

**ASSOCIATIONS OF SOCIAL CAPITAL AND RURALITY WITH ADOLESCENT
MENTAL HEALTH, SUBSTANCE USE, AND HELP-SEEKING IN ATLANTIC
CANADA**

by

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Dedications

This thesis is dedicated to Donna. Thank you for all of your insight into life in rural Nova Scotia.

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Abstract

Mental health disorders are common among adolescents, yet only a small proportion of students perceive a need for help, or receive help or use any related services. Social scientists hypothesize that social capital may decrease rates of unmet need for help by creating trusting relationships which enable the transfer of information about help and support individuals' decisions to get help.

We employed the 2012 Student Drug Use Survey in the Atlantic Provinces to investigate social capital's associations with mental health and help-seeking for Atlantic Canada adolescents. We found that greater social capital was consistently associated with lower odds of having a probable mental health disorder. However, greater social capital was generally associated with lower odds of perceived need and higher odds of unmet need. Our interpretation was that social capital may act as a protective factor which can mitigate the severity and duration of poor mental health episodes.

List of Abbreviations Used

Abbreviation	Definition
SDUSAP	Student Drug Use Survey in the Atlantic Provinces
CCHS/CCHS-MH	Canadian Community Health Survey/Canadian Community Health Survey – Mental Health
CES-D	Center for Epidemiologic Studies – Depression Scale
SCARED	Screen for Child Anxiety Related Disorders
CRAFFT	Car Relax Alone Forget Family Trouble Survey
CIDI	Composite International Diagnostic Interview
CMA	Census Metropolitan Area
CA	Census Agglomeration
MIZ	Metropolitan Influenced Zone
SSA	Shared Service Area
DHA	District Health Authority
SES	Socioeconomic Status
OR	Odds Ratio
CI	Confidence Interval

Glossary

Term	Definition
Desired Help	A student's belief that they require treatment or help for a problem with alcohol use, drug use, depression, and/or anxiety
Evaluated Need	When an adolescent has a probable depressive or anxiety disorder, or problematic drinking or drug use which indicates a need for some form of mental health help.
Received Help	When a student uses a service or receives help within the last 12 months for their alcohol use, drug use, depression, and/or anxiety
Perceived Need	When an adolescent has both desired help and evaluated need
Unmet Need	When an adolescent has an evaluated need for help and has not used a service or received help

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Chapter 1: Introduction

Adolescents frequently experience problematic substance use and depressive and anxiety disorders in the Atlantic Provinces (Newfoundland and Labrador, Prince Edward Island, Nova Scotia, and New Brunswick). According to the 2012 Student Drug Use Survey in the Atlantic Provinces (SDUSAP), nearly half of Grade 12 students binge drank in the previous year, a common example of problematic alcohol use (1). Six percent of teens used cannabis on a daily basis. Thirty one percent of Atlantic Canadian students had elevated symptoms of depression, and 18% had seriously considered suicide.

The current rates of problematic substance use and depressive and anxiety disorders are alarming because they are significantly higher for Atlantic Canada adolescents than for the rest of the country. According to the Cross-Canada student drug use report, the Atlantic Provinces demonstrated higher rates of substance use and problematic use across nearly all substances than the rest of Canada (2). At the same time, the Canadian Community Health Survey-Mental Health (CCHS-MH) reported that adolescents' experiences of an alcohol use, cannabis use, drug use, depressive, or anxiety disorder were higher for the Atlantic Provinces collectively than the rest of the country (3).

Yet even with these high rates of problematic symptoms and behaviours, the SDUSAP found that Atlantic youth often did not desire help related to depression, anxiety, or substance use. Only 2% of all students desired help with their alcohol use and 2% for their drug use (1). More frequently they desired help with depression and anxiety, but the latter two were at a lower rate than those who screened positive for probable depression and anxiety disorders (1). In general, fewer than half of those who desired help received any.

Perceiving need and receiving help for mental health and substance use disorders can be a challenge for young people. It may be difficult for young people to differentiate between negative emotional experiences and substance use from full-blown clinical disorders. Additionally, there is a significant amount of stigma which surrounds talking about mental health disorders and problematic substance use (4), which limits adolescents' knowledge about these topics. As a result, adolescents typically only perceive a need for help and receive help with the support of external enabling factors such as family, friends, and the greater community (5).

The Atlantic Provinces are often viewed as small town Canada with a strong and vibrant sense of community. This togetherness is a sign of high social capital (6), which has been demonstrated in the past to support health care use, including the use of mental health and substance use services (7). Strong community connections appear to allow for the transmission of information and the support necessary to access and continue treatment (6). At the same time, individuals in rural communities are often geographically isolated from help. Additionally, the smaller nature of rural communities, in which a large proportion of Atlantic Canadians live, may decrease privacy and increase the stigma around accessing help relative to urban communities, undermining the benefits of a cohesive community (4).

Although there have been a number of studies which have examined the relationship between social capital and access to mental health and substance use services (8-12), only a few have focused on social capital's impact on help-seeking in Canada (8,13,14). The results have been mixed on whether social capital might decrease unmet need for help. The only known study in an adolescent Canadian population did show that higher social capital was associated with decreased unmet need (14); however, two studies outside Canada found more mixed results, while using a wider variety of measures of social capital (12,15). Thus the literature concerning social capital's impact on receiving help and accessing mental health services in Canada, particularly for adolescents, remains sparse.

This project explores the relationships between social capital and adolescents' help-seeking behaviours for probable depressive and anxiety disorders and problematic substance use. It also investigates whether the level of rurality of an individual's community is an effect modifier for social capital's associations with perceived need and unmet need. In terms of novel areas of exploration, social capital's role in perceiving need, which is a key step in the help-seeking pathway, has, as far as we know, not been previously examined. Nor has there been any research into whether rurality may alter social capital's association with unmet need.

Objectives

1. To estimate the prevalence of evaluated need, perceived need, and unmet need for help and services with substance use and mental health among adolescents in the Atlantic Provinces;
2. To estimate the effects of social capital and rurality on the aforementioned outcomes after controlling for other factors, and;
3. To determine if rurality is an effect modifier for the relationships between social capital and perceived need, and social capital and unmet need, after controlling for other factors.

This thesis is structured into four sections. The first section provides a literature review to give the context to this project: the issue of mental health disorders and problematic substance use in Atlantic Canada, the process of seeking help for adolescents, and what is currently known about how social capital and rurality influence adolescents' help-seeking. This leads to the objectives of this project. The second section outlines the methods that were used to meet those objectives. This includes an overview of the data source, justification of measurements, variables, and statistical analysis. The third section outlines the results of our analysis, which is followed by a discussion and conclusion of the thesis.

Chapter 2: Literature Review

This section of the thesis presents an overview of the current literature on substance use and mental health in Atlantic Canada, the process by which adolescents identify and seek help for these issues, and the effects that social capital and rurality have on perceptions of need and help-seeking.

2.1 Substance Use and Mental Health in Atlantic Canada

2.1.1 Atlantic Canada Adolescent Substance Use

The rates of substance use for Canadian youth are not equal in all parts of the country. There is a general trend across Canada wherein more eastern provinces have higher rates of use for most legal and illegal substances, with the Atlantic Provinces consistently demonstrating some of the highest rates of substance use and their associated disorders in the entire country (2).

Of all drugs, adolescents in Canada most frequently use alcohol. According to the 2011 Canadian Centre on Substance Abuse's Cross-Canada report, the average provincial rate of adolescent lifetime alcohol use was 63.4% (2). The estimates for New Brunswick (67.9%), Nova Scotia (69.7%), and Newfoundland and Labrador (70.0%) all exceeded that average. The provincial rates of lifetime binge drinking (defined as five or more drinks on one occasion) were approximately a third of lifetime use, and mirrored lifetime use's eastwardly trend. The Canadian provincial average was 25.6%, and Nova Scotia (27.7%) and Newfoundland and Labrador (29.7%) demonstrated higher rates.

The second most commonly used substance, cannabis, has a similar eastwardly increasing trend. In the same Cross-Canada report, the national average of lifetime use by adolescents was 29.5% (2). Nova Scotia led the nation with 36.8% of students reporting lifetime use, which was a statistically significant elevation above all other provinces except for Newfoundland and Labrador (34.2%). New Brunswick (30.7%) shared the third highest prevalence with British Columbia and Ontario. By the time Atlantic teenagers were in grade 12, a majority of them had used marijuana, and the lifetime use rate was 7.7 percentage points higher than the non-Atlantic average (54.2% vs. 46.5%). Additionally, the Atlantic Provinces had higher rates of adolescents who were daily cannabis users than other provinces.

2. 1. 2 Relationship Between Adolescent Substance Use and Mental Health Disorders

The main focus of this project is to examine help-seeking for depressive, anxiety, and substance use services, so it is important to understand what role substance use can play in depressive and anxiety disorders. Adolescent alcohol use has profoundly negative consequences on lifetime mental health. Adolescent males who use alcohol are 17 times more likely to attempt suicide than those who do not drink, and females who drink are three times more likely to attempt suicide than those who do not drink (16). In terms of affecting future disorder status, one study using the US Monitoring the Future Cohort Study dataset demonstrated that drinking at an earlier age was associated with an increased risk of heavy drinking in adulthood, in part due to increased dependence and abuse, which elevated the likelihood of developing further morbidities (17). Frequency of consumption and heavy episodic drinking at age 18 were the largest factors in predicting drinking frequency and heavy drinking outcomes in adults. In a longitudinal study of American teens, established drinkers in grade 7 were over two times more likely to be dependent on alcohol at 23 than non-drinkers, and three times more likely to have multiple drug problems (18).

There has long been a suspicion about a link between cannabis use and increased risk of psychiatric disorders. Research has demonstrated that marijuana alters neural connections in the brain (19), and that regular marijuana users have impaired neural connectivity and decreased neural activity in select areas of the brain compared to non-users. According to a meta-analysis across age groups, depression was not associated with overall cannabis use when analyzing 15 studies (20), but when looking at the most frequent users (which are elevated for Atlantic Canada adolescents) there was a significant increase in depression compared to non-users (OR = 1.49) (20). A longitudinal study of Nova Scotian adolescents found a similar effect where cannabis use was associated with a 10% increase in the odds of developing a depressive disorder compared to non-users (21). In the same meta-analysis previously mentioned, anxiety disorders were not associated with cannabis use, but suicidal ideation was more frequent for cannabis users than for non-users (OR = 4.55) (20). Though the possibility of reverse causation was present, most studies excluded individuals with mental health disorders at baseline. It is not yet clear if cannabis has a differential effect in adolescents that puts them at a greater risk of

developing depressive and anxiety disorders than adults, but beginning at a younger age increases the exposure over a lifetime which enhances the risks involved with marijuana use (22).

2. 1. 3 Atlantic Canadian Adolescent Mental Health and Substance Use Disorders

Given the historically strong association between substance use and the Atlantic Provinces, it is predictable that disorders both directly and indirectly related to substance use would also be elevated. The CCHS-MH found that, across substance use disorders, the Atlantic Provinces had higher rates than the rest of Canada (3). In Canada, 21.3% of young adults (15 – 24 years old) had a substance use disorder: 16% for alcohol, 11% for cannabis, and 4.2% for other drugs. Twenty six percent of young Atlantic Canadian residents had a substance use disorder: 19.8% for alcohol, 12.5% for cannabis, and 5.4% for another drug. Only the overall substance use disorder rate and the alcohol rate were significantly higher in Atlantic Canada than non-Atlantic provinces (3), but the other point estimates suggest an overall trend of higher rates in Atlantic Canada.

The 2012 SDUSAP measured probable depressive and anxiety disorders and problematic substance use symptoms in an adolescent population, and found that 8.1% of Atlantic Canadian students had very elevated symptoms of depression at the time of the survey, and 23.4% had somewhat elevated symptoms (1). In comparison, the Ontario Student Drug Use and Health Survey found that 26% of students in similar grades had moderate or high levels of anxiety or depression (the two most common disorders in adolescents) (23). The Atlantic Provinces had a higher overall prevalence for depression by itself compared to anxiety and depression collectively in Ontario. Meanwhile the CCHS-MH found that among 15 - 24 year olds, the national prevalence of a major depressive episode in the last 12 months was 7.1% (3). Keeping in mind that the prevalence of depression is highest in the 20-29 year old range (24), the CCHS-MH estimate was likely upwardly biased compared to the SDUSAP's adolescent population. Even then, the CCHS's estimate was lower than the SDUSAP adolescent rate.

2. 1. 4 Consequences of Mental Health Disorders

The short-term consequences of adolescent mental health disorders are well documented. Anxiety and depressive disorders are associated with poor academic performance, self-medication with alcohol and drugs, and increased self-harm behaviours such as cutting or suicide attempts (25,26). Substance use disorders are associated with risky sexual behaviours, harms while under the influence, overdoses, and deterioration of social relationships (27). According to a meta-analysis of studies across age groups, for the drugs most commonly used by Atlantic Canadian adolescents (alcohol and cannabis), the risk of suicide was elevated 5.9 and 3.9 times higher for users than non-users, respectively (28). For the most common mental health disorders of Atlantic Canadian teenagers (mood and anxiety disorders), there was a 16.1 and 6.3 times increased risk of suicide for those living with those disorders than those without the disorders, respectively.

As adolescents age and continue to suffer from these disorders, chronic effects become more apparent. Adults with serious mental health disorders are more likely to have strokes and heart disease than those without serious disorders (29). This may be a result of psychological distress bringing on increased blood pressure and elevated stress hormone levels (30). Poorer nutrition and decreased physical activity for those with serious mental health disorders also decrease the strength of vascular tissue and increase arterial blockage relative to those without serious disorders. Additionally, smoking, which is a known risk factor for cardiovascular disease, is more common in people with mental health disorders than those without disorders (31).

Overall, mental health disorders are a large burden on the well-being of Canadians. People with mental health disorders die on average 8 years earlier than those without a disorder (32,33). In Ontario, mental illnesses and addictions cause nearly twice as great a reduction in health-adjusted life years as the reduction from all cancers and infectious diseases combined (34). In that province alone there are over 600,000 life years lost due to mental illness and addiction annually (34). The national life expectancy is around 80, which equates to an approximate loss of 7,500 life equivalents annually in Ontario alone. Scaling down to the Atlantic Provinces' population that translates to approximately 1,299 life equivalents lost per year.

2. 2 Met and Unmet Need

2. 2. 1 Recommended Services

Mental health professionals strive to increase the recognition among those living with mental health issues that treatment options are available for many disorders (35). As medical and societal knowledge has increased, there are now many pharmacological, cognitive, and behavioural treatment options available. The Atlantic Canada Children's Effective Service Strategies-Mental Health study identified cognitive behavioural therapy as the primary intervention for anxiety and depressive disorders, followed by medication as necessary (36,37). The Centre for Addiction and Mental Health's promoted clinical guidelines for adolescent anxiety and depressive disorders support these treatments as well (38-40). For substance use disorders, interventions are generally focused on group and individual motivational therapy, as well as sobriety monitoring (41,42). In severe cases of opiate and alcohol use, medication may be introduced. Family based motivational and cognitive therapies are also common because of the tendency for these disorders to run in families (42).

In Atlantic Canada, these services are offered in a variety of settings, from small individual family practices and community clinics, to community mental health centres and crisis phone lines, and up to larger tertiary care centres. The largest centre for mental health and substance use services in Atlantic Canada is the IWK Health Centre. Located in Halifax, it serves Nova Scotia, New Brunswick, and Prince Edward Island (43). The IWK offers acute inpatient care, adolescent intensive services, and a mobile crisis team. The IWK coordinates with clinics throughout the provinces, with more severe cases being referred to the IWK. New Brunswick's adolescent psychiatric and addiction unit is based in the Moncton General Hospital (44), it also offers a mobile crisis service and in-patient care, as well as partnering with smaller community clinics who provide more basic services. Newfoundland and Labrador's Eastern Health Region (covering over 50% of the total provincial population) operates the Janeway Family Centre which provides adolescent and family group therapy, while the Rowan Centre focuses on adolescent substance abuse services (45). Those services are offered to adolescents who receive referrals from clinicians across the Avalon Peninsula.

In addition to clinical forms of help, there are numerous informal forms of help which can be provided to adolescents. Adolescents are most likely to receive help from family members, friends, and supervising adults (i.e. teachers, coaches, principals) (5). For milder cases of depression, adolescents might be recommended to participate in non-directed group therapies or to undergo self-help with the supervision of school based counselor (40). Adolescents with substance use issues might also be recommended to undergo the supervision of a role-model who can be a guide towards other activities, or to mutual help groups such as Alcoholics Anonymous (41). It is these surrounding resources with which adolescents are most familiar with and which make up the majority of resources used to deal with adolescent mental health issues (5). They must be considered as well when examining help-seeking behaviours.

2. 2. 2 Unmet Need

To have unmet need, two conditions must exist: there must be a need for help, and the help available to reach the desired health outcome are not utilized or available (46). Easily defining need for help is difficult, especially for mental health and substance use disorders which are less easily identifiable than many physical disorders due to a lack of laboratory tests. Usually need in a mental health context is based on individuals' desired need for help (47). This is because mental health need in reality is not a discrete phenomenon where one does or does not have need based solely on the diagnosis of a disorder. Using desired need recognizes that not all of those with a diagnosable disorder will benefit from treatment, and that there are individuals who benefit from prophylactic treatment even if they do not meet the clinical definition of a disorder (47). Desired need is often employed in Canadian studies which explore unmet need by using the CCHS-MH's questions about the help that respondents *feel* they need for their emotions, mental health, or substance use (48-50).

Measuring need in adolescents is often less focused on their desires in part because adolescents experience a large discrepancy between what they observe as a problem and what they sense constitutes a need for help. A Dutch study found that over 10% of students felt that they had a mental health problem greater than most people their age, yet only a third of those students also felt that they needed help (51). In the SDUSAP, 4.1% of all

students reported having 4 or more alcohol related problems (such as driving while intoxicated or getting in trouble with the law), but only 2.1% of all students desired help with their drinking problems (1). A cut-off of two alcohol-related problems has previously been used in validated scales to identify probable substance use disorders (52).

The Medical Research Council has developed a narrow definition of a need for help in youth: a functional impairment due to a remediable or preventable cause (53). By not relying on a desired need in adolescents, and instead using objective assessments of impairment, fewer adolescents are classified as not having need simply because they do not recognize their symptoms. Other studies which focus on adolescents' unmet need for help with mental health and substance use disorders have relied on more objective means to evaluate for the presence of a disorder and to then define need (53-56). Kataoka's work on unmet need in the United States is one of the most widely cited papers on this topic, and it used the Mental Health Indicator score as a cut-off for evaluated need, which is a four question, three point Likert Scale about adolescents' behaviours in the previous six months (54).

Once a definition of need has been established, the criteria for meeting that need must be selected. Two of the most widely cited papers on adolescent unmet need simply rely on self-reporting the absence of any use of services or help for the need identified as a cut-off for unmet need (53,54). Conversely, self-reporting not having used *all* desired services or help could define unmet need. There are benefits and consequences to using more stringent or relaxed definitions for unmet need. Under the use of all services and help requirement, many people will report having unmet need because many will likely continue to desire additional services or help until they no longer experience morbidity related to their disorder (46). However this may not actually indicate more services or help are medically advisable. On the other hand, defining unmet need as not using any services and help excludes those who were undertreated when they received help (not being taken seriously by informal care-givers, not being properly referred according to guidelines, etc.). What is beneficial about using an "any-use-of-services-or-help" criterion is that it more closely measures an individual's willingness to begin the process of receiving help, as opposed to the structural issues which prevent ideal treatment once help has been initially accessed.

This variety in defining need and unmet need creates the possibility of multiple need outcomes. In this thesis, which examines help-seeking specifically, evaluated need occurs when a student is identified as likely having a disorder. For the purposes of this thesis, a designation of probable depressive or anxiety disorder or problematic substance use status are synonymous with evaluated need. Among those with an evaluated need, if a student desires help they are considered to have perceived need. If a student has an evaluated need and has not received any help related to that evaluated need, they have an unmet need.

2. 2. 3 Adolescent Unmet Need in Atlantic Canada

The current approximation is that 1 in 5 Canadians suffer from mental health or substance use disorders each year (57). Over a third of Canadians who desire help for mental health report receiving none (47). Adolescents and young adults (15 - 24 years old) are the least likely of all age groups to not use any resources for mental health and substance use disorders even though they suffer from them more frequently than all other age groups (58). An Ontario study by Nelson found that young adults had over 1.6 times the odds for desired need for help being unmet related to mental illness, mental health, and substance use help compared to the overall population (49). The reason for this increase is not known, but there is a systematic problem across the provinces where adolescent services are not neatly assigned to a specific department, which results in a chronic undersupply of resources (58). Some label adolescent mental health services as the “orphan’s orphan” of the health care system (58).

The Atlantic Provinces are not exempt when it comes to a problem with low use of mental health and substance use services and help. The SDUSAP found that 1.8% of all students had a desired need for help related to alcohol use, and 2.3% had a desired need for help with their illicit drug use (1). Only about half of those students received any help: 0.7% for alcohol use and 1.2% for drug use (1). Desired help was more common for mental disorders with 20.5% wanting help with depression and 17% for anxiety. Again, less than half received help: 7.0% received help for depression and 6% for anxiety (1).

2.3 Factors Affecting Accessing Help

When an individual tries to access help with their health, they act as the result of several upstream factors which push them to perceive a need for help (59). Factors include predisposing characteristics such as demographics, social structure, and health beliefs as well as enabling resources such as family, friends, and the community (59). This perceived sense of need occurs between two separate events of having an evaluated need for help and receiving help. This is the theory of the Andersen model, which was one of the first ways that help-seeking was conceptualized as a process (Figure 1).

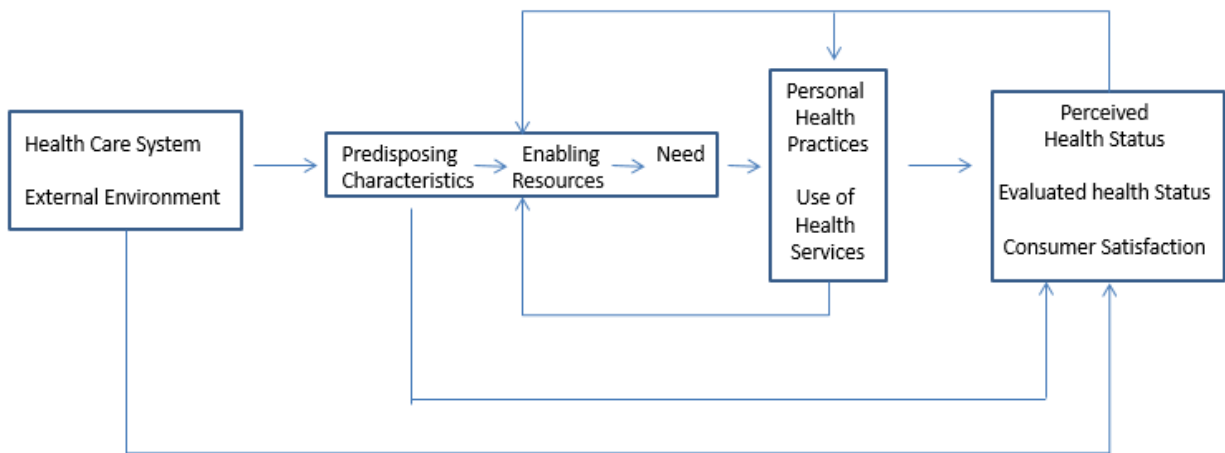


Figure 1: The fourth Andersen Model for help-seeking behaviours

It was not until Srebnik et al. (1996) put forth a new model that child and adolescent mental health help-seeking was conceptualized (5). Srebnik's model is an improvement because it includes the important step of deciding to seek help, which follows problem recognition and perceiving need. Previous models relied too heavily on rational decision making to seek help, which is especially difficult for children (60). The Srebnik three stage model of problem recognition, deciding to seek help, and receiving help proposes that the level of clinical need, predisposing factors, and barriers/facilitators to access have an effect on each stage of the pathway (Figure 2).

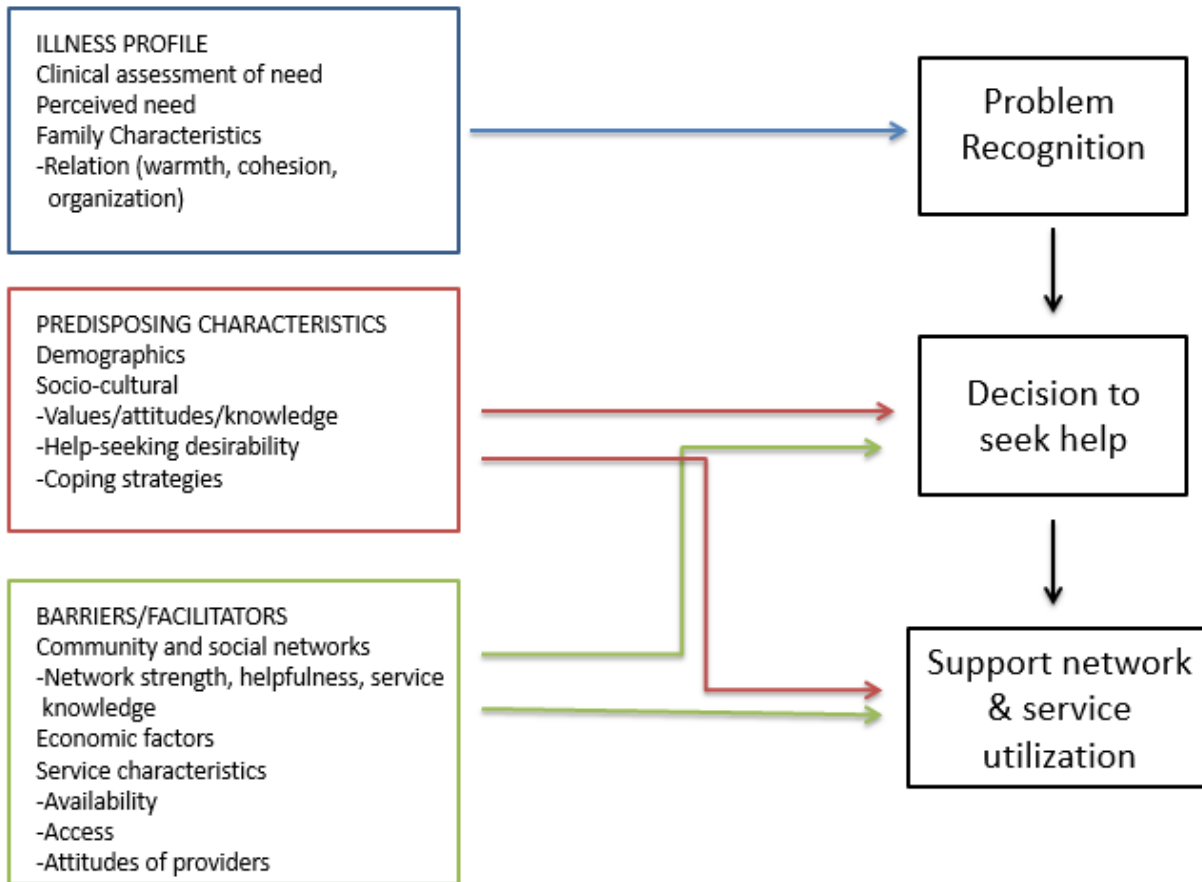


Figure 2: The Srebnik Model for adolescent help-seeking behaviours

The majority of studies about adolescent help-seeking only compare those that receive help and those that do not, but this indicates little about the earlier stages of help-seeking (recognizing a problem, perceiving need, and deciding to get help). The effect of different factors on reaching each of these stages has been studied in Atlantic Canada. Sears examined the impact of various factors across the entire process of accessing help for adolescents in Nova Scotia (61). She found that those with more negative emotional indicators (lower self-esteem and more depressive symptoms) were more likely to recognize that they had serious problems than those with fewer negative indicators, but anxiety symptoms had no effect (61). The behavioural measures of increased substance use, school misconduct, and antisocial behaviour were all associated with an increased likelihood of identifying a problem. Increases to all emotional and behavioural measures were associated with an increased likelihood of perceiving a need for help amongst those

who thought they had a problem. For moving from perceiving a need to acting on that need, only lower levels of anxiety were directly associated with increased access to help (61). The implication of these findings is that, in Atlantic Canada, one should not assume that the effect of a factor is the same across the different stages of help-seeking.

2.3.1 Common Factors Affecting Access to Mental Health Care

Research into factors related to adolescents' access to mental health help has identified variables which would be expected to apply across a variety of populations. Older adolescents are more likely to seek help than younger adolescents (5,60,62). This could be a result of greater self-awareness and self-reflection enabling the identification of poor mental health indicators. Additionally, older adolescents have greater autonomy to go seek help from a variety of sources than younger adolescents. Younger adolescents who are newly discovering their autonomy may view reaching out for help as a threat to their autonomy (62). Girls more frequently desire help and receive help than boys (5,60,62). This may be a result of cultural expectations for girls to be more willing to seek help, as well as parents and others being more concerned about getting girls help (5,60,62). Differences in access also exist across different ethnic groups (5,60,62). The hypothesis is that different cultures consistently demonstrate alternative beliefs about the use of mental health services and help (62). Minority ethnic groups also tend to have more difficult pathways to help than majority ethnic groups as they are isolated from the larger socio-cultural values and beliefs on help-seeking. Lastly, economic well-being is a commonly demonstrated variable for differences in access to care (5,60,62). Income is associated with differences in the use of funded services, even in Canada's publically funded health care system. (63). Having greater income also allows for easier use of non-funded help by reducing the challenges of accessing funded care (taking time away from work/home, paying for travel, paying for prescriptions) (4).

2.3.2 Social Capital as a Factor in Access to Mental Health Care

Social scientists refer to social capital as a measure of interpersonal trust, reciprocity, and mutual aid which acts as a resource for individuals and facilitates collective action (6). While there is debate about whether social capital is a community level

experience or something individuals internalize, it is clear that the presence of high social capital reflects strong bonds between members of a community which help to structure social interactions, to guide norms and sanction against deviant behaviour, and to allow for the transmission of information (6). Kawachi and Berkman characterized groups with high social capital as being socially cohesive and having a high level of connectedness (6).

Three contextual effects have been conceptualized by social scientists to explain the processes through which social capital could affect an individual's health: influencing health related behaviours, influencing access to services and amenities, and affecting psychosocial processes (6). Social capital promotes the rapid diffusion of health information and health norms while exerting social control over deviant behaviour to ensure that members of the community continue healthy behaviours. Socially cohesive communities create appropriate organizations to ensure access to services in response to changes in the level of services demanded in the community and to guarantee service availability. Social communities also provide affective support which can influence health, where trustworthy members offer assistance to one another as part of a larger communal responsibility. Collectively these features work together to help ensure that the health care demands of community members are met (6). By increasing knowledge about services, ensuring services are nearby and appropriate, and supporting others in their quest for help, communities high in social capital might be able to increase the rates of access.

Three different categories of social capital have been described: bonding, bridging, and linking social capital (7). Bonding capital is generally conceptualized as the social ties and resources found within informal connections. Within a community, generalized social trust and norms of reciprocity are often the measure of bonding capital. Bridging social capital refers to connections between communities or groups, and linking social capital is formal relationships between individuals and institutions. Bonding social capital is most relevant for this project because it matches most closely with the measures contained within the SDUSAP.

Social capital as a factor in help-seeking is compatible with both the Andersen and Srebnik Models of help-seeking. Andersen stated that social features would fit well into enabling factors that affect perceived needs and ultimately getting help (59). Srebnik's Model suggests that social relationships affect receiving help and the use of services (5).

The emphasis in both models on the role of relationships encourages investigating how social relationships may impact perceiving need and meeting need for adolescents.

Research into social capital's relationship to health care access is increasing. Drukker et al. conducted one of the first studies to investigate this relationship and found that Dutch citizens living in neighborhoods with greater informal social capital, specifically social control and cohesion, were more likely to utilize mental health services than those living in neighbourhoods with low control and cohesion(8). The authors measured social capital with informal social control measures (willingness to respond in neighbourhood-threatening situations), and cohesion and trust measures (neighbours' willingness to help the respondent). The authors hypothesized that high levels of informal control may result in residents striving for the resolution of psychiatric disorders, leading to higher levels of service consumption. Since that study, others have demonstrated that increased feelings of trust and reciprocity have been associated with better access to physicians, a more regular source of health care, and fewer barriers to care (64-66). Interestingly, a sister study to Drukker's which examined social capital and adolescents' mental health service use in the same city did not find strong associations (15). Social control, social cohesion, and trust did not directly affect the rates of service use, though higher social capital increased adolescents' service use in low SES neighbourhoods (15).

Within a Canadian context the implications of social capital on help-seeking have not been clearly established. One Montreal based study by Fleury found that none of the community factors measured, including sense of community and community participation, were associated with higher rates of service use for adults (9). Higher neighbourhood levels of home ownership were associated with more utilization, which the authors thought might reflect residential stability and stronger ties to the community. However, the causal pathway might be quite different considering that sense of community was not a significant factor. Another study by the same authors found that higher measures of several neighbourhood relationships were strongly associated with higher levels of professional service utilization for adults (13). The second study suggested that better neighbourhood relationships allowed for better recognition of symptoms and more social coercion to encourage help-seeking (13).

Ngamini conducted one of the few studies related to social capital and adolescents' access to mental health services, and the only one conducted in Canada (14). Looking at 433 adolescents with frequent mental disorders (phobias, depression, substance abuse, panic disorders) the authors hoped to disentangle the individual and community level effects on meeting need. Here too higher residential stability was associated with higher rates of use (OR = 1.24). Like Fleury's study, they used population mobility as a proxy for bonding social capital. However, as a proxy, this measure may be poorly correlated with social capital as it does not necessarily describe the relationships between people in the community, or assess the level of trust in that community. It could plausibly reflect other factors such as economics of the community, which perhaps prevent outward migration.

Social capital has only more recently been looked at for increasing rates of substance use treatment. Winstanley's paper offers the seminal look into social capital's relationship to access for alcohol and drug treatment for adolescents (12). Without previous literature to offer a hypothesis, they predicted that social capital would be positively related to accessing care. The authors examined neighborhood disorganization as their social capital exposure, the inability of a community to realize the common values of its residents and achieve social control (12). This measure, which included notions of safety, community cooperation, and sense of community, closely reflected a measure of bonding social capital. Incredibly, they found that higher neighbourhood disorganization (lower bonding social capital) was associated with higher rates of accessing alcohol and drug treatment even after controlling for levels of use and dependence. Medium disorganization was associated with 35% higher odds of accessing help than low disorganization, and high disorganization was associated with 48% higher odds of accessing help than low disorganization. Multiple hypotheses were offered for this unexpected outcome including the thinking that social capital may not be a pathway for health promotion in adolescents, stigma of substance use may undermine the health promotion effects of civic participation, and lastly highly pro-social youth may be less in need of help than youth with low pro-social characteristics (12). The authors were surprised that their results showed no benefit from more social capital, let alone that it showed a disadvantage, and called for more research into this area.

These findings were not completely without precedent as it has been theorized that social capital could work against access to help in some instances (67). The level of knowledge in a community about mental health and substance use, as well as what constitutes need, would likely affect the perceptions of those considering help (67). Social networks could decrease the use of certain treatments if the beliefs of the network do not support the use of those services or forms of help. Pescosolido found that, in poor Puerto Rican communities, larger social groups with greater levels of support were actually a barrier to accessing formal mental health support compared to smaller groups (68). Their study focused only on poor and rural individuals who are less likely to have positive opinions about mental health services. Their conclusions emphasized studying the context-specific effects of social capital within communities.

Ultimately social capital's impact on adolescents' access to mental health care has not been fully determined. Overall researchers studying this area have not been able to decide what measures are most appropriate for conceptualizing social capital, though the trend seems increasingly to be moving towards feelings of trust and reciprocity. This has lessened the ability of researchers to compare results across communities.

2. 3. 3 Rurality as a Factor in Access to Mental Health Care

Rurality is a classic obstacle to obtaining assistance with health issues. The problems that go along with living in remote areas are geographical separation from help, financial inability to access help, and cultural barriers to care (4). A recent study of travel distances for health care found that while 86% of Canadians lived less than 5 kilometers from a family physician or general practitioner, fewer than 70% of residents in Nova Scotia and New Brunswick were under 5 km away (69). These percentages decrease as services become more specialized. In small communities with low metropolitan influence the average distance to a psychiatrist is over 90 kilometers (70). The distance is likely farther for reaching sub-specialized child/adolescent psychiatrists. As a simple economic fact, it is difficult for health care providers to financially justify establishing a practice away from high concentrations of people when they are paid on a fee-for-service basis. As such, most rural communities are unable to support specialized personnel (4).

In theory a universal public health care system is blind to income, but events indirectly associated with treatment are often not covered under provincial health insurance plans. In rural communities the cost of travelling to help can be higher than urban communities (gas, shelter, food, daycare, etc.) in addition to the opportunity cost of not working while taking time off to seek care. People in rural communities generally have lower income than urban residents; the median income in small towns is \$10,000 less than in urban centres (71). For those from rural communities, the forfeiture of wages to take the necessary time off and the increase in costs often results in more hardship when accessing help compared to those from urban communities. Ultimately, the CCHS-MH data demonstrated that there was a difference in the rate of unmet need for desired help in the Atlantic Provinces' rural areas (50). Rural Atlantic Canadians had 0.43 times lower odds of receiving specialty mental health care and 1.27 times greater odds to report having received no care for mental health than urban Atlantic Canadians. There was no difference in primary care access.

2. 4 Stigma in Rural Communities

Accessing any form of health care may involve a certain level of stigma and embarrassment, evidenced by the ubiquity of patient privacy laws. However this experience is particularly strong for mental health and substance use issues. A recent qualitative systematic review found that the most common barrier to young people seeking mental health help was stigma, both from the public and from self-stigmatization (72). The most frequent stigma concerns discussed in the papers were related to what others, including the sources of help themselves, might think of the person seeking help. The high prevalence of this concern has been demonstrated in Canada via the CCHS-MH which measures various reasons why people have unmet need (49). The reasons are broadly categorized into accessibility (cost, transportation, competing responsibilities), acceptability (attitudes towards illness and the health care system), and availability. Respondents identified acceptability as the most common barrier (80.7%), followed by availability (18.0%) and accessibility (16.9%). Within acceptability, being “afraid to ask [for] help” was more commonly reported (15.1%) than any availability or accessibility issue. The most common acceptability issue was “preferring to manage oneself” (38.7%). It

may be that some of these respondents preferred self-management because of a desire to avoid the stigma of seeking help, or a disbelief in the benefits of help due to social stigmatization. Younger age groups were more likely to report acceptability as the reason for desired needs being unmet than older age groups (49).

2. 4. 1 Interplay of Rurality and Stigma

Stigma is a larger problem in accessing care in rural populations (4). In rural communities where word of mouth allows for a higher proportion of the community to know intimate details about other members than urban communities, there is an additional hesitancy to seek help in those experiencing morbidities. An American study found that compared to urban centers, rural physicians believed their patients were more likely to avoid care than urban patients because of embarrassment, and were also less likely to talk about stigmatizing illnesses (73).

As a result, living in close-knit communities can end up being simultaneously being an advantage and a disadvantage. In a study on barriers and supports for accessing care for adolescent emotional problems in rural communities, caregivers and health care providers identified close-knit communities as a benefit and a hindrance (74). Even though some reported appreciating the emotional support that tight-knit communities provided, others reported pressures that were due to that closeness. In a similar study on families' difficulties in accessing adolescent care in rural communities, some reported it being safer to make visits at night to avoid recognition (4). Social visibility, the social tracking of movements and behaviours, as well as the efficiency of rural gossip networks have also been described as barriers for adolescents in rural Australia (75). This may explain why Nelson found that social capital measures which might be more common in rural communities, such as increased social interactions, were positively associated with desired needs being unmet, even though increases in other social capital measures that are less likely to be affected by rurality, such as affection and emotional support, were related to decreased unmet need (49).

Confidentiality around mental health has been recognized as especially critical in rural Canada. The dual formal and informal relationship that most people hold in rural communities weakens individuals' confidence in the ability of health care workers to

respect privacy policies (76). As a consequence, rural Canadians are more likely to engage health care providers outside of their local community specifically because of privacy and confidentiality concerns than urban Canadians. A common suggestion has been to combine these services into more general medical settings to prevent others' ability to deduce what services are being accessed (76). This in turn increases patients' comfort levels and encourages the use of these services.

2. 5 Social and Geographic Characteristics of Atlantic Canada

To address the issues of unmet need in the Atlantic Provinces, it will be important to identify the features of this region which are associated with unmet need, and what parts of the help-seeking process they affect. Atlantic Canada not only has a higher prevalence for adolescent substance use and mental health disorders than the rest of the country, but it also has social and geographical characteristics that set it apart from the rest Canada which have just been demonstrated to affect access to health care.

2. 5. 1 Social Capital

Atlantic Canadians have a national reputation for being a close-knit segment of the population with strong social ties. The average provincial rate of a strong or somewhat strong sense of belonging among the Atlantic Provinces is 74%, compared to 66% of all Canadians (77). Atlantic youth (12 - 19 years old) feel slightly more connected than the rest; their average provincial rate of strong or somewhat strong connection is 83.0% compared to 76.5% of Canadian adolescents. The more rural Eastern regions of Canada (those defined by above average Aboriginal populations, low employment rates, and very low immigrant populations) have an even higher sense of community (81.4%) (77).

2. 5. 2 Rurality

Canada's expansive environment is one of the nation's defining features. It is the second largest country in terms of area, measuring 9.98 million square kilometers with just over 35 million people (78). This makes it the 9th least densely populated sovereign nation with 3.62 people per square kilometer. Within Canada, spread out regions define certain provinces more strongly than others. Atlantic Canada is one of the most rural regions

within the developed world (79). Statistics Canada, which defines rurality as populated towns or places with less than 1,000 people, estimates that 19% of Canadians live in rural communities (80). In the Atlantic Provinces the average is 46%.

Within the Atlantic Provinces, those who do not live in rural communities still tend to reside in smaller communities. Nova Scotia has one large metropolitan community (Halifax) and one medium sized population centre (Sydney) (81). The remaining population lives in small urban centres, those less than 30,000 people, or in rural communities (64.2% of total population) (82). Approximately one third of New Brunswickers are located in Moncton, Saint John, or Fredericton (81), with the remainder in small urban centres or rural communities (64.2%) (82). Sixty eight percent of Newfoundland and Labrador's population lives in small or rural communities (82).

2. 6 Governmental Priorities and Efforts on Rural and Stigma Barriers

The ability to access mental health care and its relationship to stigma and rurality has become a field of concern for multiple governments and agencies. The Mental Health Commission of Canada's strategy report, *Changing Directions Changing Lives*, offers a series of priority areas for improving the mental health status of Canadians. The first priority is to focus on understanding and reducing the stigma that surrounds mental health disorders (83). The next priority is to increase the promotion of mental health of infants, children, and youth, in part by improving their social environments. This report coincides with a CIHR Transforming Research in Adolescent Mental Health initiative to create a pan-Canadian network to improve the identification of youth with mental illnesses, and increase the timeliness and quality of their care (84).

The governments of the Atlantic Provinces are working on challenges that rural communities face in accessing mental illness and substance use services. Nova Scotia's *Together We Can* report pointed out that stigma is one of the factors that leads to rural areas having difficulties in getting adolescents into treatment (85). At the same time, the *Come Together* Report identified reviewing treatment approaches for specific communities (rural and urban) as one of the province's gaps in knowledge (57). The Report suggests that one of the areas of highest return on investment is the targeting of health promotion in children and adolescents, which can be done with the promotion of anti-stigma

environments. The Canadian Mental Health Association - Newfoundland and Labrador has identified understanding about how age causes systematic stigmatizing attitudes to mental health care as an area of needed research (86). The government of New Brunswick, as of January 2015, has begun participation in an initiative to emphasize children's right to equal access in part by developing safe spaces for youth with mental health issues (87).

The governments of the Atlantic Provinces have been creative in their use of technology to improve access of specialized services. New Brunswick's Mental Health Plan 2011-2018 calls specifically for increasing the use of telehealth services to increase access to specialized services in rural communities (88). Use of telehealth services in pediatric mental health care in Nova Scotia has already increased the sense of privacy and alleviated feelings of stigma and marginalization for adolescents (89). Newfoundland and Labrador is in the process of rolling out a mental health mobile application aimed at young people in remote locations (90). A mobile application offers the additional benefit of increased privacy. Adolescents could receive information in the privacy of their bedroom or home without having to go to an office where telemedicine would be administered.

Chapter 3: Project Goals

The Atlantic Provinces have higher than average rates of depressive, anxiety, and substance use disorders among adolescents than other Canadian adolescents. This directly leads to a higher relative demand for timely access to help and appropriate services, but many students are experiencing unmet need. National and provincial governments have attempted to address the unmet need in Atlantic Canada, but there is a lack of solid information about where areas of improvement exist in the health care system and whether there can be improvements. To help decision-makers target which areas require policy and programming interventions, we want to identify the areas of the provinces that have higher rates of unmet need.

Once the problem areas have been identified, the appropriate interventions can be applied. To be appropriate, an intervention will have to address the specific barriers of a community, including social or physical barriers. We know that physical isolation is a common barrier to accessing care; however, the effects of social isolation remain undetermined in the Canadian context, especially in adolescent populations. At the same time, what has not been previously investigated is whether there is an interaction between social capital and rurality where perhaps high social capital in rural communities is less beneficial or even a barrier to help-seeking. It is important for us to understand the interplay between these two variables in Nova Scotia, New Brunswick, and Newfoundland and Labrador given the strong presence of both social capital and rurality. If an interaction between social capital and rurality exists, it would indicate how compensating for these features may change in different areas.

To investigate the questions that arise given the state of the current literature and the health concerns of Atlantic Canada, we will employ data from the SDUSAP which is a large cross-sectional survey. Among other things, it measures the presence of problematic symptoms, help-seeking, social capital, and various other demographic and psychosocial variables. This information gives a large view of Atlantic Canada which can address the following objectives.

3.1 Objectives

1. To estimate the prevalence of evaluated need, perceived need, and unmet need for help and services with substance use and mental health among adolescents in the Atlantic Provinces;
2. To estimate the effects of social capital and rurality on the aforementioned outcomes after controlling for other factors, and;
3. To determine if rurality is an effect modifier for the relationships between social capital and perceived need, and social capital and unmet need, after controlling for other factors.

Chapter 4: Methods

4. 1 Data

4. 1. 1 Student Drug Use Survey in the Atlantic Provinces (SDUSAP)

The primary data source for this project was the 2012 SDUSAP. This was the most recent iteration of a provincially representative cross-sectional survey whose primary ongoing objective has been to “assess the prevalence and trends in substance use, gambling, and related behaviours and risk factors” (1). The survey was previously carried out in 1994, 1998, 2002, and 2007. Nova Scotia, New Brunswick, and Newfoundland and Labrador participated in the 2012 survey; Prince Edward Island, a previous participant, declined to participate in 2012. The survey was conducted in public schools throughout the provinces, covering grades 7, 9, 10, and 12. The final survey sample was 9,229 respondents with an approximately equal distribution across the grades surveyed. We excluded grade 7 students from this study due to their low rates of problematic substance use and probable depressive and anxiety disorders, and because of concerns that students in middle school would be considerably different in their help-seeking behaviours from their high school counterparts (60,62).

The SDUSAP was a self-reported questionnaire with 106 multiple-choice, scannable questions (1). Among the questions relevant to this study were demographics, social environment, school and community involvement, substance and alcohol use, problems related to substance and alcohol use, risky behaviours, help-seeking, and depression and anxiety symptoms.

4. 1. 2 Validity

The SDUSAP was previously validated in a Nova Scotian sample. The creators of the survey found that it was valid, reliable, and minimized under-reporting (91). The estimates for substance use were similar to other surveys. There was a low non-response rate for drug use questions (0.3-1.3%). Over-reporting of substance use is not known to be a serious threat to validity in these types of studies, but the presence of a fictitious bait drug which identified suspect responses moderated any over-reporting. Students who reported using the bait drug were dramatically more likely to report using every other drug

surveyed than those who did not report using the bait drug. The SDUSAP excluded these respondents from analysis. There was a low error rate for the survey's questions and the validation demonstrated a satisfactory level of correspondence between related items, suggesting a logical consistency in the responses.

4. 2 Sampling

The SDUSAP included students from English and French public schools in Nova Scotia, New Brunswick, and Newfoundland and Labrador. Private schools, schools on reserves, and schools on military bases were excluded. Students who were absent during the survey day (approved absences and school-leavers) or were not enrolled in a school (street-youth and dropouts) were not included into the sample (1).

4. 2. 1 Sampling Design

The sampling design involved a two-stage stratified cluster sample (1). The first stage was sampling schools within the health regions for each province. Nova Scotia and Newfoundland and Labrador each had four health regions while New Brunswick has seven. At the time of the 2012 study, Nova Scotia technically had 9 District Health Authorities (DHAs), but for the 2012 iteration of the SDUSAP they were agglomerated into 4 Shared Services Areas (SSAs): DHA 1, 2, 3; DHA 4, 5, 6; DHA 7, 8; and DHA 9. Schools in each region were eligible for random selection if they did not violate any of the previously mentioned exclusion criteria and had at least one of the selected grades with a class of 20 students. The second stage clusters were the classes within those selected schools. All of the eligible classes from the selected schools were weighted and then collectively eligible for random probability selection. This sampling strategy, after weighting classes, allowed for proportional representation of each grade within each region of the three provinces.

4. 2. 2 Response rates

Atlantic Canada

A total of 97,530 students were enrolled in the classes that met all of the criteria for selection across the three provinces for the 2012 SDUSAP (1). After the two stage selection process, 11,948 students were enrolled in the classes randomly selected for participation.

Eighty six percent (10,262) of students were present in class on the day of the survey and 89.9% (9,229) of them participated. The overall participation rate was 77.2%.

Nova Scotia

The SDUSAP was administered to 176 classes in 75 schools throughout Nova Scotia (1). Overall 84.2% of registered students were present during survey administration and 88.1% of them consented to participate (overall participation rate of 71.3%). SSA 4 had a lower participation rate than other SSAs (59% of those present), most likely due to the fact that the consent procedure in the Halifax Regional School Board (HRSB) required active consent by parents/guardians. It should be noted that this response rate was on par with previous studies performed in the HRSB (1). Overall 4,475 Nova Scotia students participated. Seven hundred eighty three students were from the Halifax region (4.5% of total HRSB student population). Forty one students were excluded for reporting use of the fictitious bait drug.

New Brunswick

The 2012 SDUSAP was administered in 193 classes in 99 schools throughout New Brunswick (1). Of the seven Health Districts, four of them (4, 5, 6, and 7) had such a small population of students that all eligible classes were included in the pool for random selection. Eighty nine percent of registered students were present during the administration of the survey and 94.7% consented to participate (overall participation rate of 84.2%). In total 3,510 students completed the survey.

Newfoundland and Labrador

The SDUSAP was administered to 126 classes in 72 schools throughout Newfoundland and Labrador. The random sampling process selected no schools from coastal communities in Labrador (1). Overall, 83.7% of students were present during the administration of the survey and 92.2% consented to participate (overall response rate of 77.2%). A total of 3,278 students participated; 25 were excluded for reporting use of the fictitious bait drug. Absentee rates were high across the four health districts due to the late survey date (11.8%-20.9%). The survey was administered late in the school year, when some students stay home to prepare for final exams (1).

4. 3 Ethics and Consent

Ethics approval for the 2012 SDUSAP was initially obtained from the Dalhousie University Health Sciences Research Ethics Board (1). Upon approval, each Department of Education and Department of Health and Wellness of the participating provinces gave approval for the project. In Nova Scotia, every superintendent and school board also gave approval for the project, and the principal from each selected school gave their approval. The authors of the study made a separate ethics application request to the Halifax Regional School Board Planning & Research Department, which required active parental/guardian consent for all schools and grade levels. Obtaining parental consent was left to the discretion of the individual schools in all other school districts. In New Brunswick, the superintendent of each school district and the authors asked each principal of each selected school for cooperation and participation. Passive consent was utilized in New Brunswick. In Newfoundland and Labrador, the authors asked school districts and principals for approval.

All students who were selected for participation implicitly gave their consent at the time of the survey through the completion of the survey (1). All parents received information about the survey regardless of whether or not parental consent was sought. Students were provided with a cover page detailing the anonymous, confidential, and voluntary nature of the questionnaire, and were reminded that they could skip questions or decide not to participate at any time.

This project received ethics approval from the Dalhousie University Health Sciences Research Ethics Board, the same board to which the SDUSAP applied and received approval.

4. 4 Variables

4. 4. 1 Outcomes

Evaluated need

As a way of measuring evaluated need for help, multiple studies have used scales to screen for the presence of substance use disorders and probable mental disorders (92-94). These scales offer a more objective way to measure need for help than respondents' desires for help, and recognize that in a health care context, timely interventions are important

regardless of how these experiences may eventually resolve without intervention so as to reduce current morbidity and improve outcomes (95-97). Thus our interest was to more objectively measure the presence of likely disorders, and tap into a comprehensive estimate of the need for help with substance use, depression, and anxiety. We measured evaluated need for each of the following types of help for all students in the SDUSAP sample: alcohol use, substance use, depression, and anxiety.

The 2012 survey included validated scale questions to assess probable mental disorders. One scale was the 12 question version of the Center for Epidemiological Studies-Depression scale (CES-D) (1), which includes validated questions to assess symptoms of depressive disorders. This shortened version, originally adopted for the National Longitudinal Study of Children and Youth, has excellent internal consistency (Cronbach alpha = 0.85) (98). The internal consistency and test-retest repeatability have been demonstrated in youth with remarkably similar rates to adults (99,100).

Each question in the CES-D is a 4-item Likert scale (“Never or rarely” = 0, “Sometimes” = 1, “Often” = 2, “Always” = 3) with values ranging from 0 to 3, higher scores indicating increased severity of the symptom. Scores were aggregated and classified. If a student scored between 1 and 20 they were classified as not at risk for depression (1), and thus no evaluated need for help. If a student scored 21 or above, they were classified as having a probable depressive disorder and had an evaluated need for help with depression.

Another included scale was a modified version the Screen for Child Anxiety Related Emotional Disorders (SCARED) (alpha = 0.90) (101). The five item version contains the question from each category in the standard SCARED which best differentiates adolescents with anxiety disorders from those without anxiety disorders. The five categories are panic, general anxiety, separation anxiety, social phobia, and school phobia. It can also differentiate anxiety cases from non-anxiety, depressive, or disruptive disorders (101). The Receiver-Operator-Curve for the 5-item version is not significantly different from the full version, meaning the sensitivity and specificity used for certain cut-offs are not different. A cut-off of 3 has the greatest accuracy (74% sensitivity and 73% specificity).

Each question in the SCARED is a 3 point Likert Scale (“Not true” = 0, “Sometimes true” = 1, “Often true” = 2). The scores were aggregated and classified. Any student with a score at or above 3 represented a probable anxiety disorder (101), and thus were classified

as having an evaluated need for help; a score of 2 or fewer was no risk for anxiety and no evaluated need.

The 2012 SDUSAP also measured patterns of use and behaviours related to alcohol and drugs. The SDUSAP did not incorporate any specific scales related to alcohol or drug use. Nevertheless it did include valuable information that was used to assess for the presence of problematic substance use. Assessing problematic substance and alcohol use was based on the CRAFFT questionnaire which was included into the Ontario Student Drug Use and Health Survey (102), the largest student population based survey in Canada since 1977 (103). The CRAFFT (**C**ar **R**elax **A**lone **F**orget **F**amily **T**rouble) questionnaire is based on DSM-IV criteria for identifying adolescents at high risk of a substance use disorder (alpha = 0.68) (104,105). The CRAFFT requires that a student respond positively to two or more of the following situations for problematic substance use to be assigned (52): *“Have you ever ridden in a **CAR** driven by someone (including yourself) who was “high” or had been using alcohol or drugs?”*, *“Did you ever use alcohol or drugs to **RELAX**, feel better about yourself, or fit in?”*, *“Do you ever use alcohol or drugs while you are by yourself, or **ALONE**?”*, *“Do you ever **FORGET** things you did while using alcohol or drugs?”*, *“Do your **FAMILY** or **FRIENDS** ever tell you that you should cut down on your drinking or drug use?”*, and *“Have you ever gotten into **TROUBLE** while you were using alcohol or drugs?”*

There were questions in the SDUSAP which closely corresponded to riding in the car of someone under the influence or driving under the influence, forgetting what you did while under the influence, getting into trouble with the law while using, and having friends and family express concern about your use. *“In the past 12 months, how often have YOU driven a motor vehicle within an hour of drinking two or more drinks of alcohol?”*, *“In the past 30 days, how many times has drinking alcohol made you drunk (that is, you had so much to drink that you threw up or you lost control of your actions)?”* *“In the past 12 months, have you been in trouble with the police as a result of your drinking?”*, and *“In the past 12 months, has your drinking caused tension or disagreement with family or friends?”* The exact same questions were asked of drug use except that the SDUSAP did not include a loss of control question. Instead we substituted two questions that similarly reflect a loss of control: *“In the past 12 months, have you damaged things after having used drugs (other than alcohol)?”*

and *“In the past 12 months has your drug use (other than alcohol) caused you to injure yourself?”*

The SDUSAP did not measure using alcohol or drugs to relax or fit in, or using while alone. These two questions in the CRAFFT measure a respondent’s social anxiety and susceptibility to peer-pressure, and the emergence of addictive pathology, respectively (105). However Knight et al. (1999) found that using a 4-item version of the CRAFFT maintained good sensitivity and specificity for identifying substance use disorders (105). Due to the fact that the questions in the SDUSAP are not exact replications of the CRAFFT, it is not known how well these questions measure the constructs contained within the CRAFFT. However, given the similarities between the questions, the information contained in the SDUSAP was used in a similar fashion to the CRAFFT to determine students’ problematic substance use status. Because this project required extensive stratification which reduced sample sizes, displaying one out of the behaviours measured was used as a cut-off for an evaluated need for help with substance use. Previous work by knight also demonstrated that a lower cut-off could be used (104). So as not to bias the descriptive results, we note the estimates of the prevalence of problematic drinking and drug use using both cut-offs in the discussion (see page 50).

Multiple drugs were surveyed in the SDUSAP, but students did not specify which drug they are referring to when they answered the problems-with-use questions. Thus we were unable to say explicitly for which drug or drugs a participant demonstrated an evaluated need for help. We classified students as having an evaluated need for help with problematic drug use generally.

Perceived need

Within the 2012 SDUSAP there were four questions which measured need based on students’ perceptions (Table XXXI). The questions were divided by substance use and mental health. The first question asked *“In the past 12 months, did you feel you needed help for your...”* and then the student responded “Yes”, “No”, or “I do not use...” to alcohol use and drug use. Student were also asked *“In the past 12 month, did you feel you needed help because you felt...”* and respondents answered “Yes”, “No”, or “I did not feel...” to depression and anxiety. If a student was classified as having an evaluated need for help based on the

modified CES-D, SCARED, or CRAFFT scales, and desired help with that same issue, then they were classified as having a perceived need.

Unmet need

For help with substance use, depression, and anxiety, the SDUSAP asked “*In the last 12 months, did you use any services or receive help to deal with your...*” alcohol use or drug use, and “*In the last 12 months, did you use any services or receive help because you felt...*” depressed or anxious. The students responded “Yes”, “No”, or “I did not use[/feel]...”. If a student had an evaluated need and replied “Yes” to receiving help for that need, they were classified as having met need with that issue (Table XXXII). If a student did not report accessing help with that same issue, then were classified as having unmet need.

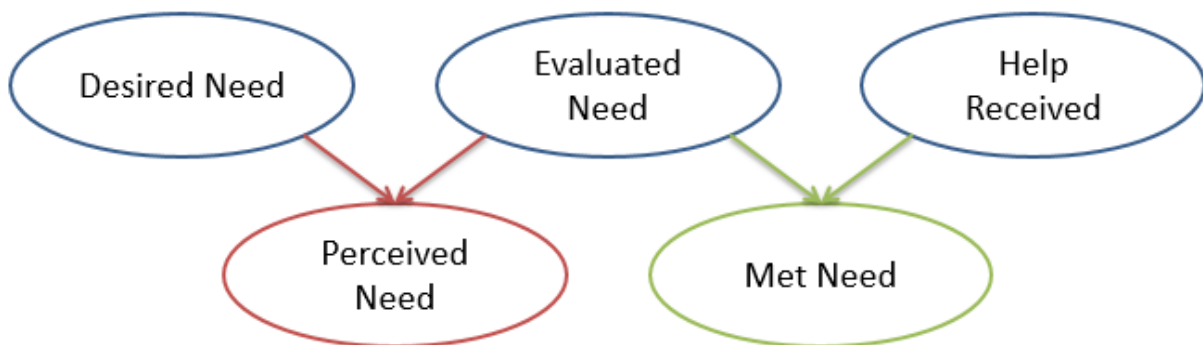


Figure 3: Derivation of outcomes

4. 4. 2 Exposure Variables

Community Social Capital

The SDUSAP included four 5-item Likert questions to measure bonding social capital in the community (alpha = 0.87): “*It is safe for younger children to play outside during the day*”, “*You can trust people around here*”, “*People say ‘Hello’ and often stop to talk to one another on the street*”, and “*I could ask for help or a favour from my neighbours.*” This is a shortened version of the five question scale piloted by the Health Behaviors of School-aged Children survey (106). For each question, “Strongly Disagree” was scored as 1. Each option with more agreement was scored successively as one more point (“Strongly Agree” = 5). The scores were summed and categorized (1 – 11 = Low, 12 – 14 = Medium, 15 - 17 = high) (Table XXXIII) (107).

School Social Capital

The SDUSAP included two binary measures of social capital within schools. One question measured feelings of trust in others at school: “Most of the people I go to school with can be trusted” and “You can’t be too careful of the people I go to school with.” The other measured feelings of helpfulness at school: “Most of the time, the people I go to school with try to be helpful” and “Most of the time, the people I go to school with look out for themselves.” Each measure was treated individually with the students reporting higher trust or helpfulness being considered as having greater school social capital.

Rurality

The schools gave insight into each student’s level of rurality. Each survey was coded to a school, and the six digits of the school’s postal code are known. This allowed for rurality classification by the Canadian Census’ rural-urban continuum, the Statistical Area Classification (SAC) (Figure XVII). We assigned students to two urban classifications (Table A4). Students were classified as metropolitan if their school was located in a Census Metropolitan Area (CMA) (situated in a major urban core with at least 100,000 residents) (108). Students were considered urban if their school was in a Census Agglomeration (CA) (situated in a major urban core with at least 10,000). Students were considered rural if their school was in a census subdivision of less than 10,000. Students were also classified as rural if their school was located in a rural census division or dissemination area within a CMA or CA. Schools were also matched to DHAs. We performed descriptive analyses using both the DHA/health region location and rurality classification. For any regression analysis we only used the SAC classification.

4. 4. 3 Control variables

Socioeconomic status (SES), sex, age, family structure, academic environment, religion, and family connectedness have been shown to affect the perception of a need for help, or the presence of unmet need for help (49,53,109-114). We controlled for potential confounding from these variables in the regression analysis (Table XXXIV). The SDUSAP measured SES on a 10 point scale; these scores were categorized as high (8 – 10), moderate (5 - 7), and low SES (1 – 4) (115). Sex was measured as the binary female/male. Age was measured with an ordinal scale from 11 to 19. We used age instead of grade because

certain legal rights and responsibilities such as driving are based on age and not grade. We also only used the ages that match to those in grades 9 and above (13 – 19 years old). With whom the student currently lives was the measure for family structure. We categorized students as living with two parents/guardians, one parent/guardian, or another structure. The educational achievement environment for the student was measured in two ways: student marks and maternal degrees. We categorized students as having an above 80% and above average or below 80% average. We categorized students as having a mother who had some form a post-secondary education, graduated high school, did not graduate high school, or no information. We dichotomized students' frequency of attending religious services as infrequently attending services (less than monthly) or frequently (at least monthly). Parental connectedness was three 5-point Likert questions ($\alpha = 0.74$): “My parent(s) or guardian(s) usually know where I am when I am not at home” “My parent(s) or guardian(s) usually know who I am with when I am not at home”, and “It is important that I do not let down or disappoint my parent(s) or guardians”. We assigned each answer a value between 1 (strongly disagree) and 5 (strongly agree), and summed and categorized the values (1 – 9 = low, 10 – 11 = medium, 12 – 13 = high) (115).

4. 5 Analysis

Data from individual surveys were weighted to correct for the overall disproportionate sampling survey and survey non-responses. All analyses were conducted with the Stata 13.0 computer program (StataCorp, 2015) using the survey commands that account for intra-cluster correlation due to sampling strategy.

(1) In Atlantic Canada, what are the rates for evaluated need, perceived need, and unmet need for help with certain mental health and substance use disorders? Do these rates differ between and/or within the provinces?

To estimate of the prevalence of evaluated need, perceived need, and unmet need for help (no evaluated need = 0, evaluated need = 1; unperceived need = 0, perceived need = 1; met need = 0, unmet need = 1) with certain mental health and substance use disorders in the Atlantic Provinces, and to estimate differences based on location and demographics.

For each outcome, prevalence estimates and their 95% confidence interval (CI) were calculated in each province, health region or DHA. We tested for significant differences between provinces, and regions.

2) What associations do social capital and rurality have with students' odds of experiencing each of the outcomes of interest?

To determine the association that social capital (low = 0, medium = 1, high = 2) and rurality (metropolitan = 0, urban = 1, rural = 2) have with the presence of each outcome of interest (no evaluated need = 0, evaluated need = 1; unperceived need = 0, perceived need = 1; met need = 0, unmet need = 1).

This part of the project used multivariate logistic regression modelling. Four separate models representing the different types of help were applied to each of the outcomes to measure the effects of social capital and rurality. Initially the models were unadjusted with only the social capital and rurality variables present (Figure 4).

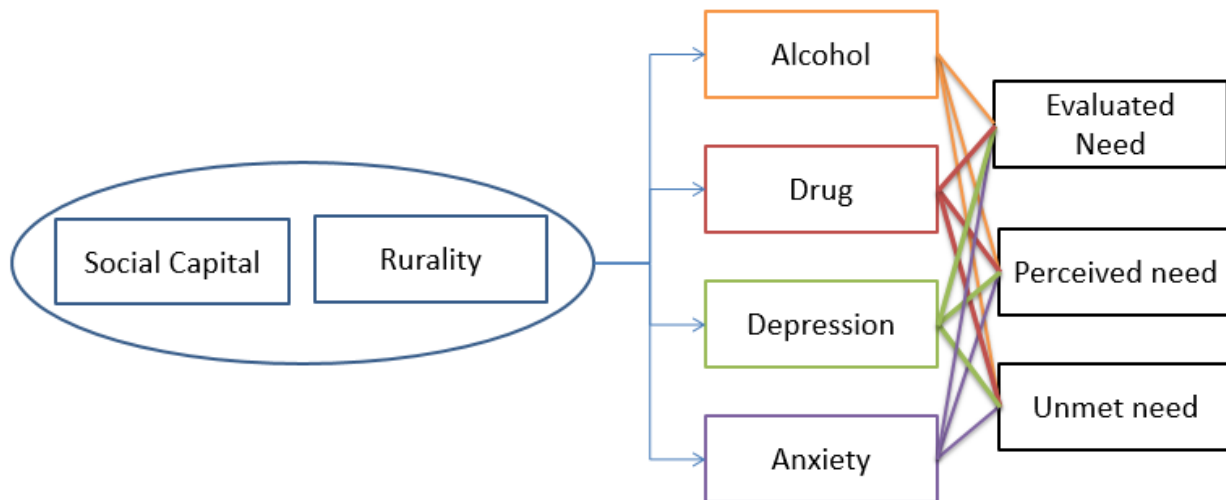


Figure 4: Unadjusted logistic regressions for social capital and rurality's relationship to the outcomes for each of the types of need

Next, the models were run with the control variables added (Figure 5). Control variables were selected if, when run individually with the social capital and rurality variables, the control variable had a p-value of at least 0.10. If only a missing or no information category was significant, that variable was not included.

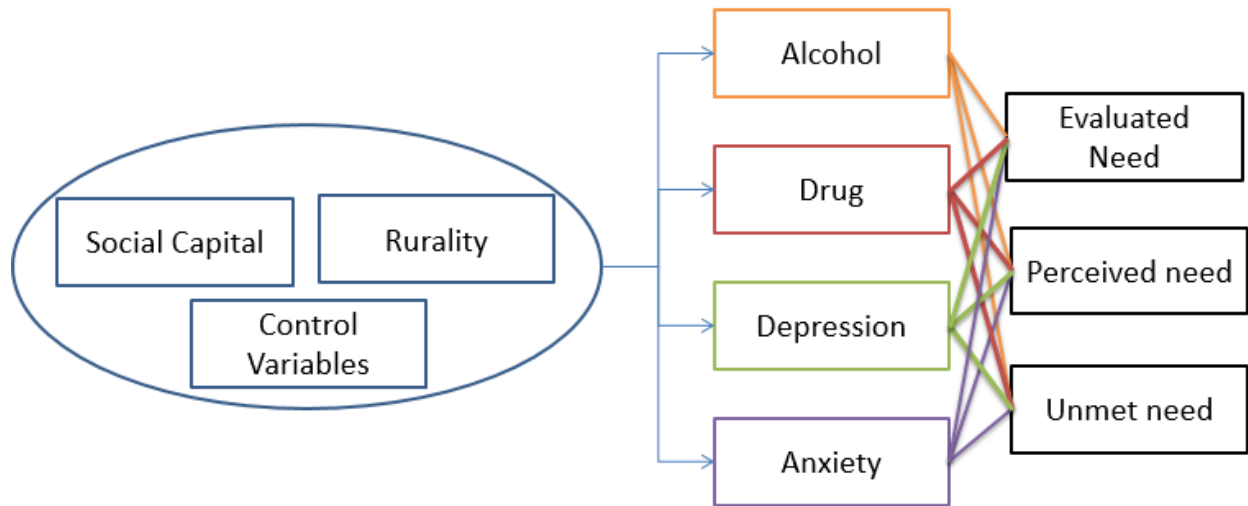


Figure 5: Adjusted logistic regressions for social capital and rurality’s relationship to the outcomes for each of the types of need

3) Does rurality act as an effect modifier for the relationships between social capital and perceived need, or social capital and unmet need?

To determine if rurality (metropolitan = 0, urban = 1, rural = 2) acts as an effect modifier for social capital’s effect (low = 0, medium = 1, high = 2) on perceived need (unperceived need = 0, perceived need = 1) or unmet need (met need = 0, unmet need = 1).

This part of the project used multivariate logistic regression modelling with stratification for rurality (Figure 6). For both outcomes of interest, separate analyses were run for each type need: anxiety, depression, alcohol use, or drug use. We stratified students by metropolitan community (CMA), urban community (CA), or rural community (MIZ). We only performed the fully adjusted analyses using the same control variables from the second objective given that we were comparing to the fully adjusted, non-effect modified analyses.

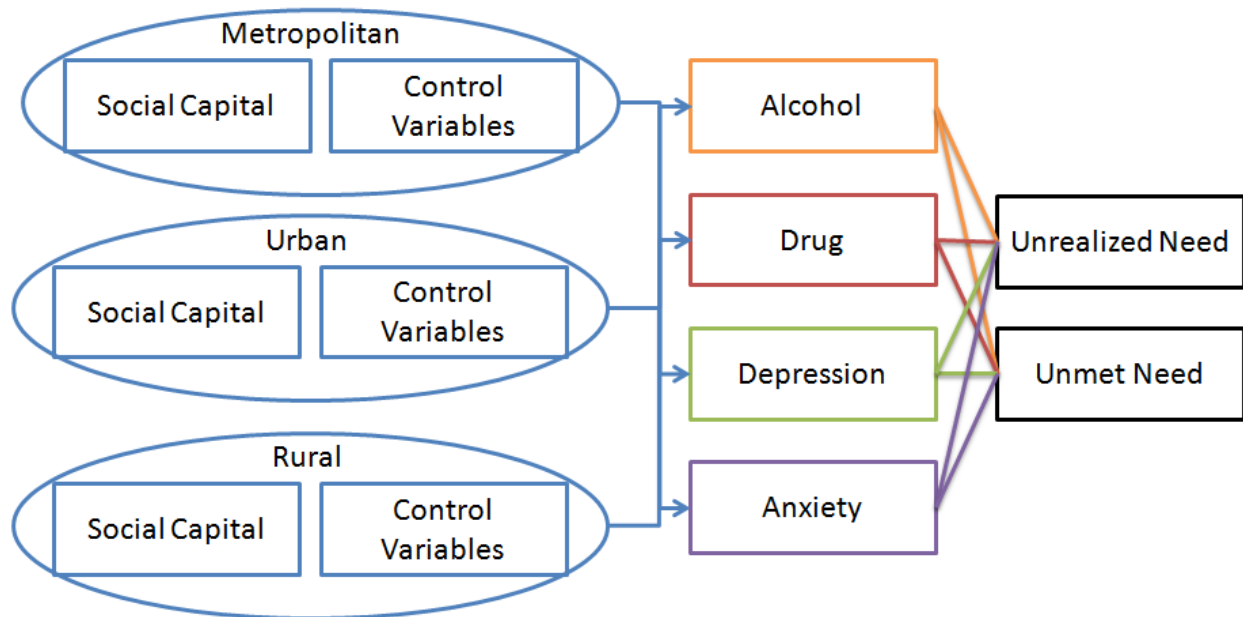


Figure 6: Adjusted logistic regressions for social capital’s relationship to perceived need and unmet need for each type of need, stratified by level of rurality

Chapter 5: Results

This sections consists of a complete overview of the results based on the methods described in the previous section. The layout reflects the order of the objectives as stated.

5. 1 Sample & Population Demographics

The sampling strategy allowed for a representative sample of adolescents from the Atlantic region (Table I). The most common age was 15 (31.4%), and the mean age was 16.0 years. There was a marginal difference in the proportion of female and male respondents (50.5% vs. 47.3%, non-responses omitted from discussion). Most students lived in homes with two parental figures (74.8%), with one fifth (18.4%) living in single parent homes, and a small minority in other living situations (6.8%). Most students reported moderate socioeconomic status (SES) (54.8%), one third (34.3%) noted high SES, and 5.5% indicated low SES. The rates of students with average marks above 80% and those below 80% were approximately equal (47.8% vs. 45.1%). Most students (58.2%) had a mother who had achieved some form of post-secondary education, while 18.0% had mothers who had graduated high school with no further education, 16.7% did not know their mother's educational achievement, and only 7.0% had mothers without a high school degree. Most students infrequently attended religious services (83.4%). A quarter (25.0%) of students had low family connectedness, with the remaining 75% equally split between medium and high levels (37.5% each). There was a unimodal shaped distribution of community social capital. Nearly half of students had medium community social capital (42.8%), followed by low (35.5%), and then high (21.7%). For both feelings of trust in others at school and feelings that others at school were helpful, there was an approximate 55%/45% split between affirmative and negative responses. Overall, almost half of students lived in rural communities (48.1%), followed by metropolitan areas (30.6%), and lastly urban areas (20.3%). In total, 6,778 students from eligible classes were included in the study.

There were no associations between rural status and the social capital measures (Table II); however there were significant differences in the distribution of select demographic measures between social capital measures. (Table III). Students with increased community social capital were more likely to have two parental figures in the

home, have higher SES, have higher average marks, have mothers with higher academic achievement, frequently attend religious events, and feel more connected to their family. Students with higher feelings of trust for others at school were more likely to live with two parental figures, have higher SES, have higher average marks, have mothers with higher academic achievement, and feel more connected to their family. Students who reported feelings of helpfulness at school were more often males, lived with two parental figures, had higher SES, had higher average marks, had mothers with higher academic achievement, and felt more connected to their family.

5. 2 Prevalence of Outcomes

5. 2. 1 Evaluated Need

Employing the scales outlined in the methods section, our analysis identified individuals with a likely disorder and an evaluated need for depressive, anxiety, and substance use disorders (Table IV). Our analysis identified a total of 697 students (10.5% of population) as having probable depression using the CES-D. We identified probable anxiety in nearly three times as many students via the modified SCARED scale [1741 students (26.9%)]. Using the modified CRAFFT scales, we found that 2374 students (33.7%) problematically drank, while 1038 students (16.7%) problematically used drugs. A majority (788) of those with problematic drug use also problematically drank. The weighted population prevalence of simultaneous problematic drinking and problematic drug use was 11.8%

5. 2. 2 Perceived Need

Next, we identified students with a perceived need for help among those with an evaluated need (Table IV). Among those with a probable depressive disorder, 534 students (8.3% of population, 78.9% of probable disorders) perceived a need for help. Among those with a probable anxiety disorder, 704 students (11.4% of population, 42.6% of probable disorders) perceived a need for help. Perceived need for help was lower among those with problematic alcohol and drug use than probable depressive and anxiety disorders: 131 students (1.8% of population, 5.5% of problematic drinkers) perceived a need related to

problematic drinking, and 141 (2.4% of population, 14.4% of problematic drug users) perceived a need related to problematic drug use.

5. 2. 3 Unmet Need

Unmet need for help was common among those with an evaluated need (Table IV). For those with a probable depressive disorder, 522 students (7.6% of population, 72.6% of probable disorders) had an unmet need for help. Among those with a probable anxiety disorder, 1,499 adolescents (22.6% of population, 84.9% of probable disorders) had an unmet need for help. Few students with problematic substance use received help. A total of 2,263 students (32.3% of population, 98.0% of problematic drinkers) had an unmet need for help related to alcohol use, while fewer than a hundred students received help related to drugs among those with problematic drug use, leaving 943 teenagers (15.2% of population, 92.4% of problematic drug users) with an unmet need for help with drugs.

5. 3 Geographic Distribution of Outcomes

For depressive and anxiety disorders, the distributions of evaluated need, perceived need, and unmet need did not significantly differ across the provinces (Table V). Similarly, across health regions within provinces (Tables VI – VIII), there were no significant differences in the rates of depression and anxiety outcomes.

We observed significant differences in the rates of alcohol and drug outcomes across the provinces (Table V). Newfoundland and Labrador had the highest rate of problematic drinking (39.7%), New Brunswick had the lowest rate of perceived need for help with alcohol (1.0%), and Newfoundland and Labrador had the highest rate of unmet need for help with alcohol (37.6%). Nova Scotia had the highest rate of problematic drug use (19.6%) and related unmet need (17.7%). Again, New Brunswick had the lowest rate of perceived need for help with drugs (1.8%). For the alcohol and drug use outcomes there were no significant differences in the rates across health regions within each province (Tables VI – VIII).

5. 4 Logistic Regressions

5. 4. 1 Evaluated Need

In our first set of regressions, we examined associations between the exposures of interest and the presence of evaluated need. Unadjusted logistic regression models indicated that social capital measures were related to a probable depressive disorder (Table IX). Students with medium and high community social capital had lower odds of a probable depressive disorder than those with low community social capital [OR = 0.50 (0.38, 0.66) and OR = 0.50 (0.34, 0.75), respectively]. Students with feelings of trust in others at school had two-thirds lower odds for a probable depressive disorder than those without feelings of trust [OR = 0.37 (0.29, 0.48)], and higher feelings of helpfulness at school were associated with one third lower odds of a probable depressive disorder [OR = 0.62 (0.47, 0.81)]. Rurality was not associated with a probable depressive disorder. Adjusted regression models included sex, family structure, SES, average marks, maternal education, and family connectedness as covariates. After adjustment, social capital measures continued to be associated with a decreased odds of a probable depressive disorder [medium community social capital OR = 0.59 (0.44, 0.78), higher school trust OR = 0.43 (0.34, 0.56), and higher school help OR = 0.65 (0.50, 0.86)]. High community social capital was no longer significantly associated with a probable depressive disorder.

Similar results were observed for logistic regression models of probable anxiety disorders (Table X). Medium community social capital was associated with a lower odds of a probable anxiety disorder relative to low community social capital [OR = 0.78 (0.65, 0.94)]. Those who felt higher trust in others at school had lower odds of a probable anxiety disorder [OR = 0.53 (0.45, 0.63)]. Higher feelings of helpfulness at school were also significantly associated with a reduced odds of a probable anxiety disorder [OR = 0.77 (0.65, 0.90)]. Rurality was again not related to a probable disorder. The adjusted model included sex, family structure, SES, and family connectedness as covariates. In the adjusted model, as with depression, higher social capital measures continued to be associated with a lower odds of a probable anxiety disorder [medium community social capital OR = 0.77 (0.63, 0.92), higher school trust OR = 0.59 (0.49, 0.71), and higher school helpfulness OR = 0.77 (0.65, 0.91)].

Logistic regression models suggested that social capital had a less uniform impact on problematic alcohol use than for probable depressive and anxiety disorders (Table XI). Higher feelings of trust in others at school was the only social capital measure related to problematic drinking in the unadjusted regression models; those with higher feelings of trust had lower odds of problematic drinking [OR = 0.71 (0.61, 0.82)]. The adjusted regression model included age, average marks, religious attendance, and family connectedness as covariates. In the adjusted model, high community social capital was significantly associated with an increased odds of problematic relative to lower community social capital [OR = 1.39 (1.12, 1.73)]. Higher trust in others at school continued to be associated with a lower odds of problematic drinking [OR = 0.73 (0.61, 0.87)].

Compared with alcohol, social capital measures were less frequently associated with problematic drug use (Table XII). Medium community social capital (compared to low community social capital) and higher trust in others at school were both associated with a lower odds of problematic drug use [OR = 0.78 (0.63, 0.94) and OR = 0.58 (0.45, 0.75), respectively]. As with all other disorders, rurality was not associated with problematic drug use in the unadjusted regression models. All of the potential confounders were incorporated into the adjusted model as covariates. After adjustment, higher feeling of trust in others at school was the only exposure of interest which remained significantly related with problematic drug use [OR = 0.60 (0.47, 0.78)].

5. 4. 2 *Perceived Need*

Next we examined perceptions of need for help, which was measured by feelings of a need for help related to a disorder for which a student had an evaluated need. Unlike social capital measures, rurality was significantly associated with perceived need outcome status across disorders. In the case of depression, no social capital measures were significantly associated with perceived need in the unadjusted regression model, while rurality was. Living in urban and rural communities was associated with a lower odds of perceived need among those with a probable depressive disorder than those in metropolitan communities (Table XIII) [OR = 0.45 (0.21, 0.94) and OR = 0.42 (0.21, 0.87), respectively]. Age, sex, and average marks were included in the adjusted regression model as covariates. After adjustment, living in urban and rural communities remained negatively

associated with perceived need [OR = 0.42 (0.20, 0.89) and OR = 0.39 (0.20, 0.80), respectively].

For anxiety, two social capital measures were significantly associated with perceived need in unadjusted models (Table XIV). Medium levels of community social capital (relative to low community social capital) and higher feelings of helpfulness at school were associated with lower odds of perceived need [OR = 0.69 (0.51, 0.91) and OR = 0.67 (0.48, 0.95), respectively]. Rurality was associated with decreased odds of perceived need, similar to depression [urban OR = 0.67 (0.46, 0.96) and rural OR = 0.72 (0.52, 1.00)]. The adjusted model included age, sex, SES, average marks, and family connectedness as potential confounders. After adjustment, only higher feelings of helpfulness in school remained significantly related to perceived depression need [OR = 0.68 (0.48, 0.96)]. Rurality's association with perceived depression need strengthened after adjustment [urban OR = 0.66 (0.45, 0.95) and rural OR = 0.69 (0.51, 0.95)].

Community social capital and rurality were the only exposures of interest significantly associated with perceived alcohol need in the unadjusted regression model (Table XV). Medium community social capital was related to a reduced odds of a perceived alcohol need compared to low community social capital [OR = 0.55 (0.33, 0.93)]. Living in rural communities was positively associated with perceived alcohol need relative to metropolitan communities [OR = 2.80 (1.36, 5.79)]. The adjusted regression model included age, SES, average marks, and family connectedness as covariates. With adjustment, only living in rural communities remained significantly associated to perceived alcohol need [OR = 2.88 (1.34, 6.16)].

Unadjusted logistic regression model suggested that community social capital and trust in others at school were also strongly associated with perceived drug need (Table XVI). Medium and high community social capital were associated with a lower odds of perceived need related to drug use relative to low community social capital [OR = 0.41 (0.23, 0.71) and OR = 0.28 (0.12, 0.65), respectively]. Higher feelings of trust in others at school were negatively associated with perceived drug need among those with problematic drug use [OR = 0.52 (0.29, 0.92)]. No potential confounders were identified with respect to perceived drug need, leaving the above odds ratios unchanged.

5. 4. 3. *Unmet Need*

In the third series of regression analyses, we investigated associations of the exposures of interest to unmet need among those with an evaluated need due to likely having a disorder. There was an inconsistency in the relationship of social capital measures and rurality to unmet need across disorders. For unmet depression need, higher feelings of helpfulness at school were negatively associated with the receiving help or use services related to depression (Table XVII). Students with higher feelings of helpfulness at school had a higher odds of unmet depression need [OR = 2.09 (1.35, 3.24)]. Living in increasingly rural communities was associated with an increased odds of unmet depression need [urban OR = 2.23 (1.13, 4.40) and rural OR = 2.65 (1.53, 4.57)]. No potential confounders were identified with respect to unmet depression need, leaving the above odds ratios unchanged.

Logistic regression models showed that social capital was also associated with unmet anxiety need (Table XVIII). Medium community social capital was positively associated with unmet anxiety need compared to low community social capital [OR = 1.55 (1.08, 2.24)], as were higher feelings of helpfulness at school [OR = 1.63 (1.16, 2.30)]. Living in urban communities was positively associated with unmet need relative to metropolitan communities [OR = 1.92 (1.12, 3.28)]. Adjusted regression models included age, family structure, and average marks as potential confounders. After adjustment, higher feelings of helpfulness at school was the only social capital measure which remained significantly associated with unmet anxiety need [OR = 1.66 (1.17, 2.36)]. The association of living in urban communities was only slightly attenuated in the adjusted model [OR = 1.85 (1.08, 3.17)].

Of all exposures of interest, only medium community social capital was related to unmet alcohol need in unadjusted analysis (Table XIX). Medium community social capital was positively associated with an increased odds of unmet alcohol need compared with low community social capital [OR = 2.68 (1.20, 6.02)]. Age was the only covariate included in the adjusted regression model. After adjustment, medium community social capital continued to be positively associated with unmet alcohol need [OR = 2.45 (1.10, 5.48)].

As with alcohol, medium community social capital was the only covariate of interest which was associated with unmet drug need (Table XX). Medium community social capital

was positively associated with unmet drug need relative to low community social capital [OR = 2.68 (1.20, 6.02)], with the same point estimate as for unmet alcohol need. Age was incorporated into adjusted regression models. After adjustment, medium social capital continued to be positively related to unmet need [OR = 1.96 (1.00, 3.80)].

5. 4. 4 Stratification

Our third objective was addressed by stratification by rurality to test if the measures of social capital were differently associated with perceived need and unmet need outcomes across rurality categories. Stratification by rurality did not reveal many new findings (Tables XXI – XXVIII). Two notable exceptions were detected related to perceived depression need: high community social capital for students in metropolitan communities (compared to low community social capital) [OR = 8.64 (1.30, 57.62)], and higher feelings of trust in others at school for students in urban communities [OR = 3.32 (1.08, 10.20)] were associated with a higher odds of perceived need for help related to depression compared to the other rurality levels. In all other cases, confidence intervals of an estimate in one rural category overlapped with the point estimates of other levels of rurality, indicating that the estimates were not significantly different, and thus there was no difference in the associations across rurality

5. 4. 5 Influence of peer drug use on perceived drug needs

We noted strong associations of community social capital and feelings of trust in others at school with perceived drug help need compared to the other perceived need outcomes. To investigate one possible explanation that having drug using friends discourages a perceived need for help, an additional analysis stratified students with problematic drug use by the number of their friends who used marijuana (no or a few friends, or half or more friends using) (Table XXIX). Marijuana was the only drug with data on the number of using friends in the SDUSAP. With stratification, only adjusted models of students for whom most friends used marijuana continued to demonstrate significant associations between social capital measures and perceived need. Medium community social capital, high community social capital, and higher feelings of trust were associated with a reduced odds of perceived need [OR = 0.43 (0.23, 0.81), OR = 0.28 (0.11, 0.71), and

OR = 0.49 (0.26, 0.91), respectively]. Very few students reported having “no or a few friends” who use marijuana. As such there was insufficient power (30%) to detect a difference.

CHAPTER 6: DISCUSSION

The remainder of this thesis consists of the interpretation of the results. It includes information about the strengths and limitations so as to contextualize the quality of the study. Relevance of this work to the continual process of improving access to health care is also identified.

The goal of this study was, first, to describe the prevalence of likely depressive, anxiety, and substance use disorders among adolescents in Atlantic Canada and their corresponding needs, the prevalence of students who perceived a need for help related to those disorders, and the prevalence of students who did not use services or receive help for their evaluated need. As per the second goal, the project estimated the associations of various social capital measures and rurality with having an evaluated need, having perceived need for help, and having unmet need for help for each disorder. A related goal was to investigate the possibility that associations would be different depending on where the student resided, be it a rural or metropolitan setting. Little research on the impact of social capital on adolescents' help-seeking behaviours exists, and available studies do not provide strong evidence for whether social capital may be beneficial to accessing help (12,14,15). This study aimed to build on the limited research in this field by providing evidence drawn from a representative sample of high-school students from Atlantic Canada.

6.1 Prevalence Findings

Our results showed that while likely disorders were common, most students with an evaluated need had unmet need for help and for only one disorder did a majority of students perceive a need for help. The analysis found that 10.5% of the study's population had a probable depressive disorder, 26.9% had a probable anxiety disorder, 33.7% had problematic drinking, and 16.7% had problematic drug use. Nearly 4 in 5 students with a probable depressive disorder perceived a need for help (79%). This was more common than the perceived need for help related to anxiety (42%), and substantially higher than the perceived need for help among those engaged in problematic drinking (5%) or drug use (14%). Unmet need was common across all disorders. Three quarters of students with a probable depressive disorder had unmet need for help (72%). Unmet need for help was

higher among those with a probable anxiety disorder (84%) compared to depression. Nearly all students with problematic substance use had unmet need for help (alcohol at 96% and drugs at 91%).

For several outcomes, there were differences in the prevalence between provinces (see Figures II-IV). There was evidence of unequal distributions for all of the alcohol and drug outcomes. For alcohol, Newfoundland and Labrador students most frequently displayed problematic drinking, perceived need for help, and unmet need for help. For all of the drug outcomes, Nova Scotia had the highest prevalence. New Brunswick had the lowest proportion of students with perceived need for help out of all students with an evaluated need for both alcohol and drug use. New Brunswick also had the highest proportion of unmet need for alcohol help among those with problematic drinking. Newfoundland and Labrador had the highest unmet need proportion among those with problematic drug use. These discrepancies were anticipated as the CCSA's Cross-Canada report demonstrated that Newfoundland and Labrador had the highest prevalence of adolescent drinking, and Nova Scotia had the highest adolescent marijuana use (2). With increased use, it was expected to see increased problematic use. With higher problematic use it was anticipated that a higher absolute provincial percentage of perceived need and unmet need would follow. Our findings suggest, however, that New Brunswick had significantly greater difficulty when it came to perception of need, relative to the other provinces. This was not anticipated and demands future investigation.

Discrepancies existed between the rates of probable disorders in this study and the rates found in other Canadian studies. The Canadian Mental Health Association estimated that 5% of males and 12% of females between the ages of 12 and 19 had experienced a depressive episode (116). The results of our study found an overall prevalence of probable depressive disorder of 10.5%. There were more females with probable disorders (15%) than the CMHA's estimate, though the rate for males was the same as the CMHA's. The prevalence of probable depressive disorders was also higher than the CCHS's estimate of a national prevalence of 6.1% for all young adults (i.e. age 15 – 24) and 7.1% for the Atlantic Provinces 7.1% (117). The CCHS's national prevalence of anxiety disorders in 12 – 19 year olds in the past 12 months was 5.3% (118). Our study found a prevalence of nearly 27% for probable anxiety disorders. This significant difference is likely due to that fact that the CIDI

used by the CCHS only identifies generalized anxiety disorders (the SCARED also identifies separation anxiety disorders, phobias, and panic disorders) (101,118); as well as the CIDI is a diagnostic tool while the SCARED is a screening tool; the SCARED is expected to produce more false positives. This project also found that problematic alcohol and drug use were approximately 3 times higher than the prevalence estimates from the CCHS (118). If our modified CRAFFT's cut-off was raised to 2, reflective of the original CRAFFT's cut-off, the prevalence of problematic drinking would fall to 9.5% and the prevalence of problematic drinking would drop to 6%; estimates which were in line with the CCHS's disorder rates among young adults (118).

Rates of perceived need for help have not been thoroughly studied in Atlantic Canada for a range of disorders. The CCHS reported 21.6% of all Atlantic Canada young adults had desired mental health care (117). This estimate was generated by asking individuals how their needs were being met, which implied need among those who did not respond "no need". In this study, the overall rate of perceived need for help among those with a likely disorder constituted 16.8% of the overall population. Cormetto measured perceived need for help using a methodology similar to that of our study. Among students from Windsor Ontario identified as having some need for further psychological evaluation, using the Youth Self-Report Pediatric Symptom Checklist, they found that 26% of students had either decided they needed formal services, or had received those services (62). If the desire for informal help was included, the overall percentage rose to 53%. In our study, 31% of students who were high risk for any of the four disorders perceived need for help.

Perceptions of need for help were notably higher among those with probable depressive and anxiety disorders compared to those with problematic substance use. This finding has been demonstrated previously in adolescents. A qualitative study from New Zealand found that adolescents tend to conceptualize depression as a "genuine" mental illness and view problematic alcohol behaviours as a natural part of youthful indiscretion (119). Many of the symptoms that were markers of problematic alcohol use were considered by the students to be desirable experiences. This discrepancy in perceptions among people with different disorders has also been found in adults. A study of 15 - 54 year olds in the American National Comorbidity Survey found that among those with mood

disorders 49% perceived a need for help, 21% for anxiety disorders, and 14% for substance use disorders (120). This project found that same decreasing trend.

Results from this project suggest a much lower rate of receiving help and using services than existing estimates from previous national studies. A cross-sectional study using the CCHS found that 40% of adolescents with depressive disorders had unmet need (121). A study of Atlantic Canadians identified as having a probable depressive disorder estimated that 66.5% of adolescents received no care (50). Meanwhile, 73% of the students in our study with a probable depressive disorder had unmet need for help. Cometto's estimate of unmet need for help among adolescents with a variety of disorders was 73% (62). Among all students with an evaluated need for help with a disorder in the SDUSAP, our study found unmet need for help was 84%. Comparing our results with the CCHS is difficult as it relies on self-reported disorder status, however our results are similar to those found by Starkes. While slightly elevated relative to Starkes, it should be noted that Starkes used a different screening scale (CIDI) which identified only 7.5% of adolescents as having probable depressive disorders (50). It may be that the CIDI has greater specificity than the measures in this study, which would be expected to lead to a lower rate of unmet need if the measures in this study included false positives who were unlikely to receive help. Additionally, Cometto's estimate is from a pool of urban students (Windsor, ON), whose access to care is anticipated to be higher than a predominantly rural population such as Atlantic Canada.

6.2 Associations with Disorders

We examined social capital measures' associations with being at high risk for probable depressive and anxiety disorders and having an evaluated need. For probable depression and anxiety, those with increasing levels of all three social capital measures were less likely to have an evaluated need. This was not consistently found for substance use disorders, making it unclear if social capital may play a role in substance use problems. For alcohol, high community social capital was a marker for problematic drinking relative to low community social capital, while higher trust in others at school was more likely to be found in those without problematic drinking. For drug use disorders, higher feelings of trust in others were more common among those without problematic drug use than those

with problematic use. The hypothesis that living in rural communities would be associated with being at high-risk compared to metropolitan communities was not supported.

One of the first theoretical applications of social capital was its impact on overall health and well-being. Putnam, one of the originators of the concept of social capital, believed that disconnectedness in America had resulted in detrimental consequences for Americans' physical and mental health (122). Even though social capital was developed within an adult framework, it had been expected that adolescents could access social capital as well, especially in school settings where their autonomy is more apparent, with an ultimate effect of improving their health (123). A systematic review of studies of social capital and mental health disorders/behavioural problems found that higher quality and wider social capital networks were associated with fewer internalizing problems such as depression and anxiety (123). High quality environments in schools were repeatedly demonstrated to predict improved mental health of students. This protective feature of relationships in schools was generally the case in our study. The exception for social capital was for medium community social capital's association with a higher risk of problematic drinking compared to low community social capital, though this was not entirely unprecedented. This was observed in a Greek version of the HBSC, which found that higher community participation for boys and stronger neighbourhood connections for girls were associated with increased drinking and, for girls, binge drinking (124). That study and our own findings are in disagreement with Winstanley's paper which noted that higher community participation was associated with decreased drinking (12). Our initial expectation was that, with less social control, adolescents would be more likely to exhibit behaviours that were discouraged by society. Our results may be a product of the strong drinking culture in Atlantic Canada, which associates drinking with socializing and, while not necessarily encouraging it, expects adolescent drinking to occur (125). It may be that students use drinking as a means of increasing their social networks, and as a result, highly pro-social adolescents drink more than socially deficient adolescents. The fact that higher trust in others at school was negatively related to problematic drinking but greater community social capital was positively related might indicate that supportive relationships in the broader communities of Atlantic Canada contribute to problematic drinking behaviour, while supportive classmates sustain reduced drinking or abstinence.

It may be that older Atlantic Canadians do not exhibit enough disapproval towards adolescent drinking. Large and tight-knit communal groups in Atlantic Canada might differentially use alcohol compared to weak social networks. A qualitative report of drinking in Atlantic Canada concluded that alcohol was a cultural norm, where the expectation was to drink during social events (125). According to the Social Development Model, adolescents who are intertwined with communities which expect drinking as a means of socialization will become bonded to that activity as the community approves of drinking (126). This explanation was supported by the fact that higher community social capital was not a predictor of problematic drug use. Due to the legal prohibition of drugs, there has been a more clear disapproval of drug use from a legal lens, as well as an increased difficulty in acquiring drugs. This reduction in acceptability and accessibility may prevent social groups from easily or openly using, and thus prevent the normalization of drug use in the mind of highly connected adolescents.

6.3 Associations with Perceived Need

Among those with an evaluated need, social capital was frequently related to perceived need for help. Generally those with higher levels of social capital were less likely to perceive a need for help, which was the opposite of the original hypothesis. The expectation was that higher social capital would be positively related to perceived need for help due to a combination of students' increased willingness to discuss their problems with others, and others in the community identifying a student's problematic behaviours (6). Higher levels of each of the social capital measures were only found to be associated with not perceiving a need for help.

Our analyses did detect differences in the likelihood of perceived need across rurality. Living in increasingly rural communities was associated with not perceiving a need for help for those with probable depression and anxiety disorders. This was in line with the findings of previous studies, where mental health illiteracy and stigma were more common in rural communities, contributing to lower perceived need (4). However for perceived alcohol need, those living in rural communities were more likely to perceive a need for help than those living in metropolitan areas, the opposite of our hypothesis.

Increased rurality was not associated with perceived need among those with drug use disorders.

It was surprising to find that increasing social capital was significantly and negatively associated to perceiving a need for help. One of the multiple models which theorize how social relationships influence health outcomes is the stress-buffering model (127). Originally theorized by Cohen and Willis, Kawachi proposed a model to understand how individuals might react to a stress inducing experience (e.g. decreased psychological health). Social supports might lead to individuals having a more benign appraisal of the severity of their situation, and avoid a cascading series of worsening emotion, psychological, and behavioural responses.

This dampening by social capital has been explored through the notion of “natural recovery”, or spontaneous remission. A previous thesis on the association between social capital and substance use pointed out that many Canadians with substance use problems undergo natural recovery (128). Seventy-seven percent of Canadians who recovered from problematic drinking underwent recovery without medical intervention. A series of qualitative interviews with 40 spontaneously recovered addicts found that the relationships individuals had before their addiction, and the ones they were able to be maintain during, were essential in recovering from dependency (129). While those interviews were only with adults, one common finding was that having a stable social network within which addicts were able to observe the consequences of their use was a large factor in inspiring change. A similar Swedish study undertook in depth examinations of the lives of drug and alcohol users who recovered by either treatment or through self-remittance (130). The authors found that long term changes to user’s social standing, health, and finances were often a signal to self-remitting users that they needed to change their behaviours. Those who remitted with treatment tended to have rapid changes in their lives such as medical or legal incidents which inspired change relative to those who required treatment. Intense social networks might provide continual markers for students which guide decisions to change use behaviours before dependency makes changing behaviours difficult. On the other hand, students without those markers may continue to problematically use and eventually decide they need help as they can no longer stop using on their own. It may be that reaching out for help only comes into play after the supportive

surroundings are unable manage the problems (130), and that the use of mental health services and help is a reflection of social deficit as opposed to social capital (131).

Increased rurality was significantly associated with lower odds of perceived need for help with depression and anxiety. The association of increased rurality with decreased perceived need for help related to probable depressive and anxiety disorders was in line with the hypotheses of this project: rural areas are known to harbour less supportive attitudes toward mental health help and services relative to more urban settings (132). There is an additional emphasis on self-reliance in rural communities that may make seeking help an undesirable option for adolescents (132). The long history of self-employed fishing and living in small communities of the Atlantic Provinces may foster a strong “can-do” attitude in adolescents that carries over to being able to handle mental disorders without intervention.

There was a notable discrepancy, where living in increasingly rural communities associated with greater odds of perceived need for help only for problematic alcohol use. This may be due to rural Atlantic Canadians being systematically more likely to experience harms than urban Canadians. For example, a cross-Canada report concluded that rural students were more likely to experience drunk driving than urban students (133). While 48% of students from our population were rural, rural adolescents constituted 55% of driving under the influence of alcohol experiences. Drinking and driving puts an individual at high risk of legal and physical consequences which can be signals to adolescent of a problem, especially given the severity of negative experiences. Cars are also a significant status symbol for rural adolescents (134), making consequences related to driving more powerful motivators. Additionally, drinking and driving is likely an easier symptom for others to detect than other symptoms, which could promote identifying other negative experiences measured in the SDUSAP, such as tensions with family and friends, and eventually a desire to change habits. Lastly, in a qualitative report concerning Nova Scotians, rural adolescents were more likely to report personally knowing a tragic drunk driving incident than urban adolescents (134). As a result, the report postulated that rural youth were more acutely aware of the risks of injury and death related to drinking and driving than their urban counterparts. Concerns about injury coupled with the greater

possibility of personal knowledge around drunk driving may explain why rural adolescents were more perceptive of their evaluative need.

6.4 Associations with Unmet Need

Similar to perceived need, the associations between social capital and unmet need were unexpected. Higher feelings that others at school were helpful were repeatedly, positively associated with unmet need for help related to depressive and anxiety disorders. Additionally, medium community social capital was related to an increased odds of unmet need for help for problematic drinking compared to low community social capital. The literature suggested the opposite where increased social capital for students would increase the transfer of knowledge about available resources, increase support for help-seeking decisions, and in turn increase help-seeking (6). However, increasing rurality did relate to unmet need as anticipated, being positively related to unmet need for help. Specifically, rurality was related to unmet depression and anxiety need. This expectation was due to the geographic, financial, and social barriers to accessing help in rural communities (12). The same association was anticipated for unmet alcohol and drug need, but was not demonstrated.

Our findings were counter to Nelson, who wrote one of most authoritative papers on unmet mental health needs in Canada and how community relationships are associated with those outcomes. Nelson found that higher levels of social support and connectedness among Ontario adults were associated with lower odds of unmet need (49), possibly through increased opportunities to confide in others and learn about mental health. However, Nelson did hint at the possibility of social relationships reinforcing individuals' decisions to address mental health issues independently (49), a notion echoed in findings by Winstanley.

Winstanley's paper on the role of social capital and neighbourhood disorganization and unmet alcohol or drug use needs offers the closest analogue to the results of this project. Her paper found that medium and high levels of social disorganization (measured by perceptions of crime and neighbours' willingness to help one another) were significantly associated with greater substance use treatment compared to low social disorganization (12). An increase in social disorganization in that study was analogous to a decrease in

social capital in our study (measures of safety and relationships with neighbors). After controlling for disorder status, Winstanley found that those living in highly disorganized neighbourhoods were 50% more likely to receive treatment than those living in non-disorganized neighbourhoods. Our results showed a positive association between higher social capital measures and unmet need. Community social capital was significantly associated with unmet need for help only for alcohol at the medium level relative to low community social capital. For both depressive and anxiety need, we found higher feelings of helpfulness were positively related to unmet need. Winstanley's conclusions aligned with our results and suggested an inverse relationship exists between social capital measures and the receiving help for depression, anxiety, and substance use .

Winstanley offered three possible explanations as to why social capital might not be positively related to access to help: 1) social capital was not a conduit that actively promoted health in adolescents; 2) the stigma surrounding mental health treatment might have prevented social capital from promoting health; and 3) youth with prosocial relationships may not have needed help (12). The first explanation offered an intuitive interpretation where social capital may simply not be related to accessing help. However it does not adequately address why both Winstanley's study and our study found significant negative associations. Stigma as an explanation made sense in the context of our study's findings. For unmet alcohol needs, higher community social capital was associated with a higher odds of unmet need. Given the pro-drinking norms of Atlantic Canada and the stigma of help-seeking, it is reasonable to interpret this result as a product of social ties preventing students from help-seeking out of concerns about the stigma associated with requiring alcohol treatment. As Pescosolido stated, social capital can only increase care if the care is in line with the norms of that community (68). Winstanley's third explanation was in line with our previous interpretation of our results. The concepts of stress-buffering and natural recovery might help to explain why students with higher social capital were less likely to seek help. Higher social capital may have mitigated the length and severity of a disorder episode by promoting recovery. A clinical study of children with depression found that higher attachment to peers was associated with an increased likelihood of a resolution of a depressive episode. Among those with resolved depression, peer attachment was 25% higher in those without medical intervention than those who received an intervention;

parental attachment was elevated to a nearly identical percentage (135). This may explain why higher feelings of helpfulness were associated with higher odds of unmet need among those with probable depressive and anxiety disorders; perhaps higher feelings of trust helped students resolve their depression and avoid help-seeking.

The timelines of the symptom questions in the survey may also explain why social capital measures exhibited differential associations between the depressive and anxiety disorders and the substance use disorders. Anxiety and depression symptoms were measured based on students' feelings within the past 7 and 30 days, respectively, while alcohol and drug use were measured over the past 12 months. All perception of need and help-seeking questions were asked in the context of the past 12 months. Probable depressive and anxiety disorder assignments would be biased towards more recent disorders, which have had less time for recognition and help-seeking, because disorders which resolved in the past year but not in the past month would not be included. Problematic substance use assignments would contain a wider mix of recent and long-standing disorders, including old disorders which were resolved. As social capital is hypothesized to act over time through relationships, this difference in time may influence social capital's associations with the various outcomes.

Differences in the directionality of association between rurality and unmet need for help across disorders was another interesting discrepancy. The hypothesis for this study was that increased rurality would be associated with increased unmet need for help in each disorder type. Yet, only for depression and anxiety was there a significant association between increased rurality and increased unmet need for help. One reason for this discrepancy may be the difference in treatment regimens by medical professionals for mental disorders compared to substance use disorders. In conjunction with the more common cognitive therapies, depression and anxiety treatment regimens more frequently incorporate pharmacological interventions which can be provided exclusively by licensed physicians and adolescent mental health specialists (136,137), who are often unavailable in rural communities (70). Physicians are also frequently unprepared or unwilling to manage adolescent substance use disorders in their practices (138,139). Substance use treatment on the other hand involves more behavioural adjustment and social support to prevent relapse (e.g. group therapy) (140), which can be organized by unregistered therapists and

counselors (e.g. Alcoholics Anonymous). Adolescents are known to strongly prefer non-medical resources over family doctors and psychiatrists, due to a combination of perceived lack of severity in their own case and disapproval of the perceived standoffishness of medical providers (119). Unregulated care providers may be more able to provide care in rural communities due to fewer educational and financial requirements, and if their more informal nature is preferred, it would explain why rurality did not predict unmet need related to substance use; unlike depression and anxiety whose treatments tend to be centred on physicians.

There are a variety of more informal forms of help which are beneficial to individuals suffering from depression, anxiety, and problematic substance use. As mentioned throughout the discussion of social capital and its relationship to evaluated need, social relationships are known to be protective against negative mental health experiences. In the context of adolescents, social relationships can extend to school counselors, teachers, and parents, who also can be a form of help when they act as counselors and guiders of adolescents' behaviours. These forms of help are unlikely to be differently dispersed across rurality, however relying on social relationships might not fit within students' understanding of what it means to seek help. They may narrowly view help in a biomedical sense. Sunderland's worked showed that Canadians with mood and anxiety disorders are more likely to desire medication and counselling than information (47). Because our measures are self-reported, if adolescents do not consider these informal resources as help, even though these are the resources most likely to be accessed (5), then the types of care which are unequally distributed across rurality and perceived as the help needed will exaggerate the associations between rurality and unmet need. As mentioned earlier, adolescents tend to view depression and anxiety as medical issues while alcohol and drug use is not (119), which may lead to an overreliance of medical help with depression and anxiety. This would result in limitations to access to medical help due to rurality over-exaggerating the relationship between rurality and unmet need.

Our interpretations of the unexpected results for the associations of social capital to perceived need and unmet need are in line with the original theorized mechanism of social capital on health. Three mechanisms, affecting health, affecting service availability, and affecting psychosocial processes were originally formulated (6), though we anticipated

social capital to be primarily working through the last branch. However our results suggest that perhaps social capital in adolescents in Atlantic Canada primarily functions through affecting health directly by preventing negative experiences instead of leading to treatment for those that develop.

6.5 Associations across Rurality

Stigma was mentioned several times throughout the discussion as a possible explanation for why social capital measures may or may not be associated with perceived need or unmet need outcomes. The expectation was that, in more rural communities, increased social visibility and concerns about stigmatization would lead to social capital being less accessible to adolescents when it came to depression, anxiety, and substance use issues. This would in turn weaken social capital's associations to perceived need and unmet need in rural communities. We expected higher social capital to be less strongly related to perceiving a need for help and receiving help with increasingly rural communities. However, our main results indicated that higher social capital was generally associated with lower perceived need and higher unmet need. Our interpretation of these findings largely revolves around social capital's ability to subtly mitigate the severity of disorder symptoms such that students do not realize that they have a need, and resolve their problems on their own. As a result, issues of social visibility and stigma in rural communities would not be expected to affect the protective and mitigating nature of social capital. This was demonstrated when we consistently failed to demonstrate different associations depending on rurality.

6.6 Strengths

This study has a number of key strengths. The sampling methodology provided a large sample size representative of the Atlantic region. The methodology also weighted students' responses so that to reduce non-response biases. There was a high overall response rate which helped to reduce participation biases. To avoid confounding biases, a large array of questions were included in adjusted regression models which was only possible due to sample size. A smaller study would have impeded the ability to control for a host of potential confounding variables with any reasonable power.

Along with the sampling methodology, the sample itself was a benefit for investigating the goals related to rurality. Atlantic Canada provides a region where the split between rural and urban communities is approximately equal. This allows for a region for which there is not a skewed population distribution which prevents conclusions from easily being drawn in the minority population setting (i.e. too few rural students in a sample).

The validity of the survey was previously established with a high degree of robustness (91). Specifically, this study included previously validated scales for probable depression and anxiety which have been incorporated into other cross-sectional surveys. This helped to increase the internal validity of the study by increasing the confidence that students identified as having probable depressive and anxiety disorders were experiencing elevated symptoms. The use of these common measures for probable depression and anxiety also helped to increase the external generalizability to other studies which used these scales.

A limitation in other Canadian studies of this topic area has been the measurement of social capital. For example, Fleury's study of social capital and access to care in Montréal used the average tenancy of residential units (9), which did not provide a good understanding of the perceptions of those living in the communities. Our study was able to rely on three different measures of social capital, including one incorporated into the HBSC survey (106). The ability to measure school and community social capital independently was critical to understanding the impact of those two distinct worlds on students' help-seeking for depression, anxiety, and substance use. Additionally, the fact that community social capital was adopted by one of the largest ongoing adolescent health studies helped to unify the social capital literature. Studies related to social capital have bemoaned the inconsistency of social capital measurements, limiting generalizability (7). If the literature on social capital is going to become more unified at some point it will have to move towards a collective measure.

6.7 Limitations

This study is not without limitations. A limitation inherent to all cross-sectional surveys is the inability to determine causal order. In the case of this study, it was not

possible to determine if social capital measures caused or were caused by the outcomes of interest. It is possible that high-risk disorder status changed how students perceived others in the community, altering their answers to social capital measures. It may be that when disorders manifested, students began to feel less as if they could rely on others. There were other survey inherent biases such as the self-report nature of the survey which made it impossible to fully understand the level of social capital of a student except through their own perspective, recall biases due to students forgetting or not understanding their own experiences and circumstances, and under-reporting or social desirability biases which may have caused students not to admit to certain experiences and to embellish others.

As described in the introduction, assigning need is a contentious area in the literature. While some studies exclusively use the perceived need of study participants, others prefer to use diagnostic criteria of disorders, especially with children, or to use clinician's opinion (141). All studies have to balance the trade-off of sensitivity and specificity. Using symptomatic indicators in our study as a measure of need was inherently biased to including false positives because not everyone with a probable disorder requires intervention from the health care system to recover to a state of health and low-need. Thus our estimates of evaluated need were biased upwards. It is important to interpret the overall rates of each outcome with this consideration, and to focus more on how the areas surveyed differed relative to one another. In terms of logistic models, these false-positives increased the likelihood of a null result, because social capital and rurality were systematically less likely to influence perceptions of need and help-seeking among those without a genuine need.

While the investigators in the SDUSAP designed it to identify students with probable depressive and anxiety disorders using validated scales (the CES-D and SCARED scales, respectively), identifying probable substance disorders through validated scales was not explicitly part of the SDUSAP. Information included in the survey employed constructs similar to the CRAFFT scale, but not in an identical manner. This creates the inherent limitation of an unknown sensitivity and specificity, which can only be assumed to be similar to the original CRAFFT. The SDUSAP also missed information corresponding to using substances to relax, using substances while alone, and forgetting while using drugs. This reduced the sensitivity for detecting substance use disorders. It likely did not affect

the specificity, because students without substance use disorders would have been unlikely to report the excluded behaviours. As a result, the need was likely underestimated relative to the original CRAFFT scale. The decrease in sensitivity was mitigated by the fact that this project uses a cut-off score of 1 instead of the traditional CRAFFT cut-off of 2. However this decision invariably increased the number of students who were incorrectly labelled as having a substance use need, and biased the logistic regression results towards a null result, as those without a disorder were unlikely to get help or to perceive a need.

6.8 Implications

Findings from this study offer important recommendations for governments and policy makers. We consistently demonstrated that adolescents with higher social capital were less likely to demonstrate being at high risk for several of the highest burden mental health and substance use disorders in Canada. Considering that many disorders begin to manifest in adolescence, understanding the circumstances which can contribute to chronic disorders is an important public health and pecuniary topic for governments. We found that those with higher social capital were up to 50% less likely to experience high levels of symptoms related to the disorders of interest. While directly creating social capital is likely too difficult for a government to achieve, governments may be able to create the conditions that encourage social capital to develop (142). This is especially true for adolescents who spend a significant proportion of their day in governmental institutions (143). By taking steps such as creating social activities or promoting collaboration, it may be possible for schools to achieve reductions in depression, anxiety, and substance use as a by-product of other efforts which may also target fitness, safety, and academic performance. The best practices for building social capital among adolescents tend to revolve around schools encouraging volunteerism, strengthening relationships between different levels of communities (friends, families, neighbours), and strengthening relationships to governmental organizations (144). Thinking of schools as governmental organizations, cohesive relationships can be built by higher quality teachers, fair discipline and grading, and interesting learning environments (145). Our findings offer a strong statement to encourage schools and communities to support adolescents' participation in society, and to recognize that cuts to funding for programs which are friendly towards adolescent

involvement may result in unforeseen increases in adolescent depressive, anxiety, and substance use disorders.

6.9 Future Directions

Given that results related to social capital and its associations with perceived need and unmet need were generally the opposite of our hypotheses, there is considerable future research that would be beneficial to this area of interest. Throughout the discussion we noted how higher social capital may be associated with a lower odds of perceived need and a higher odds of unmet need for two reasons: negative impressions and stigma surrounding mental health might act to discourage help-seeking, and social capital may have protected adolescents against more severe episodes, instead resulting in milder degrees of evaluated need. Following the Andersen and Srebnik model's, less severe levels of evaluated need would lead to lower perceived need and use of help. Qualitative research investigating the experiences of adolescents who display symptoms of depression, anxiety, and problematic substance use might offer some insights into which, if either, of these explanations reflects students' lived experiences. A finding that social relationships discourage help-seeking would be a limited finding in terms of its application outside of Atlantic Canada, but would have significant implications about future efforts to destigmatize depression, anxiety, and substance use disorders and their corresponding treatments. A finding that social capital mitigates the need for help-seeking could have broad application suggesting to policy makers the importance of reciprocating relationships in communities for reducing depression, anxiety, and substance use.

Additionally, gathering more information about the types of help students desire and use would help to guide future planning for the purposes of expanding access to care. The questions in this project were general in their assessment of perceived need and help received. Other studies have been able to measure need related to information, counseling, and medication (47). Including these measures in future work would help tease out the mechanism by which social capital acts on adolescent help-seeking.

Lastly, longitudinal work in the area of social capital and adolescent help-seeking would help to alleviate the limitations of this study. The cross-sectional nature of our dataset did not allow for an assessment of causation, which is one of the major advantages

of longitudinal research. Longitudinal research would allow for an investigation into how social capital affects the risk of a disorder over time. Because social capital is theorized to act over time, longitudinal work would address issues related to when social capital was measured, when disorder indicators were manifest, when need was perceived, and when help was sought.

This area of research offered few analogous studies with which to compare results. While there is considerable research in Canada with regards to unmet needs in adults and the barriers experienced by adults, the limited adolescent research offered few opportunities to contextualize our results. This study largely limited to describing this field. We encourage future research in adolescent help-seeking in Canada, and how social capital relates to adolescent help-seeking to better understand the implications of our results.

6.10 Conclusions

This project investigated the role of social capital and rurality on two steps of the help-seeking process for adolescents in a Canadian population. There is a gap in the current understanding of social capital's role in a Canadian context on perceptions of need for help and help-seeking among those identified as having a need for help. We expected social capital to be protective against disorder symptoms and that was borne out in our results. However, higher social capital was generally associated with lower perceived need and met need. Even though this finding might be a signal that social capital is acting as a barrier to help, we have offered possible explanations for why our findings might suggest that social capital is primarily increasing health not access. Understanding the association of social capital with help-seeking will be an interesting endeavour for future research.

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Appendix I: Results Tables

Table I: Descriptive table of study sample with population weighted percentages

VARIABLE	Sample size	Population weighted %
AGE		
14	940	13.4
15	2,189	31.4
16	1,422	20.9
17	1,101	16.4
18	1,021	16.5
19	87	1.4
Average		16.0
SEX		
Female	3,406	50.5
Male	3,229	47.3
Indeterminate	143	2.2
FAMILY STRUCTURE		
2 P/G	5,137	74.8
1 P/G	1,190	18.4
Others	451	6.8
SES		
Low	410	5.5
Moderate	3,630	54.8
High	2,365	34.3
Indeterminate	374	5.4
AVERAGE MARKS		
<80%	3,137	45.1
80+%	3,167	47.8
Indeterminate	47	7.2
MATERNAL EDUCATION		
Post-secondary	3,830	58.2
Graduate HS	1,213	18.0
Did not graduate HS	515	7.0
No information	1,220	16.7
RELIGIOUS ATTENDANCE		
Infrequent	5,595	83.4
Frequent	1,183	16.6
FAMILY CONNECTEDNESS		
Low	1,673	25.0
Medium	2,518	37.5
High	2,512	37.5
COMMUNITY SOCIAL CAPITAL		
Low	2,179	35.5
Medium	2,848	42.8
High	1,632	21.7
SCHOOL TRUST		
Do not trust others	2,754	44.2
Trust Others	3,905	55.8
SCHOOL HELP		
Others do not help	2,891	45.5
Others help	3,758	54.5
RURALITY		
Metropolitan	1,180	30.6
Urban	1,221	20.3
Rural	4,252	48.1
Indeterminate	125	1.0

Table II: Frequency values and population weighted percentage of social capital measures across rural classifications and Pearson Chi².

MEASURE	Metropolitan	Urban	Rural	Indeterminate	p-value
COMMUNITY SOCIAL CAPITAL					
Low	427 (37.5)	426 (35.7)	1297 (33.1)	30 (27.1)	0.092
Medium	501 (42.5)	509 (41.4)	1786 (42.1)	52 (42.6)	
High	233 (18.2)	262 (21.3)	1096 (23.4)	41 (27.1)	
SCHOOL TRUST					
Don't trust others	473 (44.1)	565 (46.4)	1666 (41.8)	51 (49.9)	0.614
Trust others	686 (54.3)	637 (52.2)	2507 (56.3)	75 (50.1)	
SCHOOL HELP					
Others don't help	473 (43.5)	559 (46.4)	1812 (44.8)	48 (43.7)	0.674
Others help	687 (54.9)	643 (52.4)	2350 (53.1)	78 (56.3)	

Missing category for each measure omitted

Table III: Cross tabulation of demographic features across social capital measures with frequency values, population weighted percentages, and Pearson Chi

Measure	Community Social Capital				School Trust			School Help		
	Low	Medium	High	p-value	Low Trust	High Trust	p-value	Low Help	High Help	p-value
Age										
14	286 (13.3)	401 (13.5)	238 (13.3)	0.291	348 (12.4)	570 (13.9)	0.076	378 (12.4)	537 (13.9)	0.484
15	721 (32.5)	876 (29.6)	551 (32.9)		886 (31.4)	1266 (31.4)		947 (31.0)	1207 (32.0)	
16	477 (21.4)	580 (20.3)	336 (21.1)		642 (22.8)	762 (19.5)		635 (21.8)	756 (20.1)	
17	353 (16.1)	474 (16.8)	259 (16.3)		435 (15.7)	651 (17.1)		469 (16.4)	616 (16.4)	
18	303 (14.8)	467 (18.4)	238 (15.8)		389 (15.8)	609 (17.0)		417 (16.7)	586 (16.4)	
19	39 (2.0)	38 (1.3)	8 (2.0)		48 (1.8)	38 (1.0)		40 (1.7)	46 (1.1)	
Mean (Years)	15.9	16.0	15.9		16.0	15.9		16.0	15.9	
Sex										
Female	1105 (50.5)	1467 (51.3)	793 (50.0)	0.640	1531 (55.8)	1827 (46.6)	<0.001	1534 (53.0)	1824 (48.7)	0.017
Male	1027 (47.3)	1319 (46.4)	812 (48.4)		1154 (41.7)	2011 (51.7)		1299 (45.0)	1854 (49.1)	
Indeterminate	48 (2.3)	62 (2.3)	27 (1.5)		70 (2.6)	67 (1.7)		59 (2.0)	80 (2.3)	
Family Structure										
2 P/G	1508 (68.7)	2187 (75.7)	1362 (84.0)	<0.001	2000 (71.7)	3052 (77.3)	0.005	2136 (72.3)	2903 (76.8)	0.009
1 P/G	490 (23.3)	483 (17.7)	196 (11.6)		537 (20.5)	636 (16.9)		544 (20.3)	629 (17.0)	
Others	182 (8.0)	178 (6.7)	74 (4.5)		218 (7.8)	217 (5.8)		212 (7.4)	226 (6.2)	

	Community Social Capital				School Trust			School Help		
	Low	Medium	High	p-value	Low Trust	High Trust	p-value	Low Help	High Help	p-value
SES										
Low	210 (9.0)	132 (3.6)	64 (3.8)	<0.001	233 (7.6)	173 (4.0)	<0.001	223 (7.4)	181 (4.0)	<0.001
Medium	1281 (61.0)	1539 (54.4)	766 (46.3)		1521 (57.4)	2060 (53.0)		1617 (56.6)	1964 (53.7)	
High	555 (23.8)	1051 (27.5)	723 (45.5)		866 (30.3)	1480 (38.0)		910 (31.4)	1427 (37.0)	
Indeterminate	134 (6.1)	126 (4.5)	79 (4.5)		135 (4.7)	192 (5.0)		142 (4.6)	186 (5.3)	
Average Marks										
80%	1175 (52.4)	1268 (42.3)	627 (37.6)	<0.001	1380 (49.5)	1689 (41.2)	<0.001	1395 (46.7)	1674 (43.5)	0.036
80+%	793 (37.3)	1389 (51.3)	952 (59.1)		1170 (42.8)	1986 (52.3)		1293 (46.0)	1842 (49.9)	
Indeterminate	212 (10.3)	191 (6.3)	53 (3.3)		205 (7.6)	248 (6.5)		204 (7.3)	242 (6.7)	
Maternal Education										
Post-secondary	1069 (50.9)	1668 (60.3)	1040 (67.1)	<0.001	1485 (54.2)	2295 (61.9)	<0.001	1610 (56.3)	2169 (60.2)	0.022
Graduated HS	410 (19.6)	518 (18.1)	270 (15.9)		541 (20.1)	659 (16.6)		537 (19.6)	662 (16.9)	
Did not graduate HS	222 (10.2)	197 (5.8)	90 (4.2)		244 (8.5)	260 (5.7)		243 (7.7)	260 (6.2)	
No information	479 (19.3)	465 (15.8)	232 (12.8)		485 (17.2)	691 (15.8)		502 (16.4)	667 (16.7)	

	Community Social Capital				School Trust			School Help		
	Low	Medium	High	p-value	Low Trust	High Trust	p-value	Low Help	High Help	P-value
Religious Attendance										
Infrequent	1872 (86.4)	2347 (83.0)	1281 (79.1)	<0.001	2312 (84.7)	3186 (82.3)	0.058	2406 (84.0)	3081 (82.8)	0.303
Frequent	308 (13.6)	501 (17.0)	351 (20.9)		443 (15.3)	719 (17.8)		486 (16.1)	677 (17.2)	
Family Connectedness										
Low	761 (34.9)	641 (22.3)	237 (13.7)	<0.001	829 (30.8)	823 (20.4)	<0.001	875 (30.9)	771 (20.1)	<0.001
Medium	819 (38.3)	1168 (39.8)	505 (32.2)		957 (35.0)	1514 (39.2)		1012 (34.4)	1464 (39.9)	
High	588 (26.8)	1019 (37.9)	881 (54.1)		954 (32.2)	1534 (40.4)		985 (34.7)	1493 (40.0)	

Table IV: Number of students with each outcome and population weighted percentage

OUTCOME	Sample size	Population weighted %
DEPRESSION		
Need	697	10.5
Perceived Need	534	8.3
Unmet Need	522	7.6
ANXIETY		
Need	1,741	26.9
Perceived Need	704	11.4
Unmet Need	1,499	22.6
ALCOHOL		
Need	2,374	33.7
Perceived Need	131	1.8
Unmet Need	2,263	32.3
DRUGS		
Need	1,038	16.7
Perceived Need	141	2.4
Unmet Need	943	15.2

Table V: Population weighted outcome percentages by province and Pearson Chi²

OUTCOME	Newfoundland & Labrador	New Brunswick	Nova Scotia	p-value
DEPRESSION				
Need	11.0	9.5	11.2	0.343
Perceived Need	8.5	7.6	8.7	0.467
Unmet Need	7.7	6.7	8.4	0.475
ANXIETY				
Need	28.0	24.8	28.0	0.183
Perceived Need	11.4	9.6	12.9	0.107
Unmet Need	23.4	21.5	23.0	0.085
ALCOHOL				
Need	39.7	29.4	34.2	<0.001
Perceived Need	2.5	1.0	2.1	<0.001
Unmet Need	37.6	28.3	32.9	<0.001
DRUGS				
Need	15.0	14.2	19.6	<0.001
Perceived Need	2.0	1.8	3.0	0.007
Unmet Need	14.0	12.9	17.7	0.002

Table VI: Population weighted outcome percentages by health region in Newfoundland and Labrador and Pearson Chi²

OUTCOME	100	200	300	400	p-value
DEPRESSION					
Need	9.8	11.6	9.0	11.5	0.372
Perceived Need	8.4	8.7	5.7	9.3	0.385
Unmet Need	6.3	8.5	7.6	7.6	0.327
ANXIETY					
Need	27.3	26.6	23.2	29.9	0.301
Perceived Need	8.0	10.3	6.9	13.5	0.271
Unmet Need	23.1	23.8	20.8	24.7	0.349
ALCOHOL					
Need	41.7	40.7	34.8	40.8	0.506
Perceived Need	3.2	1.7	2.3	2.7	0.293
Unmet Need	38.0	39.0	33.4	38.4	0.747
DRUGS					
Need	15.0	17.2	11.8	15.3	0.249
Perceived Need	2.2	3.2	1.1	1.9	0.422
Unmet Need	13.7	16.2	11.3	14.2	0.367

Table VII: Population weighted outcome percentages by health region in New Brunswick and Pearson Chi²

OUTCOME	1	2	3	4	5	6	7	p-value
DEPRESSION								
Need	9.0	11.8	12.0	4.6	6.5	4.4	9.5	0.320
Perceived Need	7.6	8.5	9.8	3.9	5.7	3.1	7.0	0.453
Unmet Need	6.0	7.3	8.9	2.9	5.8	3.3	8.0	0.316
ANXIETY								
Need	24.0	23.7	29.9	23.5	21.6	20.1	23.1	0.226
Perceived Need	9.2	9.9	11.1	7.8	8.8	7.3	9.2	0.375
Unmet Need	20.5	20.3	26.2	19.7	20.1	18.0	21.1	0.449
ALCOHOL								
Need	24.5	29.4	30.2	31.5	37.0	31.3	36.5	0.111
Perceived Need	1.3	0.7	0.7	0.3	1.2	1.5	2.2	0.262
Unmet Need	23.4	28.8	28.4	31.5	34.4	30.5	35.0	0.527
DRUGS								
Need	11.7	15.7	19.2	10.9	8.8	9.7	12.1	0.099
Perceived Need	1.4	2.7	2.2	1.6	1.2	0.8	1.1	0.284
Unmet Need	10.6	14.6	16.9	10.6	8.8	9.2	10.0	0.129

Table VIII: Population weighted outcome percentages by health region in Nova Scotia and Pearson Chi²

OUTCOME	1	2	3	4	p-value
DEPRESSION					
Need	10.7	14.8	12.8	9.3	0.064
Perceived Need	8.6	10.3	10.2	7.5	0.132
Unmet Need	8.6	10.8	10.0	6.3	0.211
ANXIETY					
Need	23.8	26.7	30.8	29.4	0.179
Perceived Need	11.8	12.1	12.6	13.9	0.283
Unmet Need	19.5	22.9	26.5	23.4	0.242
ALCOHOL					
Need	34.1	37.4	36.4	31.9	0.249
Perceived Need	1.8	3.3	2.3	1.7	0.562
Unmet Need	33.0	36.2	33.9	31.0	0.569
DRUGS					
Need	19.0	19.3	19.3	20.1	0.945
Perceived Need	3.2	2.5	2.7	3.2	0.970
Unmet Need	17.7	17.5	16.9	18.1	0.978

Table IX: Logistic regression of probable depressive disorders on social capital, rurality, and control variables among all included students (n = 6186)

VARIABLE	Unadjusted Odds Ratio (95% CI)	Adjusted Odds Ratio (95% CI)
COMMUNITY SOCIAL CAPITAL		
Low	Reference	Reference
Medium	0.50 (0.38, 0.66)***	0.59 (0.44, 0.78)***
High	0.50 (0.34, 0.75)***	0.68 (0.46, 1.03)
SCHOOL TRUST		
Do not trust others	Reference	Reference
Trust Others	0.37 (0.29, 0.48)***	0.43 (0.34, 0.56)***
SCHOOL HELP		
Other don't help	Reference	Reference
Others help	0.62 (0.47, 0.81)***	0.65 (0.50, 0.86)***
RURALITY		
Metropolitan	Reference	Reference
Urban	0.86 (0.60, 1.21)	0.95 (0.65, 1.38)
Rural	0.89 (0.66, 1.21)	0.90 (0.66, 1.23)
Indeterminate	0.84 (0.29, 2.43)	0.71 (0.26, 1.92)
AGE	1.02 (0.92, 1.12)	---
SEX		
Female	Reference	Reference
Male	0.34 (0.26, 0.45)***	0.28 (0.21, 0.38)***
Indeterminate	0.69 (0.39, 0.78)	0.58 (0.27, 1.25)
FAMILY STRUCTURE		
2 P/G	Reference	Reference
1 P/G	1.29 (0.96, 1.72)*	1.09 (0.79, 1.49)
Others	1.21 (0.79, 1.86)	0.86 (0.55, 1.34)
SES		
Low	Reference	Reference
Moderate	0.53 (0.38, 0.76)***	0.54 (0.36, 0.80)***
High	0.27 (0.23, 0.48)***	0.34 (0.22, 0.53)***
Indeterminate	0.66 (0.34, 1.25)	0.74 (0.38, 1.47)
AVERAGE MARKS		
<80%	Reference	Reference
80+%	0.67 (0.52, 0.87)***	0.59 (0.53, 0.91)***
Indeterminate	0.99 (0.66, 1.49)	1.11 (0.73, 1.70)
MATERNAL EDUCATION		
Post-secondary	Reference	Reference
Graduated HS	1.23 (0.92, 1.64)	1.02 (0.76, 1.37)
Did not graduate HS	1.64 (1.04, 2.57)**	1.19 (0.80, 1.78)
No information	1.08 (0.76, 1.51)	1.04 (0.74, 1.47)
RELIGIOUS ATTENDANCE		
Infrequent	Reference	---
Frequent	0.80 (0.60, 1.07)	---
FAMILY CONNECTEDNESS		
Low	Reference	Reference
Medium	0.66 (0.50, 0.86)***	0.66 (0.50, 0.86)***
High	0.55 (0.41, 0.72)***	0.53 (0.39, 0.72)***
* p < 0.10 (only for unadjusted) ** p < 0.05 *** p < 0.01		

Table X: Logistic regression of probable anxiety disorders on social capital, rurality, and control variables among all included students (n = 6255)

VARIABLE	Unadjusted Odds Ratio (95% CI)	Adjusted Odds Ratio (95% CI)
COMMUNITY SOCIAL CAPITAL		
Low	Reference	Reference
Medium	0.78 (0.65, 0.94)***	0.77 (0.63, 0.92)***
High	0.83 (0.68, 1.01)	0.84 (0.69, 1.01)
SCHOOL TRUST		
Do not trust others	Reference	Reference
Trust Others	0.53 (0.45, 0.63)***	0.59 (0.49, 0.71)***
SCHOOL HELP		
Other don't help	Reference	Reference
Others help	0.77 (0.65, 0.90)***	0.77 (0.65, 0.91)***
RURALITY		
Metropolitan	Reference	Reference
Urban	0.93 (0.69, 1.25)	0.96 (0.72, 1.29)
Rural	1.00 (0.75, 1.33)	1.02 (0.77, 1.34)
Indeterminate	0.84 (0.43, 1.65)	0.72 (0.30, 1.72)
AGE	1.04 (0.95, 1.12)	---
SEX		
Female	Reference	Reference
Male	0.26 (0.22, 0.31)***	0.26 (0.21, 0.31)***
Indeterminate	0.50 (0.31, 1.59)	0.49 (0.31, 0.78)***
FAMILY STRUCTURE		
2 P/G	Reference	Reference
1 P/G	1.13 (0.93, 1.38)	1.08 (0.88, 1.33)
Others	1.60 (1.21, 2.11)***	1.44 (1.08, 1.93)**
SES		
Low	Reference	Reference
Moderate	0.85 (0.62, 1.15)	0.83 (0.60, 1.14)
High	0.69 (0.50, 0.95)**	0.59 (0.42, 0.84)***
Indeterminate	0.69 (0.42, 1.15)	0.71 (0.42, 1.21)
AVERAGE MARKS		
<80%	Reference	---
80+%	1.13 (0.97, 1.33)	---
Indeterminate	0.98 (0.71, 1.33)	---
MATERNAL EDUCATION		
Post-secondary	Reference	---
Graduated HS	1.01 (0.80, 1.29)	---
Did not graduate HS	1.07 (0.78, 1.45)	---
No information	0.80 (0.63, 1.01)*	---
RELIGIOUS ATTENDANCE		
Infrequent	Reference	---
Frequent	1.16 (0.95, 1.42)	---
FAMILY CONNECTEDNESS		
Low	Reference	Reference
Medium	1.03 (0.84, 1.26)	0.96 (0.78, 1.20)
High	1.17 (0.98, 1.41)*	1.03 (0.85, 1.25)
* p < 0.10 (only for unadjusted) ** p < 0.05 *** p < 0.01		

Table XI: Logistic regression of problematic drinking on social capital, rurality, and control variables among all included students (n = 6367)

VARIABLE	Unadjusted Odds Ratio (95% CI)	Adjusted Odds Ratio (95% CI)
COMMUNITY SOCIAL CAPITAL		
Low	Reference	Reference
Medium	1.01 (0.85, 1.20)	1.20 (0.99, 1.45)
High	0.94 (0.77, 1.15)	1.39 (1.12, 1.73)***
SCHOOL TRUST		
Do not trust others	Reference	Reference
Trust Others	0.71 (0.61, 0.82)***	0.73 (0.61, 0.87)***
SCHOOL HELP		
Other don't help	Reference	Reference
Others help	0.87 (0.76, 1.01)	0.92 (0.78, 1.09)
RURALITY		
Metropolitan	Reference	Reference
Urban	1.16 (0.89, 1.51)	1.20 (0.96, 1.49)
Rural	1.19 (0.94, 1.50)	1.15 (0.95, 1.39)
Indeterminate	2.53 (0.90, 7.09)	3.00 (1.44, 6.25)***
AGE	1.33 (1.26, 1.41)***	1.30 (1.22, 1.38)***
SEX		
Female	Reference	---
Male	0.34 (0.26, 0.45)	---
Indeterminate	0.69 (0.39, 0.78)	---
FAMILY STRUCTURE		
2 P/G	Reference	---
1 P/G	0.96 (0.80, 1.14)	---
Others	1.10 (0.70, 1.72)	---
SES		
Low	Reference	---
Moderate	0.94 (0.70, 1.27)	---
High	0.95 (0.71, 1.29)	---
Indeterminate	0.78 (0.53, 1.15)	---
AVERAGE MARKS		
<80%	Reference	Reference
80+%	0.54 (0.46, 0.64)***	0.68 (0.57, 0.81)***
Indeterminate	0.50 (0.37, 0.69)***	0.57 (0.41, 0.79)***
MATERNAL EDUCATION		
Post-secondary	Reference	---
Graduated HS	1.13 (0.92, 1.40)	---
Did not graduate HS	1.11 (0.83, 1.47)	---
No information	0.68 (0.55, 0.84)***	---
RELIGIOUS ATTENDANCE		
Infrequent	Reference	Reference
Frequent	0.55 (0.43, 0.72)***	0.68 (0.51, 0.89)***
FAMILY CONNECTEDNESS		
Low	Reference	Reference
Medium	0.53 (0.44, 0.63)***	0.57 (0.47, 0.69)***
High	0.22 (0.17, 0.29)***	0.25 (0.19, 0.34)***

* p < 0.10 (only for unadjusted) ** p < 0.05 *** p < 0.01

TABLE XII: Logistic regression of problematic drug use on social capital, rurality, and control variables among all included students (n = 6212)

VARIABLE	Unadjusted Odds Ratio (95% CI)	Adjusted Odds Ratio (95% CI)
COMMUNITY SOCIAL CAPITAL		
Low	Reference	Reference
Medium	0.78 (0.63, 0.94)**	0.94 (0.75, 1.17)
High	0.83 (0.63, 1.09)	1.34 (0.99, 1.81)
SCHOOL TRUST		
Do not trust others	Reference	Reference
Trust Others	0.58 (0.45, 0.75)***	0.60 (0.47, 0.78)***
SCHOOL HELP		
Other don't help	Reference	Reference
Others help	0.80 (0.63, 1.01)	0.86 (0.66, 1.11)
RURALITY		
Metropolitan	Reference	Reference
Urban	1.02 (0.69, 1.50)	1.05 (0.73, 1.50)
Rural	1.08 (0.77, 1.50)	1.05 (0.79, 1.40)
Indeterminate	1.26 (0.47, 3.34)	1.32 (0.67, 2.59)
AGE	1.41 (1.28, 1.55)***	1.36 (1.23, 1.50)***
SEX		
Female	Reference	Reference
Male	1.18 (0.99, 1.40)*	0.94 (0.78, 1.14)
Indeterminate	0.97 (0.54, 1.76)	0.76 (0.38, 1.53)
FAMILY STRUCTURE		
2 P/G	Reference	Reference
1 P/G	1.19 (0.93, 1.54)	0.99 (0.74, 1.31)
Others	1.80 (1.36, 2.40)***	1.27 (0.92, 1.77)
SES		
Low	Reference	Reference
Moderate	0.84 (0.59, 1.18)	1.02 (0.71, 1.47)
High	0.67 (0.45, 1.00)**	1.10 (0.69, 1.74)
Indeterminate	0.97 (0.55, 1.73)	1.50 (0.74, 3.04)
AVERAGE MARKS		
<80%	Reference	Reference
80+%	0.38 (0.30, 0.47)***	0.46 (0.37, 0.58)***
Indeterminate	0.56 (0.36, 0.87)**	0.69 (0.41, 1.13)
MATERNAL EDUCATION		
Post-secondary	Reference	Reference
Graduated HS	1.27 (0.99, 1.63)*	1.07 (0.81, 1.41)
Did not graduate HS	1.47 (1.01, 2.12)**	1.06 (0.74, 1.51)
No information	0.79 (0.60, 1.04)*	0.67 (0.50, 0.90)***
RELIGIOUS ATTENDANCE		
Infrequent	Reference	Reference
Frequent	0.42 (0.31, 0.56)***	0.54 (0.39, 0.74)***
FAMILY CONNECTEDNESS		
Low	Reference	Reference
Medium	0.44 (0.34, 0.55)***	0.48 (0.38, 0.61)***
High	0.16 (0.13, 0.21)***	0.20 (0.15, 0.27)***
* p < 0.10 (only for unadjusted) ** p < 0.05 *** p < 0.01		

Table XIII: Logistic regression of perceived need on social capital, rurality, and control variables among all students with probable depressive disorders (n = 676)

VARIABLE	Unadjusted Odds Ratio (95% CI)	Adjusted Odds Ratio (95% CI)
COMMUNITY SOCIAL CAPITAL		
Low	Reference	Reference
Medium	0.98 (0.57, 1.67)	0.98 (0.55, 1.74)
High	1.13 (0.57, 2.24)	1.24 (0.62, 2.50)
SCHOOL TRUST		
Do not trust others	Reference	Reference
Trust Others	1.08 (0.64, 1.82)	1.08 (0.63, 1.84)
SCHOOL HELP		
Other don't help	Reference	Reference
Others help	0.92 (0.54, 1.56)	0.90 (0.53, 1.52)
RURALITY		
Metropolitan	Reference	Reference
Urban	0.45 (0.21, 0.94)**	0.42 (0.20, 0.89)**
Rural	0.42 (0.21, 0.87)**	0.39 (0.20, 0.80)***
Indeterminate	0.47 (0.13, 1.61)	0.31 (0.07, 1.34)
AGE	1.23 (1.00, 1.51)*	1.26 (1.02, 1.56)**
SEX		
Female	Reference	Reference
Male	0.58 (0.34, 0.99)**	0.49 (0.21, 0.83)***
Indeterminate	0.59 (0.14, 2.55)	0.25 (0.05, 1.20)
FAMILY STRUCTURE		
2 P/G	Reference	---
1 P/G	0.90 (0.51, 1.59)	---
Others	1.02 (0.32, 3.27)	---
SES		
Low	Reference	---
Moderate	1.02 (0.52, 1.99)	---
High	0.89 (0.39, 2.00)	---
Indeterminate	1.63 (0.50, 5.36)	---
AVERAGE MARKS		
<80%	Reference	Reference
80+%	0.63 (0.37, 1.09)*	0.56 (0.32, 0.97)**
Indeterminate	0.56 (0.22, 1.43)	0.53 (0.19, 1.44)
MATERNAL EDUCATION		
Post-secondary	Reference	---
Graduated HS	1.28 (0.72, 2.27)	---
Did not graduate HS	1.86 (0.79, 4.37)	---
No information	0.77 (0.43, 1.38)	---
RELIGIOUS ATTENDANCE		
Infrequent	Reference	---
Frequent	0.82 (0.44, 1.52)	---
FAMILY CONNECTEDNESS		
Low	Reference	---
Medium	1.23 (0.72, 2.09)	---
High	1.13 (0.62, 2.07)	---
* p < 0.10 (only for unadjusted) ** p < 0.05 *** p < 0.01		

Table XIV: Logistic regression of perceived need on social capital, rurality, and control variables among all students with probable anxiety disorders (n = 1676)

VARIABLE	Unadjusted Odds Ratio (95% CI)	Adjusted Odds Ratio (95% CI)
COMMUNITY SOCIAL CAPITAL		
Low	Reference	Reference
Medium	0.69 (0.51, 0.91)**	0.76 (0.56, 1.04)
High	0.77 (0.50, 1.16)	0.92 (0.61, 1.39)
SCHOOL TRUST		
Do not trust others	Reference	Reference
Trust Others	0.82 (0.63, 1.06)	0.79 (0.60, 1.03)
SCHOOL HELP		
Other don't help	Reference	Reference
Others help	0.67 (0.48, 0.95)**	0.68 (0.48, 0.96)**
RURALITY		
Metropolitan	Reference	Reference
Urban	0.67 (0.46, 0.96)**	0.66 (0.45, 0.95)**
Rural	0.72 (0.52, 1.00)**	0.69 (0.51, 0.95)**
Indeterminate	0.52 (0.32, 0.83)	0.49 (0.35, 0.68)***
AGE	1.20 (1.08, 1.34)***	1.19 (1.07, 1.33)**
SEX		
Female	Reference	Reference
Male	0.70 (0.54, 0.92)***	0.61 (0.47, 0.80)
Indeterminate	0.52 (0.18, 1.46)	0.52 (0.18, 1.56)**
FAMILY STRUCTURE		
2 P/G	Reference	---
1 P/G	1.08 (0.76, 1.53)	---
Others	1.28 (0.81, 2.02)	---
SES		
Low	Reference	Reference
Moderate	0.61 (0.39, 0.94)**	0.66 (0.44, 1.00)
High	0.50 (0.32, 0.78)***	0.58 (0.38, 0.89)**
Indeterminate	0.62 (0.27, 1.43)	0.78 (0.33, 1.85)
AVERAGE MARKS		
<80%	Reference	Reference
80+%	0.74 (0.58, 0.95)**	0.85 (0.66, 1.10)**
Indeterminate	0.78 (0.42, 1.44)	0.96 (0.50, 1.83)
MATERNAL EDUCATION		
Post-secondary	Reference	---
Graduated HS	1.03 (0.75, 1.43)	---
Did not graduate HS	1.10 (0.70, 1.74)	---
No information	0.88 (0.57, 1.38)	---
RELIGIOUS ATTENDANCE		
Infrequent	Reference	---
Frequent	1.13 (0.75, 1.70)	---
FAMILY CONNECTEDNESS		
Low	Reference	Reference
Medium	0.71 (0.51, 1.00)	0.76 (0.54, 1.06)
High	0.53 (0.37, 0.77)***	0.56 (0.38, 0.83)***

* p < 0.10 (only for unadjusted) ** p < 0.05 *** p < 0.01

Table XV: Logistic regression of perceived need among on social capital, rurality, and control variables all students with problematic drinking (n = 2241)

VARIABLE	Unadjusted Odds Ratio (95% CI)	Adjusted Odds Ratio (95% CI)
COMMUNITY SOCIAL CAPITAL		
Low	Reference	Reference
Medium	0.55 (0.33, 0.93)**	0.72 (0.40, 1.27)
High	0.66 (0.32, 1.39)	0.92 (0.40, 2.09)
SCHOOL TRUST		
Do not trust others	Reference	Reference
Trust Others	0.86 (0.51, 1.44)	0.92 (0.53, 1.57)
SCHOOL HELP		
Other don't help	Reference	Reference
Others help	0.84 (0.53, 1.33)	0.91 (0.56, 1.46)
RURALITY		
Metropolitan	Reference	Reference
Urban	1.20 (0.43, 3.33)	1.47 (0.54, 4.05)
Rural	2.80 (1.36, 5.79)***	2.88 (1.34, 6.16)***
Indeterminate	2.05 (0.81, 5.17)	2.40 (0.86, 6.68)
AGE	0.86 (0.73, 1.01)*	0.89 (0.76, 1.05)
SEX		
Female	Reference	---
Male	0.78 (0.47, 1.28)	---
Indeterminate	0.82 (0.12, 5.52)	---
FAMILY STRUCTURE		
2 P/G	Reference	---
1 P/G	0.89 (0.48, 1.64)	---
Others	1.17 (0.55, 2.49)	---
SES		
Low	Reference	Reference
Moderate	0.46 (0.21, 1.01)*	0.50 (0.22, 1.13)
High	0.45 (0.18, 1.10)*	0.59 (0.23, 1.49)
Indeterminate	0.96 (0.32, 2.84)	0.97 (0.32, 2.91)
AVERAGE MARKS		
<80%	Reference	Reference
80+%	0.36 (0.21, 0.62)***	0.43 (0.24, 0.75)***
Indeterminate	0.58 (0.18, 1.91)	0.59 (0.17, 2.04)
MATERNAL EDUCATION		
Post-secondary	Reference	---
Graduated HS	0.86 (0.45, 1.63)	---
Did not graduate HS	1.30 (0.58, 2.90)	---
No information	1.27 (0.69, 2.31)	---
RELIGIOUS ATTENDANCE		
Infrequent	Reference	---
Frequent	0.90 (0.40, 2.06)	---
FAMILY CONNECTEDNESS		
Low	Reference	Reference
Medium	0.44 (0.27, 0.73)***	0.51 (0.30, 0.87)**
High	0.36 (0.17, 0.80)**	0.41 (0.19, 0.91)**

* p < 0.10 (only for unadjusted) ** p < 0.05 *** p < 0.01

Table XVI: Logistic regression of perceived need on social capital, rurality, and control variables among all students with problematic drug use (n = 977)

VARIABLE	Unadjusted Odds Ratio (95% CI)	Adjusted Odds Ratio (95% CI)
COMMUNITY SOCIAL CAPITAL		
Low	Reference	Reference
Medium	0.41 (0.23, 0.71)***	0.41 (0.23, 0.71)***
High	0.28 (0.12, 0.65)***	0.28 (0.12, 0.65)***
SCHOOL TRUST		
Do not trust others	Reference	Reference
Trust Others	0.52 (0.29, 0.92)**	0.52 (0.29, 0.92)**
SCHOOL HELP		
Other don't help	Reference	Reference
Others help	1.44 (0.81, 2.56)	1.44 (0.81, 2.56)
RURALITY		
Metropolitan	Reference	Reference
Urban	0.73 (0.28, 1.89)	0.73 (0.28, 1.89)
Rural	1.36 (0.65, 2.85)	1.36 (0.65, 2.85)
Indeterminate	2.89 (1.02, 8.16)**	2.89 (1.02, 8.16)**
AGE	0.83 (0.65, 1.06)	---
SEX		
Female	Reference	---
Male	0.88 (0.56, 1.37)	---
Indeterminate	empty	---
FAMILY STRUCTURE		
2 P/G	Reference	---
1 P/G	1.50 (0.85, 2.67)	---
Others	0.98 (0.46, 2.08)	---
SES		
Low	Reference	---
Moderate	0.62 (0.28, 1.39)	---
High	0.56 (0.22, 1.40)	---
Indeterminate	0.28 (0.07, 1.13)*	---
AVERAGE MARKS		
<80%	Reference	---
80+%	0.81 (0.46, 1.41)	---
Indeterminate	1.13 (0.44, 2.91)	---
MATERNAL EDUCATION		
Post-secondary	Reference	---
Graduated HS	0.92 (0.50, 1.70)	---
Did not graduate HS	0.78 (0.33, 1.84)	---
No information	0.74 (0.34, 1.59)	---
RELIGIOUS ATTENDANCE		
Infrequent	Reference	---
Frequent	1.56 (0.74, 3.32)	---
FAMILY CONNECTEDNESS		
Low	Reference	---
Medium	0.80 (0.45, 1.41)	---
High	1.42 (0.69, 2.93)	---
* p < 0.10 (only for unadjusted) ** p < 0.05 *** p < 0.01		

Table XVII: Logistic regression of unmet need on social capital, rurality, and control variables among all students with probable depressive disorders (n = 677)

VARIABLE	Unadjusted Odds Ratio (95% CI)	Adjusted Odds Ratio (95% CI)
COMMUNITY SOCIAL CAPITAL		
Low	Reference	Reference
Medium	1.32 (0.81, 2.13)	1.32 (0.81, 2.13)
High	1.46 (0.64, 3.32)	1.46 (0.64, 3.32)
SCHOOL TRUST		
Do not trust others	Reference	Reference
Trust Others	0.71 (0.43, 1.18)	0.71 (0.43, 1.18)
SCHOOL HELP		
Other don't help	Reference	Reference
Others help	2.09 (1.35, 3.24)***	2.09 (1.35, 3.24)***
RURALITY		
Metropolitan	Reference	Reference
Urban	2.23 (1.13, 4.40)**	2.23 (1.13, 4.40)**
Rural	2.65 (1.53, 4.57)***	2.65 (1.53, 4.57)***
Indeterminate	1.20 (0.68, 2.10)	1.20 (0.68, 2.10)
AGE	0.90 (0.73, 1.20)	---
SEX		
Female	Reference	---
Male	1.50 (0.85, 2.64)	---
Indeterminate	4.35 (0.50, 37.49)	---
FAMILY STRUCTURE		
2 P/G	Reference	---
1 P/G	0.81 (0.44, 1.52)	---
Others	0.63 (0.28, 1.43)	---
SES		
Low	Reference	---
Moderate	0.73 (0.30, 1.78)	---
High	0.54 (0.21, 1.44)	---
Indeterminate	1.35 (0.33, 5.54)	---
AVERAGE MARKS		
<80%	Reference	---
80+%	1.34 (0.78, 2.30)	---
Indeterminate	1.24 (0.50, 3.07)	---
MATERNAL EDUCATION		
Post-secondary	Reference	---
Graduated HS	1.34 (0.68, 2.65)	---
Did not graduate HS	0.61 (0.26, 1.43)	---
No information	1.45 (0.80, 2.64)	---
RELIGIOUS ATTENDANCE		
Infrequent	Reference	---
Frequent	0.97 (0.50, 1.85)	---
FAMILY CONNECTEDNESS		
Low	Reference	---
Medium	0.68 (0.37, 1.25)	---
High	0.89 (0.44, 1.78)	---
* p < 0.10 (only for unadjusted) ** p < 0.05 *** p < 0.01		

Table XVIII: Logistic regression of unmet need on social capital, rurality, and control variables among all students with probable anxiety disorders (n = 1679)

VARIABLE	Unadjusted Odds Ratio (95% CI)	Adjusted Odds Ratio (95% CI)
COMMUNITY SOCIAL CAPITAL		
Low	Reference	Reference
Medium	1.55 (1.08, 2.24)**	1.37 (0.93, 2.00)
High	1.30 (0.74, 2.27)	1.10 (0.63, 1.94)
SCHOOL TRUST		
Do not trust others	Reference	Reference
Trust Others	1.21 (0.82, 1.79)	1.25 (0.85, 1.84)
SCHOOL HELP		
Other don't help	Reference	Reference
Others help	1.63 (1.16, 2.30)***	1.66 (1.17, 2.36)***
RURALITY		
Metropolitan	Reference	Reference
Urban	1.92 (1.12, 3.28)**	1.85 (1.08, 3.17)**
Rural	1.53 (1.00, 2.35)	1.49 (0.99, 2.27)
Indeterminate	1.77 (0.34, 9.07)	1.90 (0.39, 9.27)
AGE	0.86 (0.76, 0.99)**	0.88 (0.77, 1.01)
SEX		
Female	Reference	---
Male	1.13 (0.72, 1.77)	---
Indeterminate	empty	---
FAMILY STRUCTURE		
2 P/G	Reference	Reference
1 P/G	0.64 (0.36, 1.13)	0.65 (0.37, 1.15)
Others	0.61 (0.34, 1.10)*	0.65 (0.36, 1.16)
SES		
Low	Reference	---
Moderate	1.34 (0.68, 2.64)	---
High	1.42 (0.72, 2.81)	---
Indeterminate	1.71 (0.59, 4.96)	---
AVERAGE MARKS		
<80%	Reference	Reference
80+%	1.49 (1.00, 2.22)**	1.39 (0.93, 2.07)
Indeterminate	0.86 (0.42, 1.76)	0.77 (0.37, 1.59)
MATERNAL EDUCATION		
Post-secondary	Reference	---
Graduated HS	1.04 (0.58, 1.84)	---
Did not graduate HS	0.80 (0.45, 1.40)	---
No information	1.39 (0.82, 2.35)	---
RELIGIOUS ATTENDANCE		
Infrequent	Reference	---
Frequent	0.95 (0.59, 1.53)	---
FAMILY CONNECTEDNESS		
Low	Reference	---
Medium	0.85 (0.53, 1.35)	---
High	1.12 (0.67, 1.87)	---
* p < 0.10 (only for unadjusted) ** p < 0.05 *** p < 0.01		

Table XIX: Logistic regression of unmet need on social capital, rurality, and control variables among all students with problematic drinking (n = 2239)

VARIABLE	Unadjusted Odds Ratio (95% CI)	Adjusted Odds Ratio (95% CI)
COMMUNITY SOCIAL CAPITAL		
Low	Reference	Reference
Medium	2.68 (1.20, 6.02)**	2.45 (1.10, 5.48)**
High	2.07 (0.75, 5.72)	1.94 (0.70, 5.38)
SCHOOL TRUST		
Do not trust others	Reference	Reference
Trust Others	0.63 (0.30, 1.30)	0.63 (0.30, 1.32)
SCHOOL HELP		
Other don't help	Reference	Reference
Others help	1.53 (0.80, 2.94)	1.51 (0.79, 2.92)
RURALITY		
Metropolitan	Reference	Reference
Urban	0.45 (0.14, 1.42)	0.42 (0.13, 1.34)
Rural	0.57 (0.23, 1.37)	0.57 (0.23, 1.39)
Indeterminate	2.94 (0.29, 30.13)	2.69 (0.28, 25.69)
AGE	1.61 (1.21, 2.13)***	1.61 (1.21, 2.13)***
SEX		
Female	Reference	---
Male	1.36 (0.61, 3.01)	---
Indeterminate	empty	---
FAMILY STRUCTURE		
2 P/G	Reference	---
1 P/G	0.80 (0.33, 1.96)	---
Others	1.44 (0.45, 4.65)	---
SES		
Low	Reference	---
Moderate	1.13 (0.18, 7.16)	---
High	0.90 (0.14, 5.85)	---
Indeterminate	0.71 (0.08, 5.99)	---
AVERAGE MARKS		
<80%	Reference	---
80+%	1.32 (0.56, 3.13)	---
Indeterminate	0.62 (0.16, 2.39)	---
MATERNAL EDUCATION		
Post-secondary	Reference	---
Graduated HS	0.81 (0.33, 2.02)	---
Did not graduate HS	0.76 (0.21, 2.78)	---
No information	0.88 (0.33, 2.36)	---
RELIGIOUS ATTENDANCE		
Infrequent	Reference	---
Frequent	1.13 (0.24, 5.22)	---
FAMILY CONNECTEDNESS		
Low	Reference	---
Medium	1.45 (0.57, 3.70)	---
High	1.15 (0.44, 3.02)	---
* p < 0.10 (only for unadjusted) ** p < 0.05 *** p < 0.01		

Table XX: Logistic regression of unmet need on social capital, rurality, and control variables among all students with problematic drug use (n = 953)

VARIABLE	Unadjusted Odds Ratio (95% CI)	Adjusted Odds Ratio (95% CI)
COMMUNITY SOCIAL CAPITAL		
Low	Reference	Reference
Medium	2.68 (1.20, 6.02)**	1.96 (1.00, 3.80)**
High	2.07 (0.75, 5.72)	1.57 (0.59, 4.16)
SCHOOL TRUST		
Do not trust others	Reference	Reference
Trust Others	0.63 (0.30, 1.30)	1.07 (0.54, 2.11)
SCHOOL HELP		
Other don't help	Reference	Reference
Others help	1.53 (0.80, 2.94)	0.61 (0.30, 1.24)
RURALITY		
Metropolitan	Reference	Reference
Urban	0.45 (0.14, 1.42)	0.93 (0.31, 2.85)
Rural	0.57 (0.23, 1.37)	1.00 (0.41, 2.44)
Indeterminate	2.94 (0.29, 30.13)	empty
AGE	1.58 (1.19, 2.08)***	1.58 (1.19, 2.08)***
SEX		
Female	Reference	---
Male	1.19 (0.66, 2.15)	---
Indeterminate	empty	---
FAMILY STRUCTURE		
2 P/G	Reference	---
1 P/G	0.98 (0.45, 2.12)	---
Others	1.09 (0.48, 2.40)	---
SES		
Low	Reference	---
Moderate	0.94 (0.26, 3.46)	---
High	0.53 (0.14, 2.04)	---
Indeterminate	1.73 (0.31, 9.72)	---
AVERAGE MARKS		
<80%	Reference	---
80+%	1.08 (0.51, 2.31)	---
Indeterminate	0.35 (0.14, 0.89)**	---
MATERNAL EDUCATION		
Post-secondary	Reference	---
Graduated HS	0.66 (0.31, 1.43)	---
Did not graduate HS	1.05 (0.31, 3.57)	---
No information	1.24 (0.48, 3.17)	---
RELIGIOUS ATTENDANCE		
Infrequent	Reference	---
Frequent	0.70 (0.23, 2.16)	---
FAMILY CONNECTEDNESS		
Low	Reference	---
Medium	1.07 (0.56, 2.03)	---
High	1.01 (0.39, 2.58)	---
* p < 0.10 (only for unadjusted) ** p < 0.05 *** p < 0.01		

Table XXI: Logistic regression of perceived need among students on social capital, rurality, and control variables with probable depressive disorders stratified by rural status (n = 118, n = 115, n = 430)

VARIABLE	Metropolitan Odds ratio (95% CI)	Urban Odds ratio (95% CI)	Rural Odds ratio (95% CI)
COMMUNITY SOCIAL CAPITAL			
Low	Reference	Reference	Reference
Medium	4.09 (0.19, 85.78)	1.18 (0.38, 3.67)	0.68 (0.35, 1.33)
High	8.64 (1.30, 57.62)**	0.30 (0.07, 1.31)	1.15 (0.53, 2.50)
SCHOOL TRUST			
Don't trust others	Reference	Reference	Reference
Trust others	0.52 (0.07, 3.62)	3.32 (1.08, 10.20)**	0.92 (0.48, 1.78)
SCHOOL HELP			
Others don't help	Reference	Reference	Reference
Others help	1.30 (0.34, 4.47)	0.88 (0.30, 2.59)	0.65 (0.31, 1.38)
** p < 0.05			

Table XXII: Logistic regression of perceived need on social capital, rurality, and control variables among students with probable anxiety disorders stratified by rural status (n = 295, n = 294, n = 331)

VARIABLE	Metropolitan Odds ratio (95% CI)	Urban Odds ratio (95% CI)	Rural Odds ratio (95% CI)
COMMUNITY SOCIAL CAPITAL			
Low	Reference	Reference	Reference
Medium	0.63 (0.31, 1.30)	0.81 (0.45, 1.45)	0.80 (0.56, 1.15)
High	1.10 (0.44, 2.72)	0.74 (0.31, 1.77)	0.90 (0.55, 1.48)
SCHOOL TRUST			
Don't trust others	Reference	Reference	Reference
Trust others	0.88 (0.49, 1.57)	1.11 (0.60, 2.06)	0.63 (0.46, 0.85)**
SCHOOL HELP			
Others don't help	Reference	Reference	Reference
Others help	0.64 (0.39, 1.03)	0.88 (0.52, 1.47)	0.64 (0.36, 1.13)
** p < 0.05			

Table XXIII: Logistic regression of perceived need on social capital, rurality, and control variables among students with problematic drinking stratified by rural status (n = 316, n = 373, n = 1430)

VARIABLE	Metropolitan Odds ratio (95% CI)	Urban Odds ratio (95% CI)	Rural Odds ratio (95% CI)
COMMUNITY SOCIAL CAPITAL			
Low	Reference	Reference	Reference
Medium	0.97 (0.22, 4.25)	0.45 (0.09, 2.19)	0.66 (0.33, 1.30)
High	2.11 (0.28, 16.23)	0.42 (0.02, 8.61)	0.84 (0.45, 1.56)
SCHOOL TRUST			
Don't trust others	Reference	Reference	Reference
Trust others	0.29 (0.07, 1.17)	3.35 (0.96, 11.70)	0.84 (0.45, 1.56)
SCHOOL HELP			
Others don't help	Reference	Reference	Reference
Others help	0.39 (0.10, 1.63)	0.99 (0.26, 3.75)	1.18 (0.67, 2.10)
** p < 0.05			

Table XXIV: Logistic regression of perceived need on social capital, rurality, and control variables among students with problematic drug use stratified by rural status (n = 157, n = 164, n = 631)

VARIABLE	Metropolitan Odds ratio (95% CI)	Urban Odds ratio (95% CI)	Rural Odds ratio (95% CI)
COMMUNITY SOCIAL CAPITAL			
Low	Reference	Reference	Reference
Medium	0.46 (0.15, 1.40)	0.33 (0.08, 1.38)	0.44 (0.21, 0.92)**
High	0.50 (0.08, 3.05)	0.07 (0.01, 0.65)**	0.29 (0.12, 0.70)**
SCHOOL TRUST			
Don't trust others	Reference	Reference	Reference
Trust others	0.43 (0.13, 1.41)	1.47 (0.33, 6.65)	0.42 (0.22, 0.81)**
SCHOOL HELP			
Others don't help	Reference	Reference	Reference
Others help	2.51 (0.68, 9.21)	1.19 (0.30, 4.72)	1.04 (0.55, 1.97)
** p < 0.05			

Table XXV: Logistic regression of unmet need on social capital, rurality, and control variables among students with probable depressive disorders stratified by rural status (n = 122, n = 117, n = 429)

VARIABLE	Metropolitan Odds ratio (95% CI)	Urban Odds ratio (95% CI)	Rural Odds ratio (95% CI)
SOCIAL CAPITAL			
Low	Reference	Reference	Reference
Medium	1.41 (0.54, 3.68)	0.92 (0.40, 2.10)	1.31 (0.70, 2.47)
High	2.48 (0.48, 12.82)	0.40 (0.07, 2.29)	1.64 (0.61, 4.42)
SCHOOL TRUST			
Don't trust others	Reference	Reference	Reference
Trust others	0.67 (0.26, 1.73)	0.97 (0.27, 3.47)	0.62 (0.35, 1.09)
SCHOOL HELP			
Others don't help	Reference	Reference	Reference
Others help	2.11 (0.99, 4.49)	1.91 (0.74, 4.96)	2.62 (1.39, 4.95)**
** p < 0.05			

Table XXVI: Logistic regression of unmet need on social capital, rurality, and control variables among students with probable anxiety disorders stratified by rural status (n = 300, n = 294, n = 1054)

VARIABLE	Metropolitan Odds ratio (95% CI)	Urban Odds ratio (95% CI)	Rural Odds ratio (95% CI)
COMMUNITY SOCIAL CAPITAL			
Low	Reference	Reference	Reference
Medium	1.28 (0.62, 2.62)	0.98 (0.43, 2.22)	1.67 (0.94, 2.97)
High	0.91 (0.28, 2.96)	1.43 (0.38, 5.31)	1.17 (0.61, 2.23)
SCHOOL TRUST			
Don't trust others	Reference	Reference	Reference
Trust others	1.22 (0.55, 2.68)	0.66 (0.28, 1.54)	1.55 (0.92, 2.61)
SCHOOL HELP			
Others don't help	Reference	Reference	Reference
Others help	1.35 (0.81, 2.68)	1.26 (0.45, 3.57)	2.42 (1.40, 4.20)**
** p < 0.05			

Table XXVII: Logistic regression of unmet need on social capital, rurality, and control variables among students with problematic drinking stratified by rural status (n = 194, n = 393, n = 1431)

VARIABLE	Metropolitan Odds ratio (95% CI)	Urban Odds ratio (95% CI)	Rural Odds ratio (95% CI)
COMMUNITY SOCIAL CAPITAL			
Low	Reference	Reference	Reference
Medium	empty	8.18 (1.19, 56.45)**	1.27 (0.49, 3.25)
High	0.77 (0.17, 3.43)	3.42 (0.31, 38.30)	2.91 (0.83, 10.17)
SCHOOL TRUST			
Don't trust others	Reference	Reference	Reference
Trust others	0.87 (0.22, 3.41)	0.17 (0.03, 1.20)	1.03 (0.46, 2.28)
SCHOOL HELP			
Others don't help	Reference	Reference	Reference
Others help	0.91 (0.27, 3.02)	1.35 (0.28, 6.52)	1.62 (0.70, 3.75)
** p < 0.05			

Table XXVIII: Logistic regression of unmet need on social capital, rurality, and control variables among students with problematic drug use stratified by rural status (n = 156, n = 171, n = 626)

VARIABLE	Metropolitan Odds ratio (95% CI)	Urban Odds ratio (95% CI)	Rural Odds ratio (95% CI)
COMMUNITY SOCIAL CAPITAL			
Low	Reference	Reference	Reference
Medium	1.00 (0.25, 4.01)	3.48 (0.62, 19.48)	2.01 (0.82, 4.96)
High	0.46 (0.06, 3.77)	2.36 (0.34, 16.28)	2.41 (0.58, 10.06)
SCHOOL TRUST			
Don't trust others	Reference	Reference	Reference
Trust others	1.32 (0.33, 5.30)	0.69 (0.13, 3.65)	1.32 (0.59, 2.94)
SCHOOL HELP			
Others don't help	Reference	Reference	Reference
Others help	0.54 (0.11, 2.53)	0.63 (0.12, 3.31)	0.78 (0.34, 1.81)
** p < 0.05			

Table XXIX: Logistic regression of perceived need on social capital, rurality, and control variables among students with problematic drug use stratified by peer marijuana use (n = 977, 198, 777)

VARIABLE	All Evaluated Need Odds ratio (95% CI)	Evaluated Need with Minority of Peers Using Odds ratio (95% CI)	Evaluated Need with Majority of Peers Using Odds ratio (95% CI)
COMMUNITY SOCIAL CAPITAL			
Low	Reference	Reference	Reference
Medium	0.43 (0.24, 0.74)***	0.40 (0.11, 1.41)	0.41 (0.23, 0.78)***
High	0.29 (0.13, 0.68)***	0.35 (0.08, 1.62)	0.28 (0.11, 0.70)***
SCHOOL TRUST			
Don't trust others	Reference	Reference	Reference
Trust others	0.52 (0.29, 0.93)**	0.78 (0.14, 4.30)	0.49 (0.26, 0.91)**
SCHOOL HELP			
Others don't help	Reference	Reference	Reference
Others help	1.53 (0.86, 2.73)	0.90 (0.24, 3.38)	1.52 (0.81, 2.88)
RURALITY			
Metropolitan	Reference	Reference	Reference
Urban	0.74 (0.29, 1.88)	2.70 (0.27, 26.81)	0.68 (0.25, 1.87)
Rural	1.42 (0.68, 2.96)	4.68 (0.54, 40.32)	1.27 (0.57, 2.82)
Indeterminate	3.16 (1.11, 9.03)**	8.06 (0.67, 97.74)	2.85 (1.04, 7.78)**
** p < 0.05			

Appendix II: Results Figures

Figure I: Regional outcome percentages for high risk indicators by disorder category

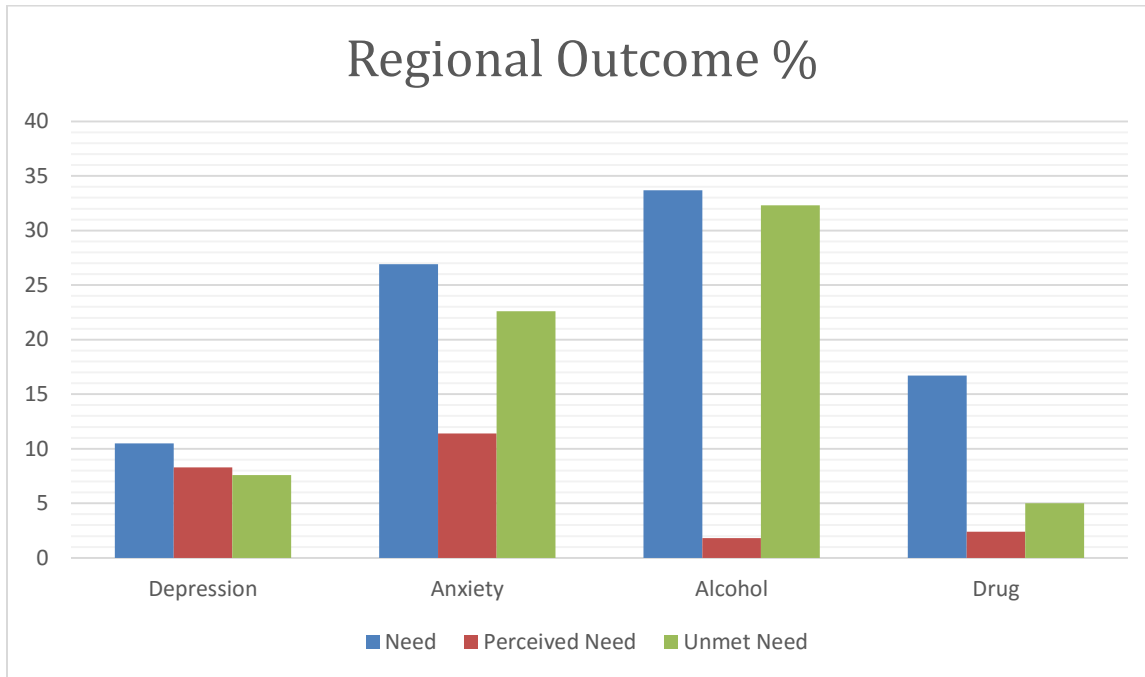


Figure II: Newfoundland and Labrador outcome percentages by disorder category

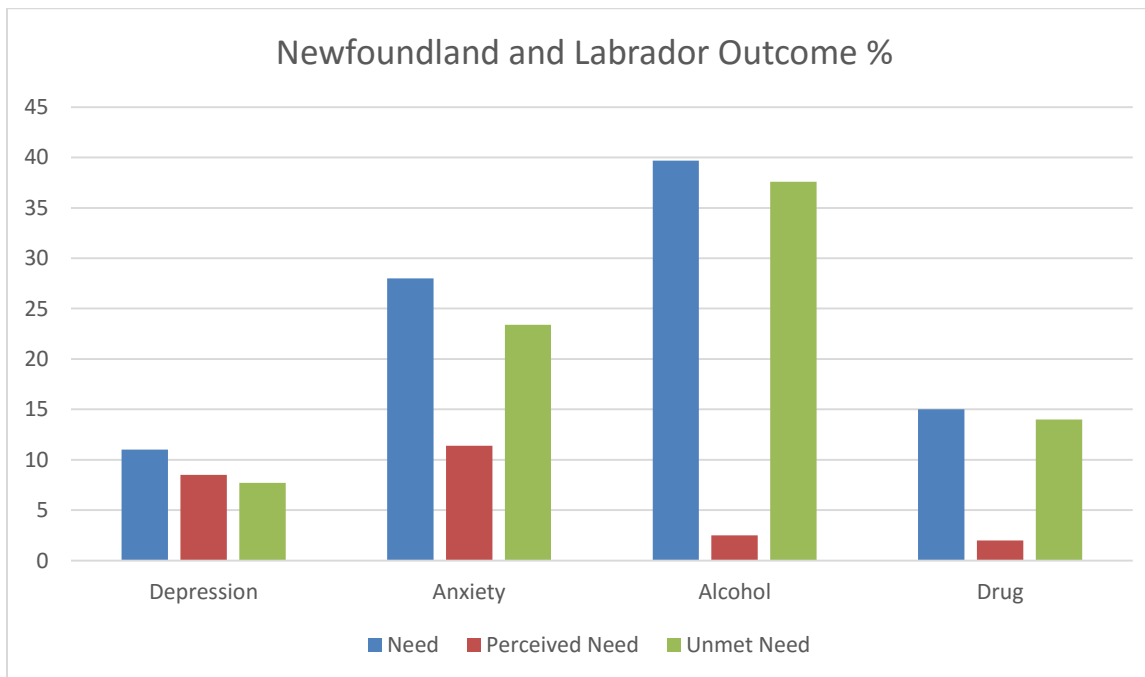


Figure III: New Brunswick outcome percentages by disorder category

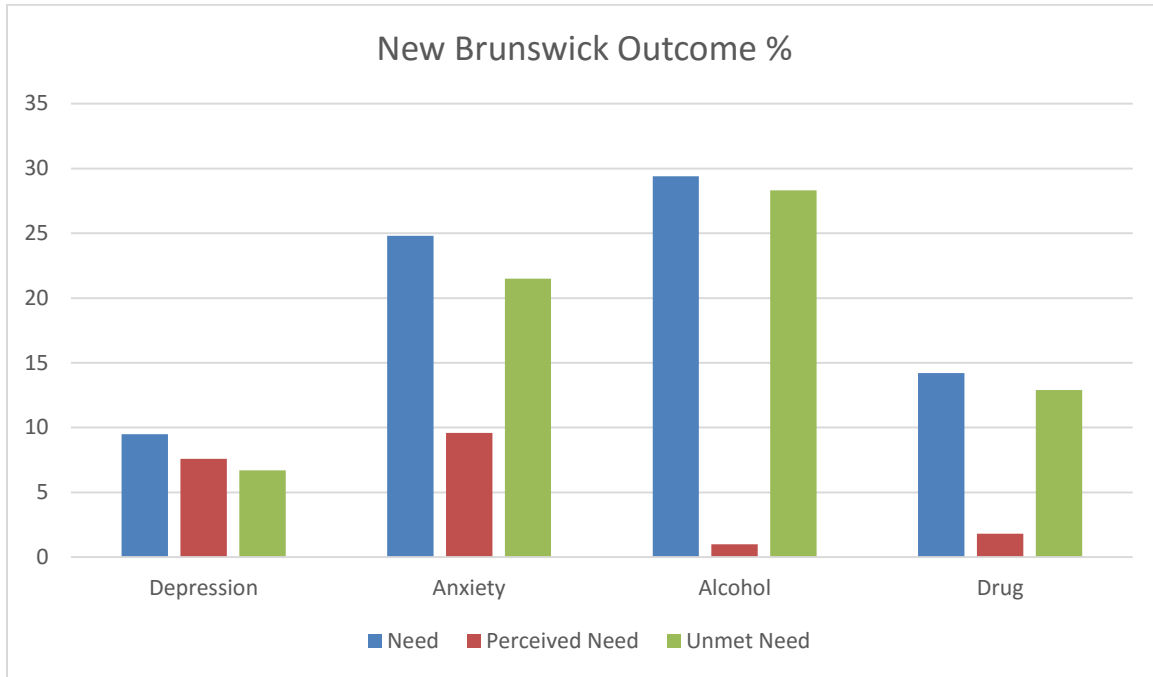


Figure IV: Nova Scotia outcome percentages by disorder category

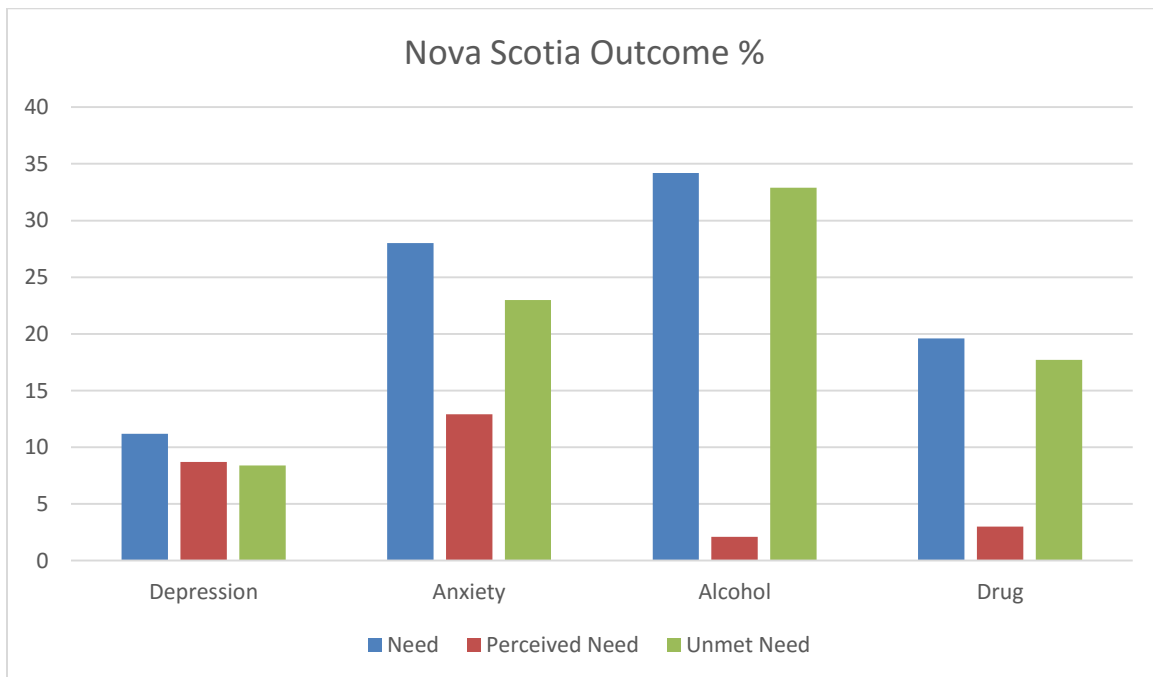


Figure V: Newfoundland and Labrador depression outcome percentages by district health authority

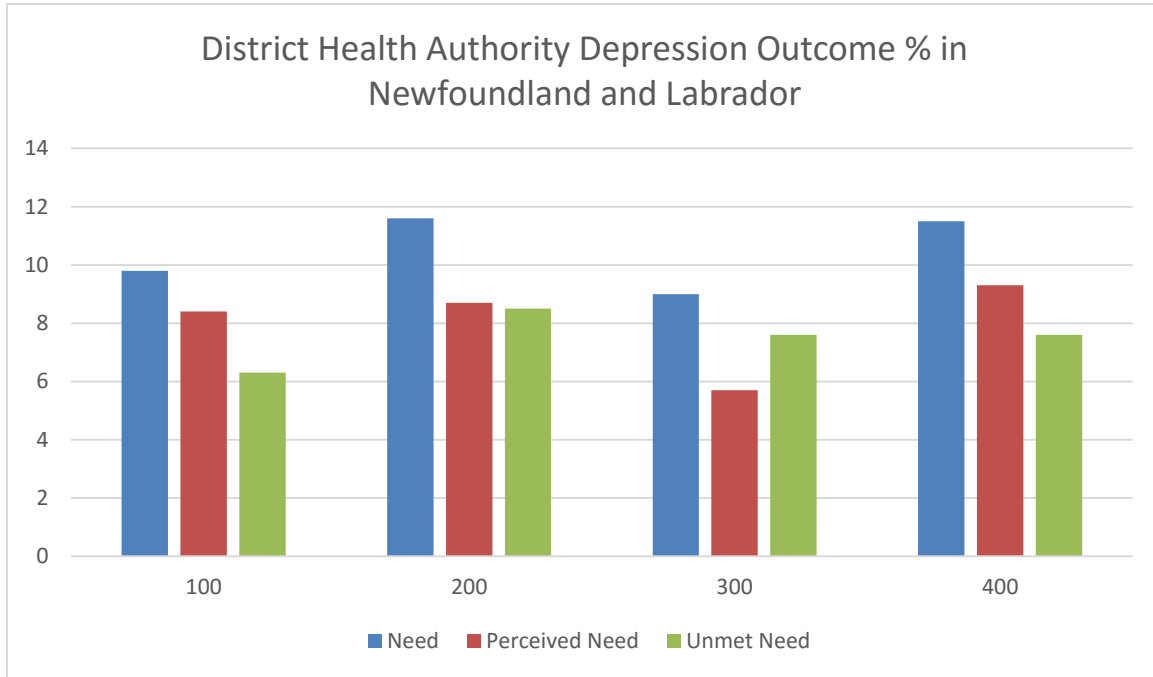


Figure VI: Newfoundland and Labrador anxiety outcome percentages by district health authority

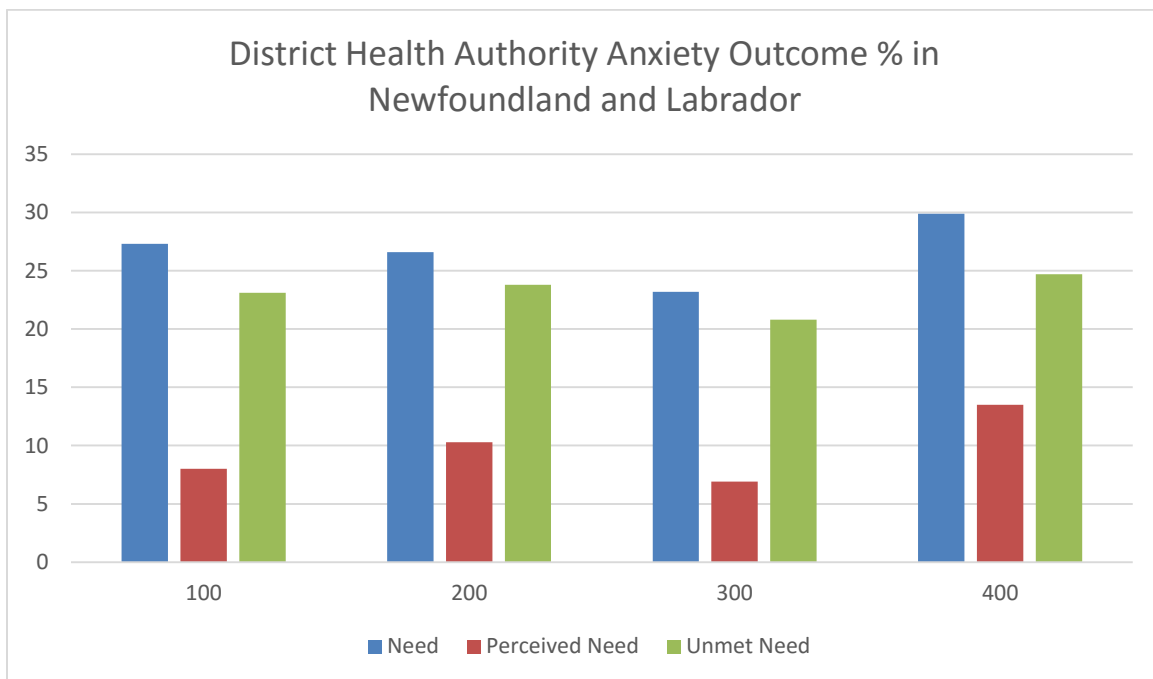


Figure VII: Newfoundland and Labrador alcohol outcome percentages by district health authority

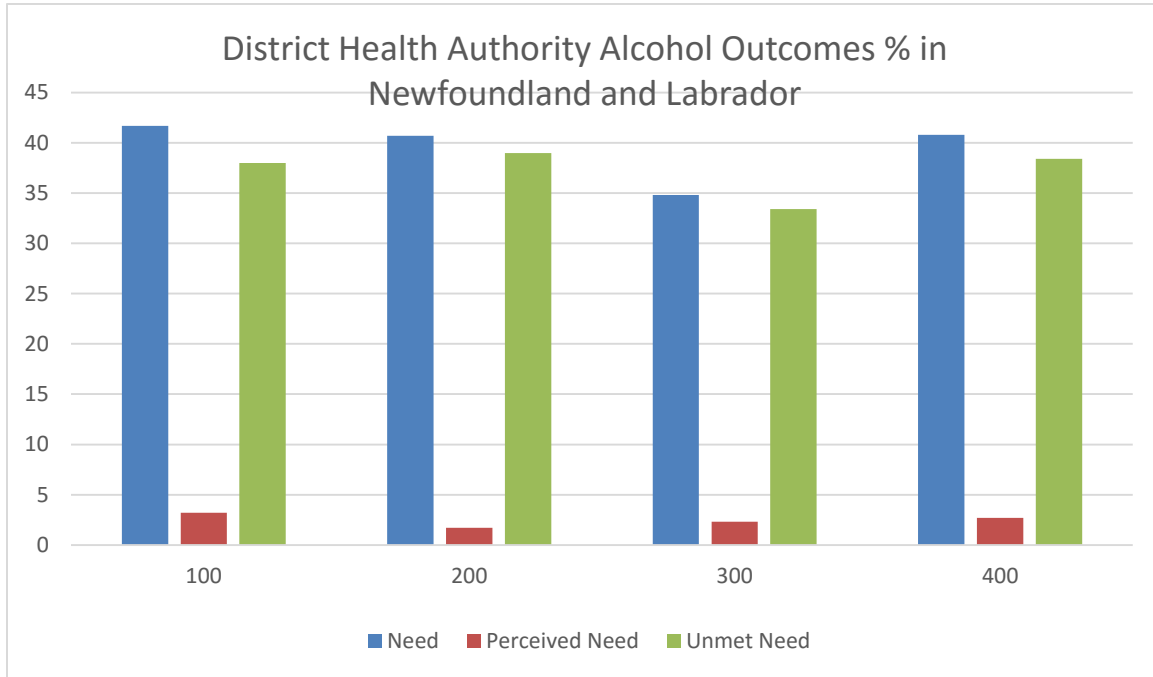


Figure VIII: Newfoundland and Labrador drug outcome percentages by district health authority

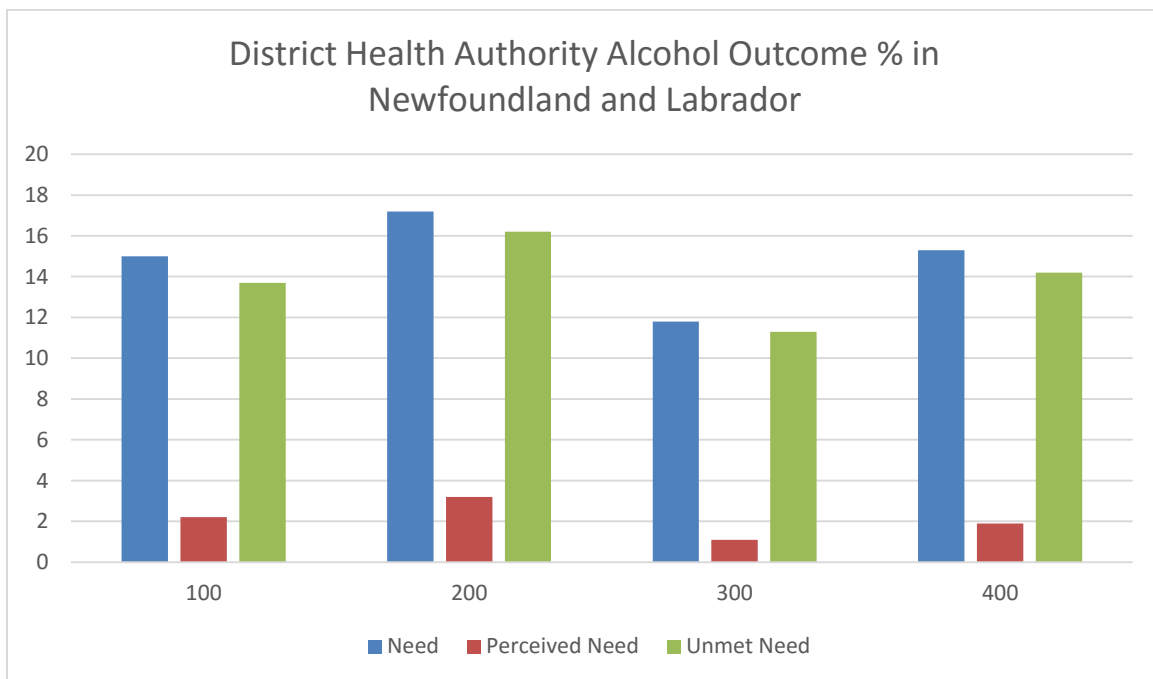


Figure IX: New Brunswick depression outcome percentages by district health authority

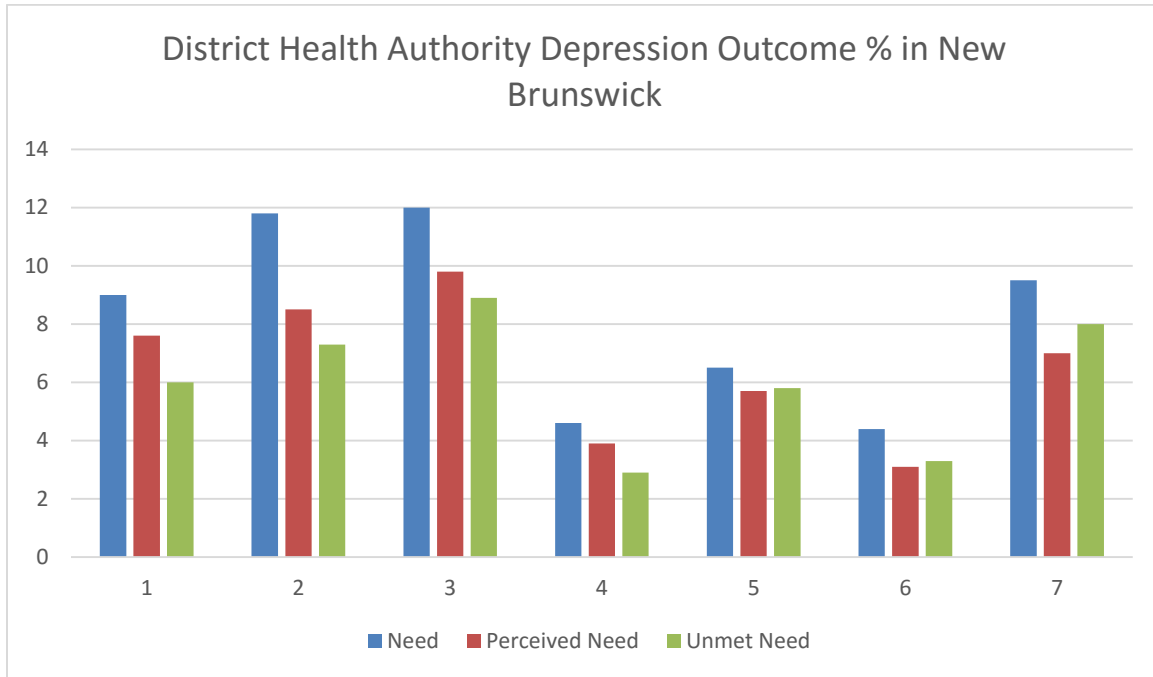


Figure X: New Brunswick anxiety outcome percentages by district health authority

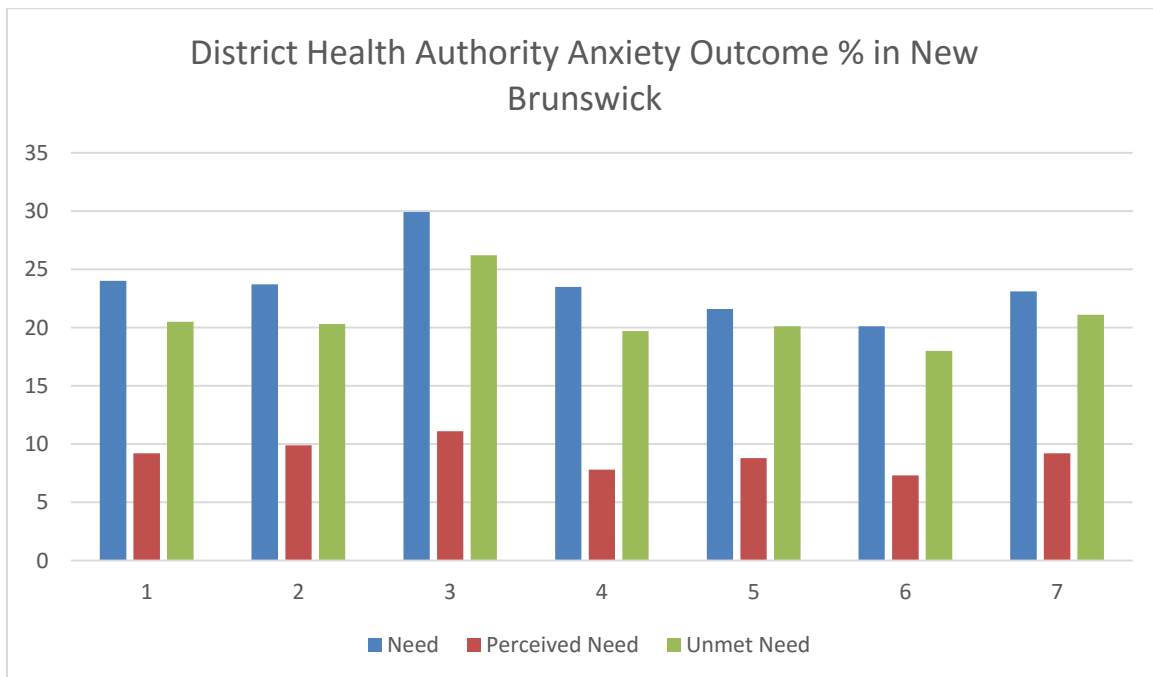


Figure XI: New Brunswick alcohol outcome percentages by district health authority

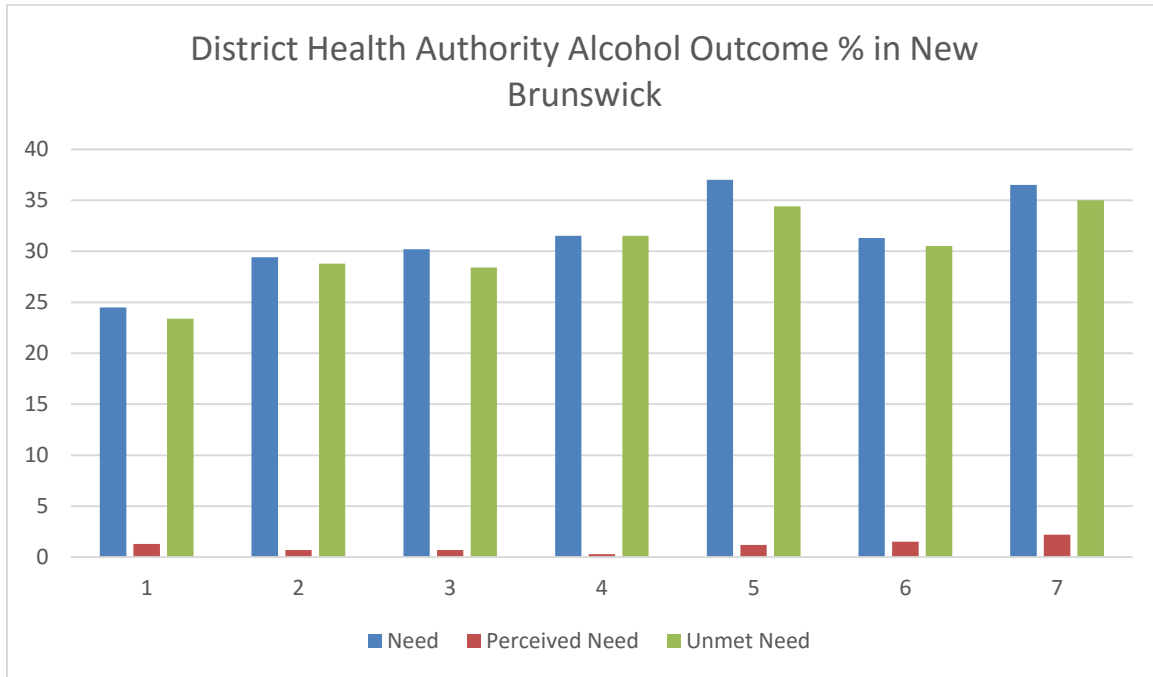


Figure XII: New Brunswick drug outcome percentages by district health authority

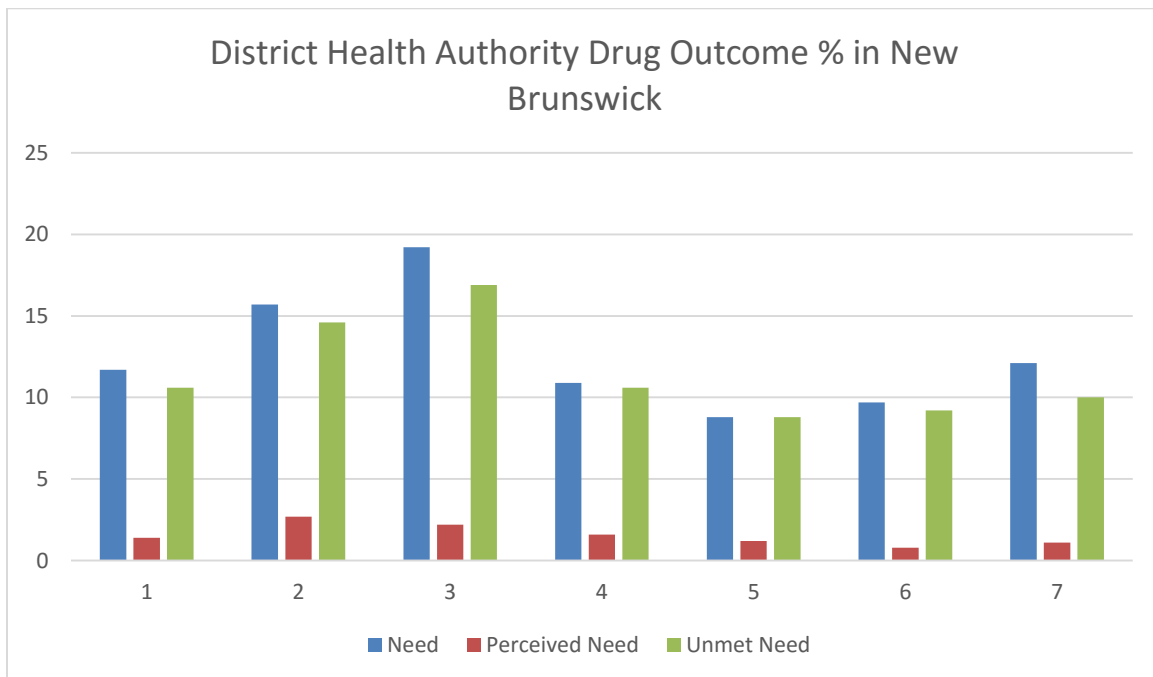


Figure XIII: Nova Scotia depression outcome percentages by shared service area

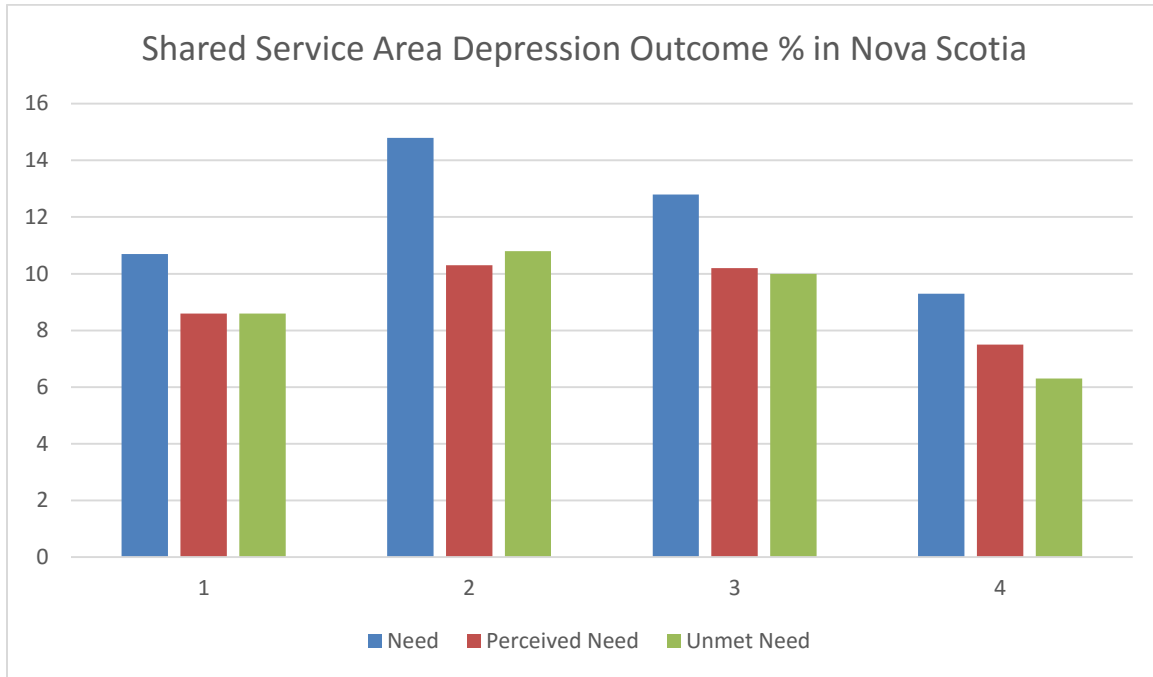


Figure XIV: Nova Scotia anxiety outcome percentages by shared service area

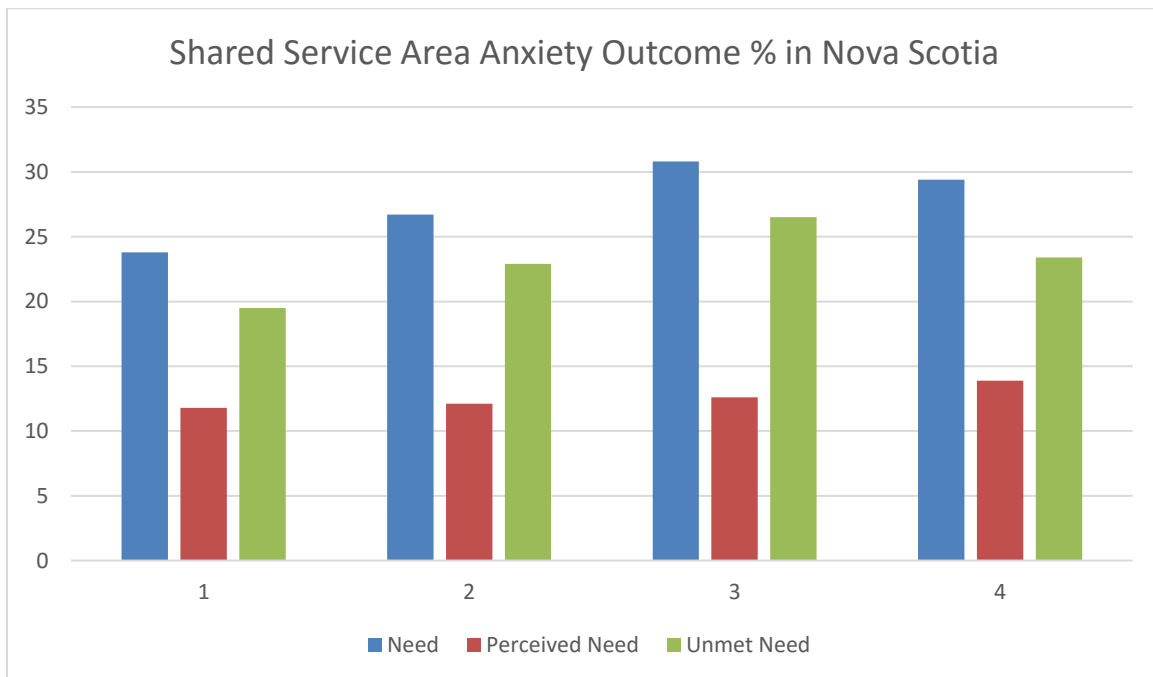


Figure XV: Nova Scotia alcohol outcome percentages by shared service area

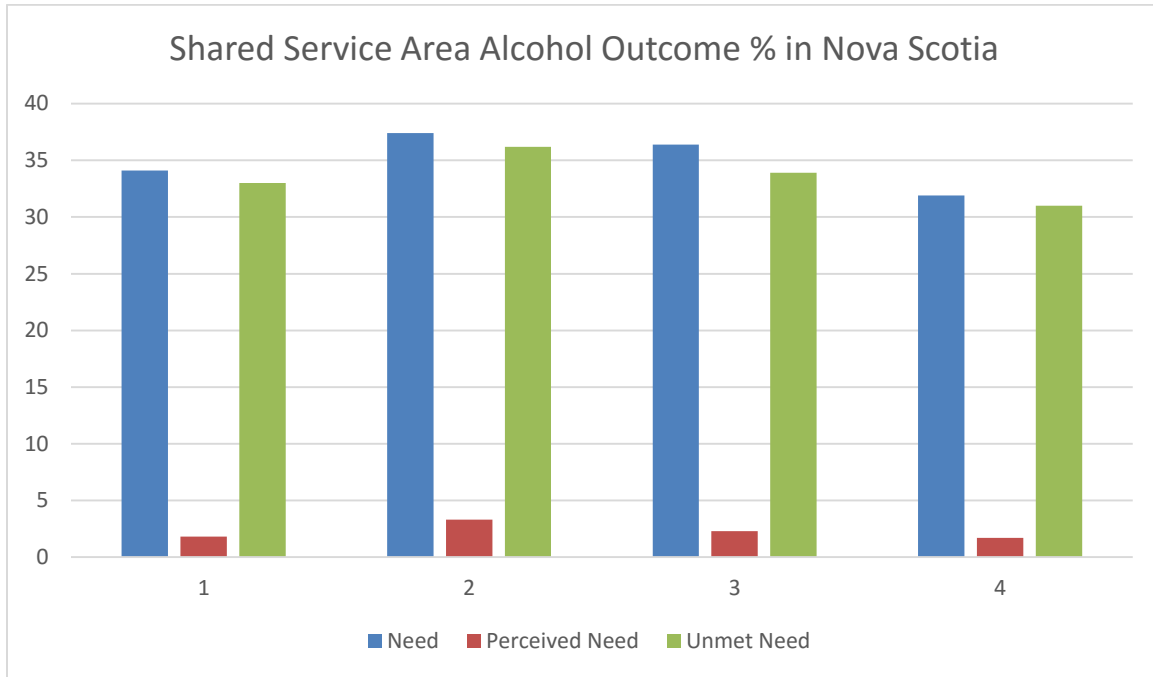
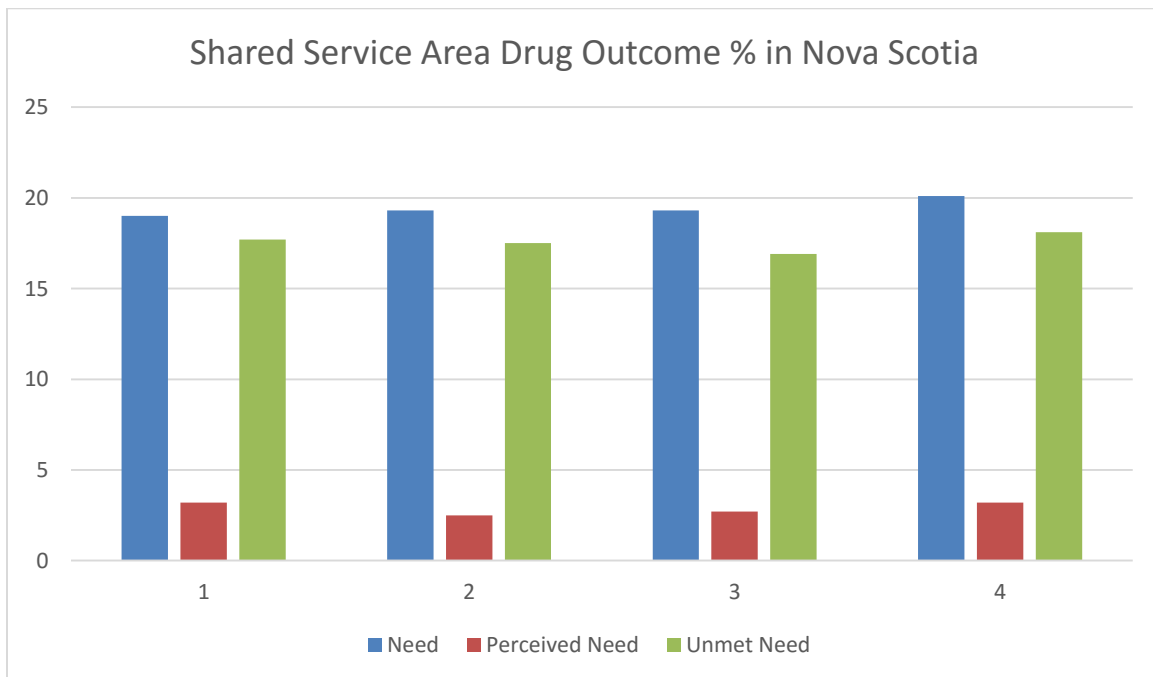


Figure XVI: Nova Scotia drug outcome percentages by shared service area



Appendix III: Coding

Table XXX: Evaluated Need Questions and Coding

Outcome	Scale	Questions	Response Coding	Evaluated Need Coding
Alcohol	CRAFFT	“In the past 12 months, how often have YOU driven a motor vehicle within an hour of drinking two or more drinks of alcohol?”, “In the past 30 days, how many times has drinking alcohol made you drunk (that is, you had so much to drink that you threw up or you lost control of your actions)?” “In the past 12 months, have you been in trouble with the police as a result of your drinking?”, and “In the past 12 months, has your drinking caused tension or disagreement with family or friends?”	Yes = 1 No = 2 I do not drink = 3 Missing = 99	No = 0 affirmative responses Yes = 1 or more affirmative responses
Drug	CRAFFT	“In the past 12 months, how often have YOU driven a motor vehicle within an hour of using cannabis?”, “In the past 12 months, have you been in trouble with the police as a result of your drug use (other than alcohol)?”, and “In the past 12 months, has your drug use (other than alcohol) caused tension or disagreement with family or friends?” “In the past 12 months, have you damaged things after having used drugs (other than alcohol)?” and “In the past 12 months has your drug use (other than	Yes = 1 No = 2 I do not use other drugs = 3 Missing = 99	No = 0 affirmative responses Yes = 1 or more affirmative responses

		alcohol) caused you to injure yourself?"		
Depression	CES-D	"I did not feel like eating; my appetite was poor", "I felt like I could not shake off the blues even with help from my family or friends", "I had trouble keeping my mind on what I was doing", "I felt depressed", "I felt hopefully about the future", "My sleep was restless", "I was happy", "I felt lonely", "I enjoyed life", "I had crying spells", "I felt people disliked me"	Never or rarely = 1 Sometimes = 2 Often = 3 Always = 4 Missing = 99	No = total value of responses is 20 or fewer Yes = total values of responses is 21 or more
Anxiety	SCARED	"I got really frightened for no reason at all", "I was afraid to be alone in house", "People told me that I worry too much", "I was scared to go to school", "I was shy"	Not true = 1 Sometimes true = 2 Often true = 3 Missing = 99	No = total value of responses is 2 or fewer Yes = total value of responses is 3 or more

Table XXXI: Desired Need Questions and Coding

Outcome	Question	Response Coding	Desired Need Coding
Alcohol	In the past 12 months, did you feel you needed help for your... Alcohol use?	Yes = 1 No = 2 I do not drink alcohol = 3 Missing = 99	No = 0 Yes = 1
Drug	In the past 12 months, did you feel you needed help for your... Other drug use?	Yes = 1 No = 2 I do not use other drugs = 3 Missing = 99	No = 0 Yes = 1
Depression	In the past 12 months, did you feel you needed help because you felt... Depressed?	Yes = 1 No = 2 I do not feel depressed = 3 Missing = 99	No = 0 Yes = 1
Anxiety	In the past 12 months, did you feel you needed help because you felt... Anxious?	Yes = 1 No = 2 I do not feel anxious = 3 Missing = 99	No = 0 Yes = 1

Table XXXII: Received Help Questions and Coding

Outcome	Question	Response Coding	Received Help coding
Alcohol	In the past 12 months, did you use any services or receive help to deal with your... Alcohol use?	Yes = 1 No = 2 I do not drink alcohol = 3 Missing = 99	No = 0 Yes = 1
Drug	In the past 12 months, did you use any services or receive help to deal with your... Other drug use?	Yes = 1 No = 2 I do not use other drugs = 3 Missing = 99	No = 0 Yes = 1
Depression	In the past 12 months, did you use any services or receive help because you felt... Depressed?	Yes = 1 No = 2 I do not feel depressed = 3 Missing = 99	No = 0 Yes = 1
Anxiety	In the past 12 months, did you use any services or receive help because you felt... Anxious?	Yes = 1 No = 2 I do not feel anxious = 3 Missing = 99	No = 0 Yes = 1

Table XXXIII: Social Capital Questions and Coding

Exposure Variable	Question	Response Coding	Exposure Coding
Community Social Capital	“It is safe for younger children to play outside during the day”, “You can trust people around here”, “People say ‘Hello’ and often stop to talk to one another on the street”, and “I could ask for help or a favour from my neighbours.”	Strongly Disagree = 1 Disagree = 2 I do not know = 3 Agree = 4 Strongly Agree = 5 Missing = 99	Low = sum of all values is 11 or less Medium = sum of all values is 12 to 14 High = sum of all values is 15 to 17
Trust in others at school	Please choose which of the following two statements you agree with.	Most of the people I go to school with can be trusted = 1 You can’t be too careful of the people I go to school with = 2 Not stated = 99	Do not trust others = 0 Trust others = 1
Helpfulness of others at school	Please choose which of the following two statements you agree with.	Most of the time, the people I go to school with try to be helpful = 1 Most of the time, the people I got to school with look out for themselves = 2 Not stated = 99	Others are not helpful = 0 Others are helpful = 1

Table XXXIV: Control Variable Questions and Coding

Control Variable	Question	Response Coding	Control Coding
Sex	Are you male or female	Male = 1 Female = 2 Missing = 99	Male = 0 Female = 1
Age	How old are you	13 = 13 14 = 14 15 = 15 16 = 16 17 = 17 18 = 18 19 or older = 19 Missing = 99	Continuous (13 - 19)
Socioeconomic status	Imagine this ladder to the right shows how Canadian society is set up. At the top of the ladder are people who are the "best off" - they have the most money, the most education, and the jobs that bring the most respect. At the bottom are the people who are "worst off" - they have the least money, little education, no job or jobs that no one wants. Now think about your family. Please fill in the bubble next to the box that best shows where you think your family	Worst off = 1 2 = 2 3 = 3 4 = 4 5 = 5 6 = 6 7 = 7 8 = 8 9 = 9 Best off = 10 Missing = 99	Low = 0 = (1, 2, 3, 4) Middle = 1 = (5, 6, 7) High = 2 = (8, 9, 10)

	would be on the ladder		
Academic performance	So far in this school year, what is your average on all your courses at school?	80% or higher = 1 70% -79% = 2 60 - 69% = 3 50 - 59% = 4 Below 50% = 5 I do not know = 6 Missing = 99	Below 80 % = 0 = (2, 3, 4, 5, 6) 80% or higher = 1
Living arrangement	Who are you living with now?	Mother and father = 1 Mother = 2 Father = 3 Mother and step-father = 4 Mother and step-mother = 5 I live alone or with friends = 6 Other = 7 Missing = 99	Two parental figures = 0 = (1, 4, 5) One parental figure = 1 = (2, 3) Other arrangement = 2 = (6, 7)
Maternal education attainment	What is the highest level of education that your mother has attained?	Graduated university = 1 Attended but did not graduate university = 2 Graduated college or trade school = 3 Attended but did not graduate college or trade school = 4 Graduated high school = 5 Attended but did not graduate high school = 6 Did not attend high school = 7 Don't know = 8 No mother = 9 Missing = 99	Did not graduate high school = 0 = (6, 7) Graduated high school = 1 = (5) Some post-secondary education = 2 = (1, 2, 3, 4) No information = 3 = (8, 9)
Religious attendance	How often do you attend religious services or event?	Never = 1 A few times a year = 2	Infrequently = 0 = (1, 2)

		At least once a month = 2 At least once a week = 3 Missing = 99	Frequently = 1 = (3, 4)
Family connectedness	“My parent(s) or guardian(s) usually know where I am when I am not at home”, “My parent(s) or guardians(s) usually know who I am with when I am not at home”, “It is important that I do not let down or disappoint my parent(s) or guardians(s)”	Strongly agree = 1 Agree = 2 I do not know = 3 Disagree = 4 Strongly Disagree = 5 Missing = 99	Low = 1 - 9 Medium 10 - 11 High = 12 - 13 Reverse coded so that lower agreement is a lower score

Appendix IV: Rurality Map

Figure XVII: Illustration of CSD classifications (Orange = CMA, Pink = CA, increasing green darkness = higher MIZ score)

