The Role of Social Capital in Determining the Health of Canadian Aboriginal Youth

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Introduction

A staggering inequality exists between Aboriginal Canadians and the rest of the Canadian population when examining social indicators such as income and educational attainment (Mendelson 2006). Comparing Aboriginal health to the non-Aboriginal Canadian population is no different. The Canadian Aboriginal population experiences an infant mortality rate that is twice as high as the non-Aboriginal Canadian population, has higher rates of chronic diseases (such as diabetes, heart conditions, and respiratory problems), and is at a greater risk of succumbing to alcoholism, smoking, and suicide (Dingle et al., 1996; Richmond, 2009).

The literature suggests two main explanations for the clear discrepancy in health indicators between Aboriginals and the non-Aboriginal population. First, due to the fact that larger portions of the Aboriginal population live in rural areas and the Arctic, a larger portion of Aboriginals have poorer access to healthcare. Without adequate access to healthcare Aboriginal health is expected to be lower (Frohlich et al., 2006). In addition, on average, Canadian Aboriginals have lower levels of socioeconomic status (SES) than the rest of the Canadian population. The Aboriginal population's average income is only 64 percent of the average non-Aboriginal Canadian. Canadian Aboriginals are also less likely to graduate from high school or to graduate with a post-secondary degree, with post-secondary completion actually declining (Mendelson, 2006). Since SES has been shown to have a significant positive impact on health (see for example Currie and Stabile, 2003 and Ettner, 1996), the lower incomes and educational attainment of Aboriginals may in part explain their worse health outcomes.

Newbold (1998) argues that although measures of SES (including income and education), age and gender have a sizable impact on Aboriginal health, Aboriginal health may also affected by a loss of tradition and culture due to a disintegration of the community and dissatisfaction with western medicine. In his study, he looks at how geographic location and responses to questions about perceived community social issues affect variations in health status and health care usage. Newbold finds that

although there are definitely problems with access to healthcare for some Aboriginals, those living in urban areas that admit to having sufficient access to healthcare are still suffering from a lower health status. Newbold argues that this health discrepancy is consistent with a lack of community environment and cultural support. Newbold's assertion is further supported by Romanow. Roy Romanow was the head of the Royal Commission on the Future of Health Care in Canada and released his final report, Building on Values: The Future of Health Care in Canada, in 2002. Romanow repeatedly writes that in order to improve health in Canada, improvements must also be made to the patient's community and family life. Health Canada, the Aboriginal Canada group, and the National Aboriginal Health Organization (NAHO) have devoted a lot of time and resources toward improving Aboriginal health in Canada by creating Aboriginal Health Centres all across Canada with the goal of not only providing physical and mental health care, but also providing traditional medicine and promoting Aboriginal culture to visitors (NAHO, 2011; Health Canada, 2011). These attempts at improving Canadian Aboriginal health relate to a relatively new area of study in health economics; how to measure social capital and its impact on health.

A general definition of social capital is still elusive, but there are a few points that are generally agreed upon. Social capital includes involvement in community organizations, networks, and environments that provide some form of positive externality (Gerdtham et al., 2006). For example, the availability of community activities and community involvement has been shown to have positive effects on health (Buka et al., 2005; Drukker et al., 2003; Rose, 2000) and communities with strong social identities and cultural groups are found to have lower mortality rates Hyyppä and Mäki (2003). However, social capital is a difficult factor to measure and many of the variables used in current literature are subject to potential measurement error. Since social capital has a relationship with many characteristics, some measureable and some not, the true impact can be difficult to ascertain. Despite these measurement issue, social capital is still an important new area of study in health economics and a

more complete review of the research on the effect of social capital on health is presented in the literature review section.

Only two studies, Richmond (2009) and Rosenburg and Wilson (2002) examine the impact of culture, activities, and environment on Canadian Aboriginal health. Both look at how different levels of community support and traditional activities such as hunting and fishing affect adult Canadian Aboriginal health. Interestingly, even after controlling for income, both studies find that traditional activities have a negative impact on health. However, is also clear that there is a negative relationship between taking part in these activities and income that is not completely eliminated. Rosenburg and Wilson feel that cultural activities are not unhealthy and that further research is required to see if Aboriginal cultural activities are actually hazardous to one's health or if there is a third factor common to both these activities and health.

There are four challenges when examining how social capital measures affect health. The first challenge relates to whether or not the measures of social capital are exogenous in the regressions. For example, someone who plays sports may be healthier, but someone who is not healthy may not be able to play sports. Similarly, there are a lot of reasons why a person chooses to live where they do; therefore, a factor thought to be related to a person's environment could instead be related to the reason for their reason for living where they do. The second challenge is again related to endogeneity, in this case between SES and health. SES, an important determinant of health, is known to be endogenous to health. It is difficult to determine whether a person is less healthy because they make less money, or if they make less money because they are less healthy and thus not able to work as much (Ettner 1996; Currie and Stabile 2003). If this endogeneity is not addressed, it is hard to predict how the estimated social capital effect will be affected, given the likely correlation between the measures of social capital and SES. One of the shortcomings of social capital literature is its failure to accurately address this type of endogeneity in health regressions. Third, since many of the social capital measures could also be

related to SES, the reported impact of these variables on health could be overestimated. I attempt to address this issue by running separate regressions, one including SES measures and one without, to illustrate the impact of SES on the magnitude of these social capital measures. Finally, measures of social capital from the same social capital group could suffer from multicollinearity issues because they impact health in the same way. By creating index variables for each social capital group, the total impact of each group can be measured and multicollinearity is no longer an issue.

Currie and Stabile (2003) suggest that the endogeneity problem between SES and health is reduced when using data on children. They argue that since children do not work, the argument that not being unhealthy hinders one's ability to work and thus leads to a lower SES is diminished. A similar argument can be made for the location a child lives. Children have little say in where their family lives so there is no longer a question of whether location is exogenous or not. In this paper I examine the relationship between measures of social capital and health using a sample of Canadian Aboriginal youth. Since some measures of social capital are difficult to measure in children, responses of the personal most knowledgeable of the child are used. Also, by using a sample of children, I am able to overcome two of the important limitations of the existing studies as explained above. I can treat SES as exogenous and can also control for the endogeneity issues related to where the child lives. Finally, using Canadian Aboriginal data is unique from other ethnic groups in that the group suffers a noticeably lower health status than people living in the same areas. As a result, the results of this study could go a long way toward improving the health status of this disadvantaged group.

In this study, I build on the growing literature examining the relationship between social capital and health using Canadian data on Aboriginal youth. I consider the following three measures of social capital; community involvement, community environment, and individual social capital. The first measure, community involvement, is motivated by the literature which finds that involvement in

community activities fosters relationships and trust that have been shown to have a positive impact on an individual's health (see for example Rose, 2000). Similarly, the inclusion of community environment characteristics such as the availability of amenities, a sense of safety, and a feeling of trust in an environment is motivated by the literature showing that such factors can improve the health status of the community (Gerdtham et al, 2006). Finally, a network of individuals with a similar background helps create a sense of safety and community which have been shown to have a positive impact on health (Hyyppä and Mäki, 2003).

Using data from the 2006 Aboriginal People's Survey (APS) and measures for self-reported health and the incidence of chronic health conditions, I run probit regression analysis to determine the impact of the above social capital measures on Aboriginal health. I find that the indexes for each social capital group have a significant role in determining self-reported health. Similarly, indexes for community environment and individual social capital are significant in determining the incidence of chronic health conditions of children. Despite the significance of the index variables, some of the individual measures of social capital do not show a significant relationship. There is no doubt that the health status of the Canadian Aboriginal population requires attention and improvement. Improving human capital measures for Aboriginals is a start, but further research into the potential impact of expanding social capital could have policy implications. This paper can address some of the problems with current measures of social capital that the literature has been unable to properly solve.

Literature Review

This work contributes to two specific literatures: the literature on the determinants of Aboriginal health and the literature on the effects of social capital on health. The first group of literature that this study adds to, the main factors leading to the difference in health between Aboriginal and non-

Aboriginal Canadians, has been addressed in the introduction. The study of the effect of social capital on economic and social indicators is extensive, but is a relatively new field of study in health economics.

Social Capital and Health in General

Much of the social capital literature is devoted to defining social capital and attempting to justify its use as an accurate measure for analysis. The most common measures of social capital used in empirical models are measures of community involvement, as almost every study tries to capture its effect. The first group of studies looks at community level measures and their impact on community level health. Brennan et al. (2003) uses logistic regression analysis to look at the impact of civic involvement on Chicago neighbourhood mortality rates. They measure this involvement by using variables about membership in a variety of voluntary associations including; religious organizations, neighbourhood associations, ethnic clubs, as well as local political organizations. Although the magnitudes are not substantial, significant relationships between these measures of involvement and neighbourhood mortality rates.

Kawachi et al. (1997) use ordinary least squares regressions to look at civic engagement in a similar way, using state-wide organizational membership and investigating how various health measures, including mortality rates, respond to variations in membership. This study also includes indexes for measures of social trust in their analysis as a way to capture individual social capital. By using an index for trust, the study addresses the potential multicolinearity between similar questions about trust. Trust is another popular measure used in much of the literature, but in this study, community involvement and not trust is found to be predictive of health. Higher organizational membership shares a negative relationship with state-wide mortality rates. A similar study is conducted by Glass et al. (1999). They use questions about social trust aggregated to the state level and group membership in 39 states as measures of social capital. After aggregating self-rated health responses to the state level, the

model shows a significant positive impact of both community involvement and social trust on self-rated health. In addition, Kawachi et al. (2003) use OLS regression analysis to explore gender specific mortality rates in Hungary and use involvement in civil organisations, as well as questions about social trust and reciprocity between citizens to capture individual social capital. In this study, all social capital measures show a significant positive impact on health. The strongest effects are found for measures related to reciprocity between citizens. Other than the use of indexing for levels of social trust, these studies do not really address the endogeneity and multicollinearity issues prevalent in social capital analysis.

Rose (2000) takes a different look at both community involvement and individual social capital measures. Instead of looking at aggregate state-wide social capital and health measures, Rose examines social capital's impact on health at the individual level. Apart from using church attendance and involvement in formal community organizations, he explores the effect of informal organizations as a type of individual social capital that includes using friends or family for services such as home repair or instead of a real estate agent and certain measures of social and personal trust. Using OLS regressions, Rose finds that both types of social capital have some significant impact, but consistent with other literature, finds the strongest relationship to be related to the measures of community involvement. In addition, Rose runs separate regressions, one with SES measures and one without in attempt to control for the endogeneity problem related to SES and social capital. Continuing with individual level studies, Hyyppä and Mäki (2003) study the difference in health between the Swedish and non-Swedish speaking population in Finland. They use membership in any religious association, volunteer activities, and other social and civic activities to measure community involvement. Similar to Rose, they use informal friendship networks to measure individual social capital and trust. Certain measures of social and civic involvement reported positive relationships with self-rated health, and Swedish people report higher levels of social capital that have been shown to improve health.

The literature on the effect of community environment on health is also quite substantial. Buka et al. (2005) use multilevel regression analysis to present a study on different social environments on the perceived health of youths in Chicago. By examining neighbourhoods with different human and social capital, the study concludes that the associations between the youth's social environments and perceived health suggest there is a causal relationship. They use measures such as the crime and violence rates in each neighbourhood as a measure of community environment. Drukker et al. (2003) study various neighbourhood health measures in different neighbourhoods in the Netherlands using multilevel regression analysis. They use the percentage of single parent families, different ethnicities, percentage of non-voters, and unemployment rates to determine how these environments affect children's health. They also include measures of social trust and find that many of the social capital variables have a significant impact on children's mental health, but no strong relationships with other health measures. Both of these studies use various index variables for most of their social capital measures, but again fail to adequately control for issues of endogeneity.

Despite the fact that a lot of the literature examining the impact of social capital on health does not put adequate effort into addressing the estimation issues associated with the research, the issues are not ignored either. Gerdtham et al. (2006) build a large literature review of the current work being done on the impact of social capital on health. They highlight that there are two potential problems with using the popular measures of social capital, which are both highlighted in the introduction. Firstly, there are potential issues of reverse causality when looking at the effect of community involvement on health. Does being unhealthy limit community involvement or does community involvement improve health? In addition, potential multicollinearity between similar measures of social capital can also not be ignored. Although not addressed in all studies, Gerdtham et al. acknowledge these potential issues and realize that these issues need to be overcome to further social capital research.

Social Capital and Aboriginal Health

There are only two papers that relate social capital to Aboriginal health specifically. First, Richmond (2009) uses the 2001 Aboriginal People's Survey and tests how social support measures and traditional activities impact health for Inuit Canadians. By using logistic regression analysis, she find that measures such as not understanding an Aboriginal language and not participating is cultural activities are associated with poorer responses to questions about health. Rosenberg and Wilson (2002) use APS data and logistic regressions to determine the impact of traditional activities (hunting, fishing, trapping, and food gathering) on health and find a negative relationship. However, they argue that this may be due to poorer families needing to take part in these activities and after creating an interaction variable of these activity variables with responses to a question about whether or not they went hunting, fishing, trapping, or gathering because the family needed food, the relationship is no longer significant. Rosenberg and Wilson acknowledge that further work is required to better capture the impact of Aboriginal culture on health. Although both of these studies control for income, issues of multicollinearity are not properly addressed.

Data

The data for this study come from the 2006 Canadian Aboriginal Peoples Survey (APS): Children and Youth. The Aboriginal Peoples Survey is a survey based data set used to monitor the demographic and social conditions of the Canadian Aboriginal population not living on reservations in 2006 (Statistics Canada, 2009). The survey sampled 13,238 children aged 6 to 14 from every Aboriginal group in Canada along with Census data to develop a comprehensive picture of the social, economic, health, and demographic conditions of Canadian Aboriginal children. The APS has been used by the Aboriginal community, the Canadian government, and many research groups in order to create a more complete view of the health and social status of Aboriginal children in Canada and has become a regular survey

after the wide-spread use of the 1991 and 2001 versions of the survey. Unfortunately, due to changes in the APS questionnaire, multiyear analysis is not possible.

There are two main reasons that this study focuses on Aboriginal youth as opposed to adults. First of all, SES has been shown to be an important determinant of health, but is difficult to accurately model in regression analysis. As Ettner (1996) points out, even though there is correlation between health and income, the direction of the causation is not clear. Currie and Stabile (2003) suggest that this problem can be reduced by using children instead of adults for the effect of SES on health. They argue that since children do not work, the argument that not being healthy hinders one's ability to work and thus leads to a lower SES is diminished. Secondly, several of the measures of community social capital used in this study could have a similar endogeneity problem. For example, people who favour community involvement may choose to locate in places where more such opportunities exist. If such preferences are correlated with the health outcomes used in this study, it is not possible to directly examine a causal relationship. However, similar to the argument made by Currie and Stabile, since youth do not get to exert their preferences when choosing where they will live, community characteristics can be viewed as exogenous. However, if the child's social capital measures are correlated with the preferences of their person most knowledgeable (PMK), this could still be an issue.

Dependent Variables

There are three measures of physical and mental health that are considered in this study. The APS includes several questions related to the health status of the child. Firstly, the PMK of the child is asked to rate the child's health as excellent, very good, good, or fair or poor. Due to the potential ambiguity between the four answers, this study uses a dummy variable to represent the healthier children by combining the excellent and very good responses as a measure of better health versus the good and fair or poor response. By creating a "better health" variable, it is possible to determine how independent variables relate to the difference between the two health groups. Therefore, by combining

responses, the coefficients on human and social capital measures provide a more intuitive interpretation. Since the survey is focused on children, the occurrence of lower health responses is less than an adult survey, but there is still enough variation for proper analysis (Currie and Stabile, 2003).

In addition to the health rated by the PMK, the survey also asks questions related to long term conditions. Whether the child has allergies, bronchitis, a chronic heart condition, diabetes, attention deficit disorder (ADD), asthma, or autism are the useful variables for this study as these conditions often have a higher rate of occurrence among the Aboriginal population. This study examines the impact that social capital measures have on whether or not a child has any one of the chronic conditions mentioned above. The final measure looks at whether or not the child reports more than one chronic health condition, given they have at least one. This variable allows us to see if social capital continues to have an effect on the incidence of chronic health conditions beyond the first and adds some robustness to looking at the role of social capital in determining the likelihood of having chronic health conditions on the whole.

Social Capital

Following Rose (2000), the variables used to represent social capital for children are divided into three groups. The first group relates to the extracurricular activities of the child as a measure of community involvement. Availability of and participation in community activities is considered one of the most important indicators of social capital (Rose, 2000; Gerdtham et al., 2006; Brennan et al., 2003). Rose's (2000) study on the impact of social capital on health in Russia focuses on the idea of community involvement creating personal relationships. Rose uses measures of church attendance and membership in formal organizations to capture the impact of this social involvement on self-assessed health. In addition, Glass (1999) includes whether adults in the United States play sports regularly as a measure of social inclusion. The APS provides responses to questions about the amount of 1) sports, 2) art and

music lessons, 3) clubs, and 4) cultural activities the child takes part in on a weekly basis. The variables used in the analysis are binary variables for taking part in each activity at least once per week.

The second social capital group attempts to measure the child's community environment. The safety and trust a person feels and has in their community has been shown to have an impact on health through the potential stress it can cause or alleviate (Kawachi et al., 2003; Rose, 2000; Drukker et al., 2003). For example, Kawachi et al. (2003) suggest in their study of the effect of social capital on mortality in Hungary that weakening community values and trust over time are detrimental to health. Similarly, Kawachi et al. (1997) who use social cohesion measures (similar to social trust), including per capita crime rates and divorce rates, as measures of social capital when looking at mortality rates in Russia. In this study I include two binary measures of community environment: whether or not the PMK feels the school has a drug or alcohol problem and whether the PMK feels the school has a violence problem. These measures should provide a prediction of the child's community environment and whether or not the PMK feels that the school is a safe. Although not a measure of trust specifically, the safety of a child's environment is a similar measure to social trust.

The final social capital group is the child's individual social capital which attempts to measure the respondent's home environment. When using youth data, the best available variables to capture this effect relate to the opinions of the PMK on certain social matters. The way to motivate these measures of individual social capital is similar to the argument for community measures. Rose (2000) suggests that informal networks, such as home environment can have an important effect on self-reported health. In his study, Rose looks at whether people use friends or family for services such as home repair or instead of a real estate agent as a measure of a person's smaller scale community or support group. In addition, Hyyppä and Mäki's (2003) study on the impact of social capital on health in Finland looks at the difference in health between people who speak Swedish and those who do not. Swedish people reported higher measures of social capital that have been shown to improve health and

they find that speaking Swedish has a large, positive effect on health. The variables I include to capture individual social capital are dichotomous indicators for whether or not the PMK considers graduating high school and pursuing postsecondary education important, whether or not the child sits down for a family dinner more than 4 nights per week, and the importance of the child learning an aboriginal language. These measures provide an insight into the family and cultural support structure that the child receives in his or her home environment.

Control Variables

In order to control for other variables that have been shown to impact health, a series of dummy variables are also included. First, a group of variables related to information on the child's age, gender, and success in school. The age variables are dummy variables grouping children ages 6-8, 9-11, and 12-14 (the group aged 6-8 is dropped from the regression). For the measures for success in school, the PMK is asked to consider the child's success in school, taking into account report cards, and respond with very well, well, average, or poor/very poor. Variables are created for whether the PMK feels the child is doing average and whether they feel the child is doing poorly.

The second group includes human capital measures of the PMK. Studies have shown that the characteristics of the PMK are acceptable predictors of the child's SES. In addition, highest education attainment and income of the person most knowledgeable have been shown to have an impact on a child's health (Currie and Stabile, 2003). The above measures are represented by sets of dummy variables. The levels of education are not completing high school, completing high school, non-university certificate or diploma, university degree below a bachelor's degree, university degree, and other education. The series of dummy variables capturing income levels increase in intervals of $20,000 (variables for not completing high school and income below $20,000 are dropped).

Finally, the geographic area and aboriginal group the child belongs to has been shown to have a particularly large effect on socioeconomics for Canadian Aboriginals due to the cultural difference

between different aboriginal groups and different parts of Canada (Gerdtham et al, 2006). Unfortunately, the publicly available APS does not include the specific province that the child currently lives in and therefore the best data available to control for regional differences in health relate to the community classification. The APS asks whether the child lives in a Census metropolitan area (CMA), other urban area, rural area, or the Arctic and the study will use each of these as a binary variable (the CMA variable is dropped). The Aboriginal groups include North American Indian, Metis, Inuit, non-Inuit Arctic, multiple, none, and other which are all individual binary variables as well (the North American Indian variable is dropped).

Methodology

Since all of the dependent variables used in this study are binary variables, probit regression analysis, using marginal effects, is the most appropriate. The APS provides survey weights which are used in analyses and all reported standard errors are robust. This procedure provides interpretable coefficients representing how each independent variable used in the estimation impacts the probability of a positive outcome in the dependent variable. The three dependent binary variables of interest are the measure of good health, whether or not the child has at least one chronic health condition, and whether the child has more than one chronic health condition. I run each regression model three times, once for each of the three measures of health. This study follows a similar experiment to Rose's (2000) study of the impact of social capital on Russian health in that separate regressions are run to examine whether including SES greatly reduces the estimated effect of the social capital measures on health. Since variables for community involvement and environment are likely related to family income, it is important to determine that the impact of social capital is not more related to SES than the measure itself. Some survey respondents did not provide information related to income and PMK education. To maintain a consistent number of observations, the respondents without information on income or education were dropped from the analysis (331 in total).

To begin the analysis, a table of summary statistics is examined along with an investigation of how each social capital measure varies with different levels of income. Three income groups will be created with the two lowest income variables representing low income, the two middle variables forming the middle income group, and the two highest income measures covering the high income group. Seeing how the social capital measures vary by income groups is important when interpreting the magnitude of the effected social capital measures.

Rose examines the impact of three different social capital groups on health on their own, and then includes SES measures in the regressions to observe the difference. Similarly here, for the first model in this study, each of the individual measures of social capital is included as well as all of the control variables (X matrix), except for the SES variables.

(1) $$P(HealthMeasure_i) = \Phi\,(\alpha + \beta CommunityInvolveMeasures_i + \gamma CommunityEnvironMeasures_i + \delta IndivSocCapitalMeasures_i + \theta X_i + \varepsilon)$$

This method allows for the interpretation of the coefficients on the three groups of social capital measures in terms of what impact they can have on improving the likelihood of a person reporting good health and reducing the chance that a child has one, or more than one, chronic condition. At the same time, this model controls for the other factors that impact health mentioned above, without the effects of SES.

When looking at the three different social capital groups in this study, it is possible that, due to the fact that the impact of the variables could be similar within groups, there could be a problem with multicollinearity. This problem is highlighted by Gerdtham et al. (2006) which points out that a popular way to address this problem is use a form of indexing to eliminate this challenge. Chaloupka and Wechsler's (1997) study of the impact of smoking bans and cigarette prices on smoking faces a similar problem with potential multicollinearity. In order to address this issue, an index for smoking bans is

created and used in place of the four individual ban indicator variables. The index ranges from 0 to 4, with 1 point being given for each type of smoking ban. This method measures the variation in the dependent variable related to an additional ban as opposed to a specific ban. In the second model used in this study, three similar indexes are included. A separate index for each type of social capital group is created by summing the binary variables for each group. For example, if the child plays sports and takes music lessons, but does not participate in any of the other community involvement measures, the index would be a 2 out of a possible 4. Model 2 replaces the individual measures of social capital with these indexes for each group in order to capture the effect of a positive response to one more social capital measure, as opposed to each one individually.

(2) $$P(HealthMeasure_i) = \Phi\,(\alpha + \beta\, CommunityInvolvementIndex_i + \gamma\, CommunityEnvironmentIndex_i + \delta\, IndividualCapitalIndex_i + \theta X_i + \varepsilon)$$

As previously mentioned, Rose (2000) performs separate regressions to limit the potential problem of the impact of social capital measures on health being more related to SES differences than social capital differences. For example, since certain activities cost money to participate in, a child may not take part in these activities for SES reasons, rather than interest. With models 3 and 4, the SES variables for income and PMK educational attainment will be included with the other control variables in the regressions for models 1 and 2.

(3) $$P(HealthMeasure_i) = \Phi\,(\alpha + \beta CommunityInvolveMeasures_i + \gamma CommunityEnvironMeasures_i + \delta IndivSocCapitalMeasures_i + \theta X_i + \pi SES_i + \varepsilon)$$

(4) $$P(HealthMeasure_i) = \Phi\,(\alpha + \beta CommunityInvolvementIndex_i + \gamma CommunityEnvironmentIndex_i + \delta IndividualCapitalIndex_i + \theta X_i + \pi SES_i + \varepsilon$$

For the social capital measures that share a relationship with income, it is reasonable to expect there to be a noticeable change in the magnitude or significance of the coefficients on after including SES in the model. If these changes are not prominent, it will lend strength to the social capital measures, which could otherwise be considered to be biased by endogeneity, and show that social capital does play a role in determining health.

Results

Before running the regression models, I examine the raw data. By analyzing the sample means, overall and broken down by gender and SES, potential measurement issues can be identified and addressed where possible. Table 1 shows the means for all of the X social capital measures used in this study. The table includes the full sample means, the means for each gender, and the means for each income groups. Since all of the variables used in the models are binary variables, the means reflect the percentage of positive responses. The community involvement index has a maximum value of 4, while the community environment and individual social capital indexes have a maximum value of 2.

There are many important results in this table. First, the means of the variables for the importance of the child graduating high school and the family dinner measure have means of close to one. As a result, there is not enough variation for the variables to be useful in the model and they will therefore not be included in the subsequent empirical analysis. Next, when looking at the differences in mean between income groups, it is clear that many of the important social capital measures vary between income groups. Playing sports, taking art or music lessons and club participation is more likely for high income groups. This is expected as participation in such activities involves out of pocket expenditures. Conversely, the child attending a school with a violence problem is less likely with higher income groups, which is again the expected result as violence problems are more common in lower income areas. Interestingly, there is a negative relationship between the aboriginal culture variables and

income. The incidence of taking part in cultural activities and the PMK believing it is important for the child to learn an Aboriginal language significantly decrease with higher levels of income. These results support the idea from Rosenburg and Wilson (2002) that the impact of Aboriginal cultural on health could be more related to variation in income than the measures for culture. Variation in social capital between income groups in not unexpected and supports the need for an experiment similar to Rose (2000). By running two sets of regressions, one with SES measures and one without, I can determine if these variations in social capital between income groups impact the results. In terms of gender difference, the only variables that are noticeably different between males and females are playing sports (0.7267 for males and 0.6518 for females), taking art and music lessons (0.3179 for males and 0.4203 for females), and club participation (0.2406 for males and 0.3719 for females). Table 2 shows the variation between genders for the dependent, control, and SES variables.

For the most part, gender differences between these variables are minimal and the majority of the control and SES variables do not present any potential problems. However, the difference in the incidence of reporting one or more chronic health conditions and the child doing average as opposed to well in school show a noticeable difference between genders. This challenge is further investigated by running separate regressions for each gender. There is no major change in the significance and magnitudes of the variables and the analysis remains the same. Therefore, only the full sample models are included in this paper.

In order to properly present the impact of social capital on health, the regression results will be divided into three sections, one for each dependent variable: the measure of reporting good health, the likelihood of reporting at least one chronic health condition and the likelihood of reporting two or more chronic health conditions. Each section contains results tables for the coefficients and standard errors of

the social capital measures and indexes; results for the control and SES variables are included in the appendix.

Good Health

Good Health is a binary variable that has a measure of one if the PMK chose excellent, very good, or good when asked to rate the child's overall health. It is important to first examine the relationship between health and measures that have been shown to have an impact on health in other studies. In terms of the impact of the control variables on good health, the results are consistent with expectations and the results are displayed in Table 3. We see that there is a significant negative relationship between doing poorly in school and good health, along with a positive relationship between PMK education and the child's health. Similarly, income also has a positive impact on reporting good health. All of the SES measures mentioned above are consistent with other studies exploring these measures and shows that this experiment is controlling for much of the effect of these variables on health. Every income groups above $40,000 annually and all levels of PMK except the other education variable are statistically and economically significant. Table 3 also shows the results from the social capital measures from models 1 to 4 on reporting good health.

I will begin by discussing the results for the Community involvement. The results show that playing sports increase the probability of reporting good health by 6.42 percentage points without SES measures and 5.05 percentage points after including SES. The fact that there is still a significant effect after controlling for SES suggests that there is reason to believe there is still some link between participation in sports and health. The measures for taking art or music lessons, club participation, and taking part in cultural activities do not have a statistically significant impact on reporting good health. When combining all of the measures into the community involvement index (models 2 and 4), the coefficient suggests that taking part in an additional community activity increases the likelihood of

reporting good health by 2.00 percentage points without SES and 1.41 percentage points with SES. The magnitude of this index is smaller than the coefficient on sports, but these results still suggest that being involved in more community activities is good for self-reported health.

The community environment measures used in this study continue to show a significant impact for social capital. When the PMK reports that the child's school has a violence problem, the probability of reporting good health is reduced by 3.30 percentage points without SES measures and 2.51 with SES. Similar to the measure of playing sports, it seems that the relationship between income and violence problem has some impact on the strength of the measure, but after controlling for SES, the community environment still has a statistically and economically significant impact on self-reported health. The index for community environment decreases the probability by 2.21 percentage points (model 2) and 1.81 when including SES (model 4).

Finally, the individual social capital measures, whether or not the PMK thinks it is important for the child to pursue post-secondary education and learn an aboriginal language, both show a significant relationship with reporting good health, however, the direction of the impact is different for each measure. The PMK expecting the child to pursue post-secondary education has a noticeably significant positive impact of 8.38 percentage without SES and 7.60 with SES. On the other hand, the PMK placing importance on learning an Aboriginal language has a negative effect on reporting good health of 2.53 and 1.62 in models 1 and 3 respectively. Both measures have a minimal drop in magnitude when including SES, again supporting the importance of these measures of social capital. Unfortunately, due to the opposite directions of the relationship between the two variables used in the individual social capital index, the index is no longer interpretable.

Chronic Health Condition

The estimated effects of the determinants of reporting any chronic health condition is found to be different than the estimated determinants of reporting good health. Table 4 reports the impact of the control and SES variables on the chances of having one chronic health condition. Measures for age and poor performance in school increase the likelihood of the child having a chronic condition. On the other hand, living outside of a census metropolitan area actually decreases the likelihood of the child reporting a chronic condition, with all associated measures being statistically and economically significant. Unlike the good health measure, PMK education and almost all income measures have no significant impact on reporting a chronic health condition. However, having an income over $100,000 is associated with a 6.28 and 7.48 percentage point decrease in the likelihood of the child reporting a chronic health condition in models 3 and 4 respectively. The minimal impact of SES when looking at the chronic health condition variable adds more strength to the social capital measures because the relationship between SES and social capital is less of a problem. In addition, Table 4 shows the impact of the social capital measures on the child having a chronic health condition.

When looking at community involvement, playing sports decreases the chance of reporting one chronic health condition by 5.91 percentage points when not including SES in the regression and 5.63 with SES. Having SES in the regression does not result in much change in these measures. As with good health, club participation and cultural activities do not seem to have a significant effect on whether or not a child has a chronic health conditions. However, taking art or music lessons seems to increase the likelihood of reporting a chronic health condition by 2.51 and 2.60 percentage points in models 1 and 3. This is an interesting result that could be due to the fact that since children with chronic conditions may be unable to participate in sports or similar activities, taking music lessons is a more viable option. Similar to the individual social capital measure from the good health models, the community involvement index becomes difficult to interpret.

The impact of community environment measures on having a chronic health condition is similar to their impact on reporting good health. Again, drug or alcohol problems to not have a significant impact on the health measures but in there is a significant positive relationship with the school having a violence problem. Without SES, the violence problem measure increases the likelihood of having one chronic condition by 6.89 percentage points and 6.45 percentage points when including SES. Again, there is little change between including and not including SES. When looking at the index, including SES again has a minor effect. The likelihood of having one chronic condition is increased by 3.66 percentage points without SES and 3.42 with SES measures.

Lastly, the impact of individual social capital is clear when using chronic health conditions as the measure of health. Although now both social capital measures negatively impact the dependent variable, the importance of the child learning an aboriginal language is no longer significant. When not including SES in the model, the importance of the child pursuing post-secondary education reduces the likelihood of having a chronic health conditions by 6.41 percentage points and 6.21 percentage points when including SES. The individual social capital index also decreases the likelihood of having a chronic condition. Model 1 reports a 3.24 percentage point decrease and model 3 shows a 3.42 percentage point decrease, with both measures being statistically significant. Although this does not necessarily mean that the measures are not subject to potential problems, it certainly strengthens this social capital group in terms of the potential endogeneity problems associated with SES.

Multiple Chronic Conditions

The final dependent variable used is whether or not the child has two or more chronic health conditions. The results for multiple conditions are again somewhat different from what was found above. Coefficients for the control and SES variables are displayed in Table 5. Variables for age, school performance, geographic region, and the highest income group are again significant and of a similar magnitude to the models for one chronic condition. However, the rest of the SES measures are a

different story. As with good health, higher income is statistically and economically significant and reduces the likelihood of having more than one health condition. The PMK graduating high school, having a non-university diploma, or having a university degree actually increases the likelihood of reporting more than one health condition when compared to the PMK not graduating high school. This could be related to the fact that someone who is more educated would be more conscious of potential chronic conditions and more likely to seek treatment. Table 5 also reports the coefficients and standard errors for the impact of social capital on reporting more than one chronic health condition.

For community involvement, playing sports decreases the likelihood that the child has multiple chronic health conditions by 3.20 percentage points without SES and 3.01 with SES. Although there is little difference between the coefficients on sports between models 1 and 3, it is the only variable that has any significant impact. Art or music lessons, club participation, cultural activities, and the community involvement index have no economic or statistically significant impact on reporting multiple chronic conditions.

Community environment measures have the same type of relationship with multiple conditions and with one chronic condition, but the magnitudes are much less. The school having a violence problem increases the likelihood of multiple conditions by 2.53 percentage points and 2.25 percentage points in models 1 and 3 respectively. In addition, the environment index only increases this likelihood by 1.54 and 1.37 percentage points in the models. Despite the fact that the magnitudes are smaller, the community environment measures are still significant and do not drop by a significant amount when including SES.

Community involvement measures have a similar impact on multiple chronic conditions and one condition. Without SES, the importance of pursuing post-secondary education decreases the chances of the child reporting more than chronic condition by 7.89 percentage points and by 7.97 percentage

points with SES. Likewise, the community involvement index decreases the incidence of multiple conditions by 3.10 percentage points and 3.31 percentage points in models 1 and 3.

Discussion

Since the study of the impact of social capital on health is a relatively new area in economics, several problems with current social capital measures and methods still exist. As a result, it is important to be careful when drawing conclusions from the data and to be aware of the potential shortcomings of the research. However, this does not suggest that there is not still something to be learned from social capital research. Using youth data eliminates the reverse causality issues associated with health and SES and health and many measures of social capital. In addition, using index measures for each social capital group addresses the problems with multicollinearity between similar social capital measures. Finally, by running separate regressions with and without SES measures, it is possible to determine whether or not social capital's impact on health is actually just related to SES.

There were not a lot of surprising results in terms of the control variables. On the whole, variables representing age, poor performance in school, and income had the expected effects on health considering other studies done on similar measures. PMK education had the expected impact on the good health measure, but higher PMK education has a negative effect on whether the child has multiple chronic conditions. However, this is likely due to more educated parents or guardians being more likely to identify chronic conditions. There were also some interesting relationships that show in the Aboriginal identity measures. The main result is that not identifying with any Aboriginal group seems to have a positive impact on health, which backs the studies showing that Aboriginals report lower SES and health measures.

At first glance, the results for community involvement from this study seem to suggest that these measures play a role in determining health. Playing sports always shows a positive and significant

impact on the various health measures. The variable for involvement in sports is positively related to income, but there were not significant differences in the coefficients between models 1 and 3. This suggests that there is a significant impact on health not related to income. However, it is important to keep in mind that there could be issues of reverse causality between sports and health measures – those who are ill are unable to participate in sports. The other community involvement measures were generally not significant in the models.

Richmond (2009) and Rosenberg and Wilson (2002) both found that there was an apparent negative relationship with Aboriginal cultural activities and health measures. In this study there was no significant effect of cultural activities on all three measures of health considered which supports the theory that factors other than cultural activities are behind this negative relationship. The community involvement index, used to address the potential multicollinearity problem that could exist between the various indicators of community involvement, showed a significant impact in improving self-rated health, but was not significant in the chronic health condition models. In summary, it seems that finding ways to improve community involvement could be useful in improving the health of Canadian Aboriginal children.

In all models, the measure representing the child's school having a violence problem and the index for community environment were found to have a significant negative impact on health. Since the measures for community environment are negative measures, these results show that social capital has a positive effect on health. The violence problem variable does have a negative relationship with income, but only slightly drops in magnitude and remains significant when including SES variables in the good health models. As mentioned before, one of the limitations to using youth data is that measures like community environment are not easy to determine at the individual level. Regardless, the significant results for the violence problem measure and the index support to the potential impact of community environment on health.

The final social capital group provides some of the most interesting results. When looking at the good health measure, the importance of speaking an Aboriginal language has a significant negative impact. In part, this can be attributed to any uncontrolled for factors that create the relationship between low income families and the language variable. In addition, the importance of the child learning an Aboriginal language may not necessarily be the most accurate measure to capture Aboriginal culture. Again, using youth data is limited is in measures for individual social capital, but the benefits of this type of data are arguably more important. Due to this negative relationship, the index for individual social capital is no longer informative. Since learning an aboriginal language has the opposite sign as the measure for the importance the PMK places on the child graduating post-secondary education, the index no longer captures the combined effect of one more individual social capital measure. Regardless, the importance of pursuing post-secondary education has a significant positive impact on self-reported health. When looking at chronic health conditions, the Aboriginal language variable is no longer significant and the index for individual social capital is interpretable. Both the importance of pursuing post-secondary education and the individual social capital index reduce the likelihood of having one or more chronic health conditions. These significant results support the notion that individual social capital does play a role in determining Aboriginal health.

Conclusion

The clear inequality in the current levels of health between Aboriginal and non-Aboriginal Canadians is a major problem facing Canadian policy makers. Much of the difference has been associated with differences in SES measures between the two groups, but it is also understood that there is more to the problem. Studying the impact of individual and environmental social capital measures on health is a relatively new is of study in health economics. Due to the cultural and community differences between Aboriginals and non-Aboriginals, social capital could be another part of the difference in health between these two groups.

In this study, significant relationships between both self-rated health and the occurrence of chronic health conditions for Aboriginal children and several different measures of social capital were found. Community involvement, community environment, and individual social capital all play a role in determining Aboriginal health to some degree. Studies on social capital often face issues of multicollinearity and endogeneity, but by using youth data, controlling for SES in the models, and indexing measures of social capital, these issues are properly addressed. As a result, the significant results from this study suggest that the impact of social capital on health is worthy of further study and could be a great policy tool for improving Aboriginal health.

References

Abonyi, Sylvia, Kelsey Beach, Mark W. Rosenberg, Adam Wiebe, and Kathi Wilson, 2008, "Older Aboriginal Peoples in Canada: Demographics, Health Status, and Access to Health Care," SEDAP Research Paper No. 249

Brennan, Robert T., Stephen L. Buka, Ichiro Kawachi, and Kimberly A. Lochner, 2003, "Social Capital and Neighborhood Mortality Rates in Chicago," *Social Science and Medicine*, 56, p1797-1805

Buka, Stephen L., Marjan Drukker, Charles Kaplan, Kwame Mckenzie, and Jim van Os, 2005, "Social Capital and Young Adolescents' Perceived Health in Different Sociocultural Settings," *Social Science and Medicine,* 61, p185-198

Chaloupka, Frank J. and Henry Wechsler, 1997, "Price, Tobacco Control Policies and Smoking Among Young Adults," *Journal of Health Economics, 16(3),* p359-373

Currie, Janet and Mark Stabile, 2003, "Socioeconomic Status and Child Health: Why is the Relationship Stronger for Older Children?," *American Economic Review*, 93(5), p1813 – 1823

Dingle, Jennifer L., Harriet L. MacMillan, Angus B. MacMillan, and David R. Offord, 1996, "Aboriginal Health," *Canadian Medical Association Journal,* 155(11), p1569-1578

Drukker, Marjan, Charles Kaplan, Frans Feron, and Jim van Os, 2003, "Children's health-related quality of life, neighbourhood socio-economic deprivation and social capital. A contextual analysis," *Social Science and Medicine*, 57, p825-841

Ettner, Susan, 1996, "New Evidence on the Relationship between Income and Health," *Journal of Health Economics*, 15(1), p67-85

Frohlich, Katherine L., Chantelle Richmond, and Nancy Ross, 2006, "Health Disparities in Canada Today: Some Evidence and a Theoretical Framework," *Health Policy,* 79(2), p132–143

Gerdtham, Ulf, Kamrul Islam, Ichiro Kawachi, Martin Lindstrom, Juan Merlo, 2006, "Social capital and health: Does egalitarianism matter? A literature review," *International Journal for Equity in Health*, 5(3), p1-28

Glass, Roberta, Kawachi, Ichiro, and Kennedy, Bruce P., 1999, "Social Capital and Self-Rated Health: A Contextual Analysis," *American Journal of Public Health,* 89(8), p1187-1193

Health Canada: First Nations, Inuit, and Aboriginal Health, Retrieved June 15, 2011 from http://www.hc-sc.gc.ca/fniah-spnia/index-eng.php

Hyyppä, Markku T. and Mäki, Juhani, 2003, "Social Participation and Health in a Community Rich in Stock of Social Capital," *Health Education* Research, 18(6), p770-779

Kawachi, Ichiro, Bruce P. Kennedy, Kimberly Lochner, and Deborah Prothrow-Stith, 1997, "Social Capital, Income Inequality, and Mortality," *American Journal of Public Health*, 87(9), p1491-1498

Kawachi, I., Kopp, M., and Skrabski, A., 2003, "Social Capital in a Changing Society: Cross Sectional Associations with Middle Aged Female and Male Mortality Rates," *Journal of Epidemiological Community Health,* 57, p114-119

Mendelson, Michael, 2006, "Aboriginal Peoples and Postsecondary Education in Canada," Caledon Institute of Social Policy

National Aboriginal Health Organization (NAHO), Retrieved June 15, 2011 from http://www.naho.ca/about/

Newbold, K. Bruce, 1998, "Problems in Search of Solutions: Health and Canadian Aboriginals," *Journal of Community Health,* 23(1), p59-73

Richmond, Chantelle A.M., 2009, "The Social Determinants of Inuit Health: a Focus on Social Support in the Canadian Arctic," *International Journal of Circumpolar Health*, 68(5), p471-489

Romanow, Roy J., 2002, "Building on Values: The Future of Health Care in Canada," Commission on the Future of Health Care in Canada, Retrieved July 4, 2011 from http://publications.gc.ca/site/eng/237274/publication.html

Rose, Richard, 2000, "How Much Does Social Capital Add to Individual Health? A Survey Study Russians," *Social Science and Medicine,* 51, p1421-1435

Rosenberg, Mark W., and Wilson, Kathleen, 2002, "Exploring the determinants of health for First Nations peoples in Canada: can existing frameworks accommodate traditional activities?" *Social Science and Medicine*, 55, p2017-2031

Statistics Canada, 2009, Aboriginal Peoples Survey, 2006 (Children and Youth) [public use microdata file], Ottawa, Ontario: Statistics Canada, Social and Aboriginal Statistics Division.

Tables

Table 1	Social Capital Descriptive Statistics					
VARIABLES	(1) Full Sample	(2) Low Income	(3) Middle Income	(4) High Income	(5) Male	(6) Female
Sports	0.6902	0.6109	0.6951	0.7877	0.7267	0.6518
	(0.4625)	(0. 4876)	(0.4604)	(0.4089)	(0.4457)	(0.4764)
Art/Music	0.3679	0.3381	0.3643	0.4074	0.3179	0.4203
	(0.4823)	(0.4731)	(0. 4813)	(0.4914)	(0.4657)	(0.4936)
Clubs	0.3047	0.2882	0.3100	0.3176	0.2406	0.3719
	(0.4603)	(0.4530)	(0.4625)	(0. 4656)	(0.4275)	(0.4834)
Cultural Activities	0.1558	0.1728	0.1535	0.1386	0.1458	0.1663
	(.3627)	(0.3781)	(0. 3605)	(0.3456)	(0.3529)	(0.3723)
Drug Problem	0.1204	0.1177	0.1192	0.1251	0.1207	0.1201
	(0.3255)	(0.3223)	(0. 3241)	(0.3309)	(0.3258)	(0.3251)
Violence Problem	0.1928	0.2413	0.1796	0.1519	0.2007	0.1846
	(0.3945)	(0.4279)	(0.3839)	(0.3590)	(0.4006)	(0.3880)
Importance of Graduating High School	0.9673	0.9603	0.9655	0.9778	0.9615	0.9734
	(0.1778)	(0.1953)	(0.1824)	(0.1473)	(0.1924)	(0.1608)
Importance of Pursuing Post-Secondary Education	0.8510	0.8357	0.8414	0.8807	0.8354	0.8674
	(0.3561)	(0.3706)	(0.3653)	(0.3242)	(0.3709)	(0.3392)
Family Dinner	0.9749	0.9684	0.9777	0.9792	0.9749	0.9749
	(0.1565)	(0.1751)	(0.1478)	(0.1428)	(0.1564)	(0.1565)
Importance of Learning an Aboriginal Language	0.3406	0.4291	0.3183	0.2638	0.3294	0.3523
	(0.4739)	(0.4950)	(0.4659)	(0.4408)	(0.4700)	(0.4777)
Community Involvement Index	1.5185	1.4071	1.5198	1.6479	1.4309	1.6103
	(1.0721)	(1.1176)	(1.0627)	(1.0128)	(1.0097)	(1.1265)
Community Environment Index	0.3133	0.3590	0.2989	0.2770	0.3214	0.3047
	(0.5908)	(0.6071)	(0.5888)	(0.5703)	(0.5929)	(0.5885)
Individual Social Capital Index	1.1916	1.2648	1.1597	1.1445	1.1648	1.2197
	(0.6048)	(0.6393)	(0.6072)	(0.5499)	(0.6105)	(0.5976)
Observations	12,907	4,249	4,725	3,933	6,611	6,296

Reports Means
Standard Deviations in parentheses

Table 2	Control Variables Descriptive Statistics		
	(1)	(2)	(3)
VARIABLES	Full Sample	Male	Female
Good Health	0.8330	0.8189	0.8477
	(0.3730)	(0.3851)	(0.3594)
Chronic Health Condition	0.4093	0.4553	0.3611
	(0.4917)	(0.4980)	(0.4804)
More than one CHC	0.2273	0.2655	0.1873
	(0.4191)	(0.4416	(0.3902)
Age 9-11	0.3459	0.3466	0.3452
	(0.4757)	(0.4759)	(0.4755)
Age 12-14	0.3453	0.3423	0.3484
	(0.4755)	(0.4745)	(0.4765)
Income 20k-40k	0.2330	0.2344	0.2315
	(0.4227)	(0.4237)	(0.4218)
Income 40k-60k	0.2000	0.1984	0.2017
	(0.4000)	(0.3988)	(0.4013)
Income 60k-80k	0.1618	0.1614	0.1623
	(0.3683)	(0.3679)	(0.3688)
Income 80k-100k	0.1223	0.1241	0.1204
	(0.3276)	(0.3297)	(0.3255)
Income 100k+	0.1744	0.1732	0.1755
	(0.3794)	(0.3785)	(0.3805)
Average in School	0.2220	0.2638	0.1782
	(0.4156)	(0.4407)	(0.3827)
Poor in School	0.0480	0.0556	0.0401
	(0.2137)	(0.2291)	(0.1961)
PMK Graduated High School	0.3362	0.3325	0.3400
	(0.4724	(0.4712)	(0.4737)
PMK Non-University Diploma	0.2875	0.2986	0.2759
	(0.4526)	(0.4577)	(0.4470)
PMK University Below Bachelors	0.0350	0.0332	0.0369
	(0.1834)	(0.1792)	(0.1886)
PMK Bachelor's Degree	0.1126	0.1102	0.1152
	(0.3161)	(0.3131)	(0.3193)
PMK Education Other	0.0093	0.0107	0.0079
	(0.0962)	(0.1030)	(0.0886)
Region Other Urban	0.2732	0.2697	0.2768
	(0.4456)	(0.4438)	(0.4474)
Region Rural	0.2179	0.2224	0.2133
	(0.4129)	(0.4159)	(0.4097)
Region Arctic	0.0379	0.0402	0.0354
	(0.1909)	(0.1965)	(0.1848)
Metis	0.2823	0.2729	0.2922
	(0.4501)	(0.4455)	(0.4548)
Inuit	0.0449	0.0466	0.0432
	(0.2071)	(0.2107	(0.2033)
Multiple Aboriginal Groups	0.0230	0.0222	0.0237

	(0.1498)	(0.1474)	(0.1522)
Other Aboriginal Group	0.0106	0.0098	0.0114
	(0.1022)	(0.0983)	(0.1061)
No Aboriginal Group	0.2544	0.2562	0.2526
	(0.4356)	(0.4365)	(0.4346)
Non-Inuit Arctic	0.0019	0.0017	0.0020
	(0.0432)	(0.0417)	(0.0448)
Observations	12,907	6,611	6,296

Reports Means
Standard Deviations in parentheses

Table 3	Main Regression Results – Dependent Variable: Good Health			
	(1)	(2)	(3)	(4)
VARIABLES	Good Health	Good Health	Good Health	Good Health
Male	-0.0215***	-0.0148**	-0.0222***	-0.0169**
	(0.00757)	(0.00753)	(0.00747)	(0.00741)
Age 9-11	-0.0144	-0.0156*	-0.0164*	-0.0176*
	(0.00948)	(0.00955)	(0.00946)	(0.00951)
Age 12-14	-0.00144	-0.00215	-0.00377	-0.00553
	(0.00968)	(0.00962)	(0.00965)	(0.00959)
Income 20-40k			0.0115	0.0144
			(0.0127)	(0.0127)
Income 40-60k			0.0455***	0.0503***
			(0.0119)	(0.0118)
Income 60-80k			0.0432***	0.0498***
			(0.0126)	(0.0124)
Income 80-100k			0.0652***	0.0730***
			(0.0121)	(0.0117)
Income 100k+			0.0598***	0.0691***
			(0.0121)	(0.0117)
Poor in School	-0.155***	-0.171***	-0.151***	-0.162***
	(0.0226)	(0.0229)	(0.0220)	(0.0223)
Average in School	-0.0714***	-0.0772***	-0.0658***	-0.0696***
	(0.0102)	(0.0101)	(0.0101)	(0.0102)
PMK Graduated High School			0.0363***	0.0387***
			(0.00933)	(0.00934)
PMK Non-University Diploma			0.0455***	0.0512***
			(0.00959)	(0.00951)
PMK University Below Bachelor's			0.0856***	0.0885***
			(0.0130)	(0.0128)
PMK Bachelor's Degree			0.0698***	0.0758***
			(0.0111)	(0.0108)
PMK Other Education			-0.0247	-0.0248
			(0.0374)	(0.0376)
Region Other Urban	-0.00053	-0.00323	0.00257	-0.000285
	(0.00958)	(0.00963)	(0.00940)	(0.00944)
Region Rural	0.00321	-0.00064	0.00695	0.00420
	(0.00864)	(0.00866)	(0.00855)	(0.00857)
Region Arctic	-0.0707*	-0.114***	-0.0527	-0.0852**
	(0.0410)	(0.0439)	(0.0390)	(0.0416)
Metis	0.0200**	0.0333***	0.0131	0.0230***
	(0.00863)	(0.00845)	(0.00866)	(0.00852)
Inuit	0.00584	0.0147	-0.00220	0.00404
	(0.0284)	(0.0271)	(0.0289)	(0.0280)

Multiple Aboriginal Groups	0.00841	0.0180	0.00603	0.0134
	(0.0220)	(0.0211)	(0.0219)	(0.0213)
Other Aboriginal Group	0.0484*	0.0596**	0.0459*	0.0549**
	(0.0249)	(0.0237)	(0.0249)	(0.0238)
No Aboriginal Group	0.0548***	0.0717***	0.0416***	0.0540***
	(0.0099)	(0.00934)	(0.0102)	(0.00975)
Non-Inuit Arctic	0.0741	0.0818	0.0702	0.0767*
	(0.0473)	(0.0442)	(0.0460)	(0.0431)

Model 1 includes individual measures of social capital without measures of SES
Model 2 includes social capital index variables without measures of SES
Model 3 includes individual measures of social capital, includes measures of SES
Model 4 includes social capital index variables, includes measures of SES
All models are estimated with probit regressions and weighted with appropriate survey weights. Marginal effects are reported and robust standard errors are in the parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 3 (cont)	Main Regression Results – Dependent Variable: Good Health			
	(1) Good Health	(2) Good Health	(3) Good Health	(4) Good Health
Community Involvement Indicators				
Sports	0.0642***		0.0505***	
	(0.00864)		(0.00850)	
Art/Music	-0.0019		-0.00652	
	(0.00812)		(0.00815)	
Clubs	0.0129		0.0105	
	(0.00837)		(0.00835)	
Cultural Activities	0.00363		0.00402	
	(0.0101)		(0.01000)	
Community Environment Indicators				
Drug Problem	-0.00396		-0.00722	
	(0.0119)		(0.0119)	
Violence Problem	-0.0330***		-0.0251**	
	(0.0104)		(0.0102)	
Individual Social Capital Indicators				
Importance of Pursuing Post-Secondary Education	0.0838***		0.0760***	
	(0.0132)		(0.0129)	
Importance of Learning an Aboriginal Language	-0.0253***		-0.0162*	
	(0.00882)		(0.00869)	
Index Variables				
Community Involvement Index		0.0201***		0.0141***
		(0.00381)		(0.00374)
Community Environment Index		-0.0221***		-0.0181***
		(0.00621)		(0.00615)
Individual Social Capital Index		0.0173**		0.0204***
		(0.00707)		(0.00694)
Measures of SES included	No	No	Yes	Yes
Other Control Variables included	Yes	Yes	Yes	Yes
Observations	12,907	12,907	12,907	12,907

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*** p<0.01, ** p<0.05, * p<0.1

Table 4	Main Regression Results – Dependent Variable: Chronic Health Condition			
VARIABLES	(1) Chronic Health Condition	(2) Chronic Health Condition	(3) Chronic Health Condition	(4) Chronic Health Condition
Male	0.0894***	0.0805***	0.0891***	0.0810***
	(0.0106)	(0.0105)	(0.0106)	(0.0105)
Age 9-11	0.0597***	0.0597***	0.0617***	0.0619***
	(0.0130)	(0.0130)	(0.0131)	(0.0130)
Age 12-14	0.0556***	0.0499***	0.0593***	0.0548***
	(0.0137)	(0.0134)	(0.0137)	(0.0134)
Income 20-40k			0.0147	0.0123
			(0.0200)	(0.0200)
Income 40-60k			-0.0174	-0.0230
			(0.0202)	(0.0201)
Income 60-80k			-0.0142	-0.0224
			(0.0213)	(0.0213)
Income 80-100k			-0.0269	-0.0372*
			(0.0226)	(0.0224)
Income 100k+			-0.0628***	-0.0748***
			(0.0206)	(0.0204)
Poor in School	0.235***	0.244***	0.233***	0.240***
	(0.0245)	(0.0244)	(0.0247)	(0.0246)
Average in School	0.0957***	0.0999***	0.0936***	0.0966***
	(0.0129)	(0.0129)	(0.0130)	(0.0129)
PMK Graduated High School			0.00221	-0.000304
			(0.0150)	(0.0150)
PMK Non-University Diploma			0.0157	0.00983
			(0.0157)	(0.0157)
PMK University Below Bachelor's			-0.0110	-0.0143
			(0.0294)	(0.0293)
PMK Bachelor's Degree			0.0248	0.0177
			(0.0207)	(0.0206)
PMK Other Education			0.00992	0.00998
			(0.0513)	(0.0508)
Region Other Urban	-0.0338**	-0.0324**	-0.0342***	-0.0334**
	(0.0132)	(0.0132)	(0.0132)	(0.0132)
Region Rural	-0.0696***	-0.0692***	-0.0693***	-0.0694***
	(0.0118)	(0.0118)	(0.0120)	(0.0119)
Region Arctic	-0.107**	-0.0917**	-0.0983**	-0.0869*
	(0.0437)	(0.0439)	(0.0445)	(0.0445)
Metis	-0.000663	-0.00967	0.00432	-0.00229

	(0.0127)	(0.0124)	(0.0127)	(0.0126)
Inuit	-0.01937	-0.0271	-0.0130	-0.0186
	(0.0411)	(0.0404)	(0.0413)	(0.0408)
Multiple Aboriginal Groups	0.0898***	0.0829***	0.0913***	0.0859***
	(0.0320)	(0.0319)	(0.0321)	(0.0320)
Other Aboriginal Group	-0.00674	-0.0154	-0.00725	-0.0148
	(0.0515)	(0.0502)	(0.0519)	(0.0507)
No Aboriginal Group	-0.0212	-0.0328**	-0.0158	-0.0238
	(0.0152)	(0.0149)	(0.0154)	(0.0151)
Non-Inuit Arctic	-0.132	-0.134	-0.127	-0.128
	(0.1018)	(0.1004)	(0.102)	(0.101)

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*** p<0.01, ** p<0.05, * p<0.1

Table 4 (cont)	Main Regression Results – Dependent Variable: Chronic Health Condition			
	(1) Chronic Health Condition	(2) Chronic Health Condition	(3) Chronic Health Condition	(4) Chronic Health Condition
Community Involvement Indicators				
Sports	-0.0591***		-0.0543***	
	(0.0120)		(0.0121)	
Art/Music	0.0251**		0.0260**	
	(0.0113)		(0.0114)	
Clubs	0.00367		0.00387	
	(0.0118)		(0.0118)	
Cultural Activities	-0.00196		-0.00377	
	(0.0143)		(0.0143)	
Community Environment Indicators				
Drug Problem	-0.0115		-0.00963	
	(0.0174)		(0.0174)	
Violence Problem	0.0689***		0.0645***	
	(0.0146)		(0.0146)	
Individual Social Capital Indicators				
Importance of Pursuing Post-Secondary Education	-0.0641***		-0.0621***	
	(0.0154)		(0.0154)	
Importance of Learning an Aboriginal Language	-0.0121		-0.0153	
	(0.0122)		(0.0123)	
Index Variables				
Community Involvement Index		-0.00704		-0.00524
		(0.00502)		(0.00504)
Community Environment Index		0.0366***		0.0342***
		(0.00899)		(0.00900)
Individual Social Capital Index		-0.0324***		-0.0342***
		(0.00916)		(0.00920)
Measures of SES included	No	No	Yes	Yes
Other Control Variables included	Yes	Yes	Yes	Yes
Observations	12,907	12,907	12,907	12,907

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Table 5	Main Regression Results – Dependent Variable: Multiple Chronic Conditions			
VARIABLES	(1) Multiple Chronic Health Conditions	(2) Multiple Chronic Health Conditions	(3) Multiple Chronic Health Conditions	(4) Multiple Chronic Health Conditions
Male	0.0730***	0.0680***	0.0714***	0.0669***
	(0.00906)	(0.00889)	(0.00904)	(0.00887)
Age 9-11	0.0428***	0.0434***	0.0454***	0.0462***
	(0.0114)	(0.0114)	(0.0114)	(0.0114)
Age 12-14	0.0549***	0.0541***	0.0581***	0.0583***
	(0.0123)	(0.0119)	(0.0123)	(0.0120)
Income 20-40k			-0.00774	-0.00985
			(0.0161)	(0.0161)
Income 40-60k			-0.0373**	-0.0418***
			(0.0158)	(0.0157)
Income 60-80k			-0.0371**	-0.0433***
			(0.0164)	(0.0162)
Income 80-100k			-0.0487***	-0.0566***
			(0.0168)	(0.0166)
Income 100k+			-0.0615***	-0.0707***
			(0.0157)	(0.0154)
Poor in School	0.160***	0.172***	0.158***	0.168***
	(0.0242)	(0.0242)	(0.0242)	(0.0243)
Average in School	0.0560***	0.0604***	0.0556***	0.0590***
	(0.0114)	(0.0115)	(0.0115)	(0.0115)
PMK Graduated High School			0.0302**	0.0282**
			(0.0132)	(0.0132)
PMK Non-University Diploma			0.0509***	0.0454***
			(0.0141)	(0.0140)
PMK University Below Bachelor's			0.0284	0.0230
			(0.0260)	(0.0257)
PMK Bachelor's Degree			0.0591***	0.0512***
			(0.0192)	(0.0189)
PMK Other Education			0.0673	0.0686
			(0.0479)	(0.0475)
Region Other Urban	-0.0309***	-0.0279**	-0.0296***	-0.0269**
	(0.0109)	(0.0109)	(0.0109)	(0.0109)
Region Rural	-0.0456***	-0.0429***	-0.0417***	-0.0395***
	(0.00955)	(0.00953)	(0.00972)	(0.00971)
Region Arctic	-0.116***	-0.0999***	-0.104***	-0.0879***
	(0.0275)	(0.0296)	(0.0295)	(0.0315)
Metis	0.00455	-0.00553	0.00854	2.75e-05
	(0.0106)	(0.0104)	(0.0107)	(0.0105)
Inuit	-0.0339	-0.0395	-0.0265	-0.0307

	(0.0324)	(0.0316)	(0.0331)	(0.0325)
Multiple Aboriginal Groups	0.0806***	0.0395**	0.0805***	0.0732**
	(0.0297)	(0.0316)	(0.0295)	(0.0293)
Other Aboriginal Group	-0.0635**	-0.0722**	-0.0659**	-0.0737**
	(0.0309)	(0.0300)	(0.0309)	(0.0300)
No Aboriginal Group	0.00547	-0.00868	0.00877	-0.00291
	(0.0131)	(0.0126)	(0.0133)	(0.0129)
Non-Inuit Arctic	-0.139	-0.143	-0.136*	-0.140*
	(0.0734)	(0.0709)	(0.0742)	(0.0717)

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*** p<0.01, ** p<0.05, * p<0.1

Table 5 (cont)	Main Regression Results – Dependent Variable: Multiple Chronic Conditions			
	(1) Multiple Chronic Health Conditions	(2) Multiple Chronic Health Conditions	(3) Multiple Chronic Health Conditions	(4) Multiple Chronic Health Conditions
Community Involvement indicators				
Sports	-0.0320***		-0.0301***	
	(0.0103)		(0.0103)	
Art/Music	0.00538		0.00514	
	(0.00948)		(0.00948)	
Clubs	0.0109		0.00993	
	(0.00988)		(0.00987)	
Cultural Activities	0.00625		0.00435	
	(0.0122)		(0.0122)	
Community Environment Indicators				
Drug Problem	-0.00125		0.000120	
	(0.0146)		(0.0146)	
Violence Problem	0.0253**		0.0225*	
	(0.0123)		(0.0123)	
Individual Social Capital Indicators				
Importance of Pursuing Post-Secondary Education	-0.0789***		-0.0797***	
	(0.0139)		(0.0140)	
Importance of Learning an Aboriginal Language	0.0000867		-0.00208	
	(0.0102)		(0.0103)	
Index Variables				
Community Involvement Index		-0.00237		-0.00202
		(0.00445)		(0.00445)
Community Environment Index		0.0154**		0.0137*
		(0.00762)		(0.00764)
Individual Social Capital Index		-0.0311***		-0.0331***
		(0.00776)		(0.00777)
Measures of SES included	No	No	Yes	Yes
Other Control Variables included	Yes	Yes	Yes	Yes
Observations	12,907	12,907	12,907	12,907

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