influence of drugs were significantly associated with higher need for social support in the adjusted analysis, although the relationship is no longer significant when depression is entered into the model. Evidence from the literature points to a strong relationship between depression, lack of social support and alcohol or drug use in adolescent females and likely explains why depression is a mediator in these circumstances.

Unplanned sex under the influence of alcohol or drugs is a complex risky activity composed of two separate events: the decision to use alcohol or drugs and engaging in sexual activity. The risk that emerges is when the use of alcohol or drugs impairs participants from making the decisions they might otherwise make regarding choice of sexual partners, decision to have intercourse and the use of condoms. The degree of risk is difficult to assess and there is some evidence in the literature that

unplanned sex under the influence of alcohol or drugs may not significantly be associated with less condom use but results are inconsistent.<sup>78,87,93,94</sup> A review of alcohol use and sexual risk taking found that first time sexual intercourse events were most likely to fit the profile of a risky sexual activity (no condom use) but that this was not likely the case for longer term relationships.<sup>168</sup> There is evidence too that how specific individuals are using alcohol or drugs may increase their risk for sexually risky behaviour, and that different substance abuse trajectories are associated with different sexual behaviours. An American study found that binge drinking was associated with a greater number of sexual partners and that both marijuana use and binge drinking were associated with a greater number of partners and being less likely to use condoms.<sup>169</sup> Use of other drugs was not found to influence sexual risk taking and experimental cigarette smoking was positively associated with condom use.<sup>169</sup>

### **5.1.3 Mediator Variables**

An exploration of the possible mediating effects of self-esteem and depression on the bivariate relationship between social support and sexual risk taking behaviours found that depression met the criteria for mediation in the relationship between social support need and two specific risk taking behaviours in females: unplanned sex under the influence of alcohol and unplanned sex under the influence of drugs but did not mediate any other relationship explored for either males or females. Self-esteem was not found to be a mediator for either males or females. For females, this held true in the multivariate models. For males, in the full multivariate models, when either self-esteem or depression were included in the models, social support need was found to be no longer associated with anal sex without a condom. Given the very small numbers of

youth engaged in this behaviour, these results must be interpreted with caution and may indicate a artificial association.

Recall that to meet the criteria for mediation signifies that depression is thus understood to be on the causal pathway between need for social support and unplanned sex under the influence of drugs and/or alcohol in females; that is, need for social support influences depression which then influences the identified sexual risk taking behaviours.

Being at risk for depression is strongly linked to alcohol and drug use in adolescents. Social relationships are important part of determining adolescent mental health and the negotiation of romantic relationships may be an especially difficult stressor for adolescent females.<sup>96</sup> Evidence from the literature points to a positive relationship between depression and alcohol or drug use in adolescent females and this may help to understand why depression is a mediator in the relationship between need for social support and unplanned sex under the influence of drugs and/or alcohol. As reviewed in the literature, being depressed may cause one to express greater need for social support, or a (perceived) lack of social support may lead to the onset of depression.<sup>32,54</sup> Evidence of a strong association between depression in adolescents and the use of drugs and alcohol are detailed in numerous studies.<sup>170</sup> However, the directionality of this relationship is unclear. Use of alcohol or drugs may precede a depressive episode or may also be part of self medication when one is experiencing depression.

Depression is also linked to sexually risky behaviour in adolescents, above and beyond sex concurrent with the use of drugs and alcohol, but the use of alcohol and

drugs is not always clearly articulated in analyses.<sup>73,131,133,134,135</sup> Analysis of the National Longitudinal Study of Adolescent Health in the US found an overall association between depression and having multiple sexual partners.<sup>171</sup> However, analyses from the same study found that depressive symptoms in adolescent females were associated with substance use at last intercourse and with no other sexual risk taking variable.<sup>171</sup>

The literature provides strong evidence that depression is linked with both substance use and with sexually risky behaviour. In this research, the need for social support was found to operate through the pathway of depressive symptoms to influence the likelihood of having unplanned sex under the use of drugs or alcohol for females.

As noted in the literature review, low self-esteem may be associated with sexual risk taking in females<sup>172,173</sup> and with high self-esteem in adolescent boys.<sup>172</sup> However a large systematic review found little evidence for an association between self-esteem and sex risk behaviours in either male or female adolescents.<sup>174</sup> This is supported by evidence from this research.

More recent research has revealed challenges with both the measurement and conceptualization of self-esteem which may have impacted its use as a variable in this research. Using self assessment to measure self-esteem is challenging and new methods have been proposed to get at less biased aspects of self-esteem with limited success.<sup>175,176</sup> Theoretically, it is thought that the focus on boosting self-esteem seen in both school based programs and directed to parents of school age children has had uneven results in terms of improving overall health status.<sup>177,178</sup> However, the role of

self-esteem and related concepts remain important in understanding the complexities of adolescent health.

#### **5.1.4 Summed Sexual Risk Scale**

The construction of a summed sexual risk score did not meet the statistical requirements of a constructed scale for either males (6 items) or females (8 items). In interpreting the Kuder Richardson 20 statistical test, when strong correlations are seen between variables, that is that they are thought to be measuring similar aspects of a single factor, the construction of a summed scale may not meet the statistical rigor required of such a score. As the measure depends on the magnitude of the correlation and on the number of items in the scale, this may also be a factor in interpretation of the validity of the score.

Some of the variables used to construct the summed sexual risk score have obvious correlations between them. Unplanned sex after the use of alcohol and unplanned sex after the use of drugs are likely highly correlated given the strong relationship between using both drugs and alcohol. Non-use of condoms is captured in two measures: non-use of condoms at last intercourse and anal sex without a condom. For females, use of other effective forms of birth control is likely negatively correlated with non-use of a condom at last intercourse.

A summed sexual risk score may have been successful had discrete factors associated with sexual risk taking been identified from the variables captured and only those variables combined for a summed sexual risk score. Factor analysis may have identified a smaller number of less correlated variables to contribute to the successful construction of summed sexual risk taking scale. Another limitation may also be

present in the construction of a summed scale of sexual risk. In the proposed sum score, each behaviour was be weighed equally, when it may be possible that the sexual risk taking behaviours described differentially impact possible health status and should be weighted differently. It may also be that the Kuder Richardson 20 test itself should be more carefully interpreted and set in context as the interpretation may depend upon test length and homogeneity of the sample.<sup>179</sup>

A major 2011 US report on adolescent risk taking reported that correlations between various sexual behaviours was quite low, approximately .35 in several meta analyses or about the same as is seen with correlations between other risk behaviours such as smoking and using alcohol.<sup>79</sup> This means that each specific sexual risk taking behaviour may have different risk and protective factors and this thus worth exploring separately, rather than solely as a simple summed scale.

An alternative approach to a simple summed score is demonstrated in the construction of multi-variable profiles that define, through cluster analysis, low and high risk across a combination of sexual risk taking areas.<sup>180</sup> Researchers using this methodology highlight that this provides more meaningful interpretation to clustering groups of sexual risk taking behaviours and may better inform both future research and development of health programming.<sup>180</sup>

While not applicable in this research, the construction of a more sophisticated sexual risk scale in research may allow us to look at a broad range of activities and may be appropriate in future research, given the congruency and clustering of multiple sexual risk taking behaviours seen in adolescents.

## **5.2 STRENGTHS**

This research built on strong, enduring community partnerships where knowledge generated from research informs school community decision-making. It used previously validated measures with both content and face validity. The research protocol ensured that data was collected in a way to ensure confidentiality and facilitate truthfulness. It is a large sample with a high participation rate.

The use of a scale such as the ASSIS (social support measure), allows for repeated use with different populations and quantifies an area that is often indistinctly defined and measured in the literature. Exploring in a formally structured fashion the possible mediating role of depression and self-esteem in the relationship between social support and sexual risk taking behaviours, provided greater information than merely controlling for the variables in analysis.<sup>160</sup> The proposed construction of a summed sexual risk score was innovative and worth exploring despite the ultimate inapplicability in this research.

## **5.3 LIMITATIONS**

There are also some limitations to this research. The use of a cluster sampling method based on particular schools, rather than a stratified or randomized design, while simplifying the field work, somewhat reduces the efficiency of the study. While this research may provide information about other rural school areas in Nova Scotia, the generalizability may be limited for urban areas or other areas of Canada. It can also not be generalized to adolescents living in this same region who are not attending school as they may have differing patterns of social support and sexual risk taking behaviour. Heterosexuality was also somewhat implicit in the nature of the question “have you

ever had vaginal sex,” used to determine sexually active status, and thus this research is also not likely applicable to non-heterosexual youth.

The utility of the modified ASSIS scale may be affected by truncation in this particular research. Due to the modification, we do not know the extent of the social network or which individuals or social groups are available to provide support to the individual respondent and, according to much of the research about youth and social support, this may be a critical factor in our understanding of social support in this population.<sup>41,44,53,79</sup> An American report on risk taking in adolescents notes that sexual risk taking is unique in that it involves two people and thus close understanding of the behaviours and decision making of the dyads may be important.<sup>79</sup> However, the results from this research cast more light on the use of this scale in ascertaining general social support measures and generating further research questions or methodologies for measuring social support.

Baron and Kenny note that estimation of “a mediational model requires the two following assumptions: that there be no measurement error in the mediator and that the dependent variable not cause the mediator.”<sup>160</sup> It could be that in this research neither assumption holds true. It is possible that the measurement of both depression and self-esteem in this study are imperfect and that this produced associations that are not in fact true. It is equally possible that there may be a causal relationship between the sexual risk taking variables and depression and self-esteem. While much evidence from the body of literature is to the contrary, it is also possible that engaging in sexual risk taking may in fact lead to lower self-esteem and put adolescents at greater risk of depression.



As this research is cross-sectional in nature, causality is impossible to determine, however the literature reviewed has provided evidence for some informed directional hypothesizing in this research. The research is thus correlational but not causal.

This study also used self-report survey questionnaires for all measures. Confidentiality and anonymity as well as well-designed data gathering protocols facilitated honest reporting by respondents. Previous research does not provide information on possible biases on social support data self-report. The literature suggests that we can expect probable underreporting on sexual risk taking behaviours overall, with boys hypothesized as more likely to over report sexual risk taking than girls but it is unclear which gender provides the most accurate reports.<sup>181,182</sup>

#### **5.4 POLICY IMPLICATIONS**

The research provides evidence that lower levels of social support are correlated with some sexual risk taking behaviours in adolescents. Low self-esteem and being at risk for depression are also related to low levels of social support and to sexual risk taking. Enhancing the social support experienced by youth may reduce some sexual risk taking behaviours, build self-esteem, relieve depressive symptoms, and ultimately result in better overall health status.<sup>5,20,21,22,23,24,25,26,28,29,30,31,33</sup>

Interventions aiming to increase social support experienced by individuals in various socio-demographic groups have had varied success, underlining the complexities of the interactions and need for intimacy and security that facilitate a feeling of strong social support.<sup>183,184,185</sup> Barrera suggests that interventions to enhance social support can be divided into two categories with the first method having a focus

on enhancing or strengthening the existing social network and the second focused on adding or creating new support providers.<sup>186</sup> In a school based setting, both are possible models for intervention as strengthening the existing relationships among staff, students and teachers, and providing access to additional support such as peer educators, counsellors or school-based health professionals may both have positive results on social support experienced by youth. Research also holds that relationships that are bi-directional and intimate provide the greatest social support thus a need to focus to move beyond superficial relationships.<sup>44</sup> A Nova Scotia based on-line intervention to enhance social support among youth single mothers offers a model for using technological tools to create a long-term, multidimensional environment for novel social support systems and positive outcomes for participants.<sup>184</sup>

For school based interventions to improve social support, it is worthwhile to look at the types of social support thought to be most important for youth and look at activities that may be under the control of schools. For example, enhancing emotional support available at a school level may mean increasing access to counselling and other one on one resources, helping facilitate good communication with family members through parental involvement in student programs, or supporting teens in building strong, healthy friendship and romantic relationships.<sup>40</sup> An American school nursing journal notes that school nurses can and should be involved in developing appropriate programs to empower youth to take control of their own personal privacy and bodies and that is more effective than any punishment based approach.<sup>187</sup>

Ultimately the question of how best to support school aged youth in the development of healthy sexual exploration is complex. Results from this research

indicate some evidence for higher levels of social support being a positive force and thus the focus on the development of a healthy individual as opposed to a focus on risk factors shows a promising focus for applied public health action.<sup>19,118,188,189</sup>

Interventions should target multiple domains of risk as evidence shows that sexual risk taking behaviours are linked to other health risk taking and to common risk factors.

<sup>12,92,189,190</sup> For policy makers and sexual health educators, this has important implications for how best to allocate resources and where to expend time and energy. A move towards youth focused and youth involved programs such as Positive Youth Development<sup>191</sup> and Asset Development<sup>192</sup> have been adopted by school boards across North America and ultimately may be the best tool to build strong youth, who then explore their sexuality in safe and healthy ways.<sup>79,193</sup> These programs are youth-centric and focus on building strengths and resiliency and creating supportive environments for growth with a long term goal (rather than a direct focus) on reducing risk taking behaviours and negative outcomes. A comprehensive review from the United Kingdom strongly advocated a broad based approach to service delivery of health resources in schools rather than restricting it solely to sexual health services.<sup>189</sup>

In Nova Scotia, the recent development of a strategic plan for improving sexual health in the province, “Framework for Action: Youth Sexual Health in Nova Scotia,” is an important tool modeling this wholistic approach to sexual health.<sup>194</sup> The Framework combines a population based philosophy with a multi-pronged approach that is focused on improving the sexual health of adolescents.

The opening paragraph of the Nova Scotia Framework states:

*“Sexual health means much more than a state of physical well-being. It is a balance between emotional, mental, physical, spiritual, and societal dimensions of*

*sexuality and encompasses self-esteem, values, choices, and responsibility. Furthermore, sexual health encompasses respecting, protecting, and fulfilling the sexual rights of all people, which include the right to pursue a satisfying, safe, and pleasurable sexual life and being free of discrimination, coercion, and violence, as well as guilt and shame. Supports and resources that promote sexual health and informed decisions are needed for youth as they develop their sexuality, as well as across the lifespan. In addition, these supports and resources need to be responsive to and inclusive of the needs of diverse and marginalized populations of youth.”*<sup>194</sup>

The approach of the Nova Scotia Framework for Action, which clearly focuses on the building strong individuals in a healthy environment, certainly holds promise for youth developing positive health behaviours, sexual and otherwise.

## **5.5 FUTURE DIRECTIONS**

Since the time of the data collection for this work, the body of literature exploring the role of social support and social networks in the lives and decision making processes of adolescents has expanded exponentially, largely due to the growing role of technology in the day to day lives of adolescents. Social support now has additional on-line and mobile elements that are increasingly front and centre in the lives of school age youth.<sup>195</sup>

Recent media reports have illustrated the positive and negative roles that on-line social networks can play in the lives of adolescents. Interacting with peers on-line may increase social support and self-esteem for many teens, allowing them to build relationships with others, enhance their “off-line” relationships, and increasing their sense of feeling cared about by others.<sup>196,197</sup> The increase in on-line social networks and technological interconnectedness of youth communities has also led to negative health outcomes for adolescents.<sup>197,198</sup> Cyber-bullying via on-line media has been well documented and is recognized as a real problem for adolescents.<sup>196,199</sup>

The role of technology and changing dynamics in the way youth define and interact with their social networks opens up new opportunities for research and exploration in this area. Definitions of “sex” have become more fluid in youth communities and petting, kissing, oral or anal intercourse may be considered to be “having sex” by some groups of adolescents.<sup>200</sup> “Sexting,” a sexually explicit form of texting using mobile phone technology has become a frequent past time among teens.<sup>201,202</sup> The exchange of explicit language and pictures or video via text message is widespread, with studies in the UK reporting that 39% of teens are sending or posting sexually explicit messages.<sup>203</sup> A recent American study found similar results and notes that sexting is an important public health issue.<sup>204</sup> Data gathering tools about sexual health in teens have also moved on-line to the form of health diaries, which is thought to increase privacy and improve the quality of data gathered, especially for adolescents.<sup>205</sup> These new technologies and new uses of older technologies are also re-defining social networks and social support for youth. On-line intimate relationships exist in conjunction with, and in parallel to daily face to face interactions. Research focusing on social support and sexual risk taking in the context of this rapidly changing, extremely fluid environment is required.<sup>206 207</sup>

Technology also provides a novel method of intervening to enhance social support for youth. Social media are currently being used to share information and connect with youth to share positive sexual health messages.<sup>208</sup> Nurses, teachers, counsellors and other school based educators have access to a huge number of well researched sexual health websites tailored for, and marketed to, youth. Websites can include forums where isolated, shy or embarrassed youth can connect virtually with

unknown individuals in similar situations which may result in greater social support and empowerment. Future research on social support and youth will most certainly involve an aspect of examining the role and interplay of on-line social support.

## **5.5 CONCLUSIONS**

This study has identified that higher expressed need for social support is a factor for several sexual risk taking behaviours for males and females. The research also suggests that there are other psychosocial factors (self-esteem and depression) which may aid in explaining this relationship. However, social support experienced by adolescents is a complex construct and should be further explored through a variety of tools, methodologies and theoretical lenses. Like much research into the interplay of distal variables like social support and psychosocial variables like depression and self-esteem on health behaviours such as sexual risk taking, this evidence underscores the complexity of understanding the link between social constructs and health outcomes. As noted by those working in human ecology, greater understanding and acknowledgement of the scope and complexity of personal, community and systemic environments that surround the individual is required to both understand and ultimately have impact on behaviours such as sexual risk taking.<sup>19</sup> Sexual health programming that includes a focus on the social support available to adolescents, embedded in larger programs to enhance the overall wellness of adolescents may be ultimately more effective than more simplistic or direct messaging about sexual behaviours.

## **Appendix A: Instrumentation<sup>147</sup>**

**Demographics:** Age, gender, grade level, average mark during previous year, educational aspiration, mothers' and fathers' level of education and employment status and religiosity. The questions were from the sexual health survey developed for the Amherst Initiative for Health Adolescent Sexuality project.

**Sexual Activity:** Questions relating to sexual activity during their lifetime and over the past 12 months were taken from the sexual health survey developed for the Amherst Initiative for Healthy Adolescent Sexuality project. These questions were reviewed by a panel of experts and were tested with students at a school not participating in the study.

**Depression:** The student's mood level for the week previous to the survey was measured by the CES-Depression scale. The CES-Depression scale has been used in the adolescent population and previous reliability tests have indicated an alpha coefficient of 0.8 to 0.9.<sup>161</sup>

**Self-esteem:** Rosenberg Self-Esteem scale<sup>209</sup> measures the respondents' feelings of self worth. The scale is made up of 10 questions. The scale ranges from ten to a maximum of fifty with higher scores equating to higher measured self worth.

**Support Mechanisms:** The amount of social support perceived to be available to the respondent is measured by a modified version of the Arizona Social Support Indicator Scale.<sup>210</sup> The reliability coefficients for these two components of the schedule were reported as 0.69 for the support satisfaction and 0.80 for support need.<sup>210</sup>

## Appendix B: Social Support Measurement

### Part 8

Support Mechanisms. The following questions ask about the social support you have in your life. Social support refers to the resources provided (things like information, advice, some to talk to, etc.) by other persons in your life (e.g. parents, teachers, doctors, friends, coaches, etc). Please circle the appropriate answers around issues of social support.

8.1 During the last month, would you have liked:

1. a lot more opportunities to talk to people about your personal and private feelings
2. a few more opportunities
3. or was this about right?

8.2 During the past month, how much do you think you needed people to talk about things that were very personal and private?

1. not at all
2. a little bit
3. quite a bit

8.3 During the past month, would you have liked people to have loaned you or have given you things that you needed:

1. a lot more
2. a little more
3. or was it about right?

8.4 During the past month, how much do you think you needed people who could give or lend you things that you needed?

1. not at all
2. a little bit
3. quite a bit

8.5 During the past month, would you have liked:

1. a lot more advice
2. a little more advice
3. or was it about right?

8.6 During the past month, how much do you think you needed to get advice

1. not at all
2. a little bit
3. quite a bit



8.7 During the past month, would you have liked people to tell you that they liked you ideas or things that you did:

1. a lot more often
2. a little more
3. or was it about right?

8.8 During the past month, how much do you think you needed to have people let you know when they liked your ideas or things that you did?

1. not at all
2. a little bit
3. quite a bit

8.9 During the past month, would you have liked:

1. a lot more help with things you needed to do
2. a little more help
3. or was this about right?

8.10 During the past month, how much do you feel you need people who would pitch in to help you do things?

1. not at all
2. a little bit
3. quite a bit

8.11 During the past month, would you have liked:

1. a lot more opportunities to get together for fun and relaxation
2. a few more
3. or was it about right?

8.12 How much do you think you needed to get together with other people for fun and relaxation during the past month?

1. not at all
2. a little bit
3. quite a bit

## **Appendix C: Sexual Risk Taking Measurement**

The sexual risk behaviour variables that will be examined in the research and the corresponding questions from the survey are:

Early Intercourse (younger than 15)

### **Question 4.2**

I had vaginal sex for the first time when I was \_\_\_\_ years old.

Multiple partners (greater than one)

### **Question 4.4**

(a) In the past two (2) months, I have had vaginal sex with \_\_\_\_ person/people.

(b) In the past twelve (12) months, I have had vaginal sex with \_\_\_\_ person/people.

Intercourse with an older partner (3 years or more older)

### **Question 4.5**

The person with whom I most recently had vaginal sex was \_\_\_\_ years old.

Use of a condom at last intercourse (yes/no)

### **Question 4.6 (a)**

(a) Did you or your partner use a condom the last time you had vaginal sex?

Intercourse under the influence of alcohol (yes/no)

### **Question 4.8**

In the past twelve (12) months have you had vaginal sex when you didn't plan to, because you were under the influence of alcohol?

Intercourse under the influence of drugs (yes/no)

### **Question 4.9**

In the past twelve (12) months have you had vaginal sex when you did not plan to, because you were under the influence of a drug other than alcohol?

Anal intercourse without a condom (yes/no – reverse scored)

**Question 4.14**

Did you or your sexual partner use a condom the last time you had anal sex?

Only female respondents were asked to answer the questions related to effective contraception at last intercourse.

Effective contraception (effective versus none/withdrawal/other – reverse scored)

**Question 4.8(a)** Were you taking the birth control pill the last time you have vaginal sex?

**Question 4.8(b)** Were you using any other form of contraception (birth control) the last time you had vaginal sex? (Not including condoms or oral contraceptive pill.)

**Question 4.8(c)** If yes to 4.8b, what did you use:

- 1 Injection/Depo-Provera (“the needle”)
- 2 IUD
- 3 Diaphragm
- 4 Sponge
- 5 Foam/Cream/Jelly
- 6 Withdrawal
- 7 Other (please tell us what method)

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