THROUGH THE LOOKING GLASS: THE HEALTH AND SOCIO-ECONOMIC STATUS OF HEPATITIS C POSITIVE TRANSFUSION RECIPIENTS, 1986-1990

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FOREWORD

One of the most difficult tasks of writing up any study is finding a title that accurately reflects the nature and major findings of the work. In this epidemiological study, the task is even more difficult, because this survey is so closely linked to the class action suit and the issue of monetary compensation of Hepatitis C positive transfusion recipients. All sides in this legal and economic struggle have taken considerable interest in our study's results, because so little is currently known about the health and socio-economic conditions of transfusion recipients. In an attempt to reflect this quixotic struggle in the title of our work, we have borrowed from the book Through the Looking Glass by Lewis Carroll. By surveying the lives of Hepatitis C positive transfusion recipients "through the looking glass", we have attempted to identify how Hepatitis C positive persons differ socio-economically, health-wise, and clinically from other transfusion recipients. Our research findings will hopefully encourage future health research in this area and in the end play a small role in improving the quality of life and health of Hepatitis C suffers in this country.

Robert Hogg, April 1999

And though the shadow of a sigh
May tremble through the story,
For 'happy summer days' gone by,
And vanish'd summer glory -
It shall not touch with breath of bale
The pleasure of our fairy-tale.

– Lewis Carroll

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EXECUTIVE SUMMARY

Context — This study was conducted jointly by the British Columbia Centre for Excellence in HIV/AIDS and the Provincial Blood Coordination Agency and arose out of the need to characterize the health and socioeconomic status of Hepatitis C positive transfusion recipients in the province of British Columbia.

Objective — To compare the current socio-economic status, health status, symptomatology, and rate of disease progression of Hepatitis C positive and negative transfusion recipients.

Design — A case-control study of Hepatitis C positive and negative transfusion recipients. Study subjects were interviewed over the phone or in person by trained interviewers.

Setting — Province of British Columbia.

Study participants — Cases were defined as subjects who were Hepatitis C positive and seeking monetary compensation; while the comparison group were a random sample of Hepatitis C negative transfusion recipients identified from the British Columbia Blood Recipient Notification Program. Participants also had to be aged 18 years and over, to have self-reported that they had a transfusion between August 1, 1986 and June 30, 1990, and completed an interview that the interviewer felt was of satisfactory quality.

Main Outcome Measures — The survey instrument elicited information about the participant's demographic characteristics, employment and educational history, personal and household income in 1997, health status, social support, transfusion history, restriction of activities and disabilities, fatigue and sleeping disorders, disease symptomatology, health service use and costs, and alcohol use.

Results — This study was based on 241 cases and 222 control subjects. Results from our multivariate analysis indicated that even after adjusting for differences in age, medical expenses, and current unemployment, Hepatitis C positivity was associated with an eight-fold (Odds Ratio [OR] = 8.04; 95 % Confidence Intervals [CI]: 4.22, 15.32), increase in the likelihood of being in poorer health, after adjusting for differences in age, medical expenses, and current employment. We have also shown that recipients living with Hepatitis C were more likely to have two or more clinical symptoms (OR = 3.53; 95% CI: 1.44, 8.70), to be male (OR = 2.86; 95% CI: 1.65, 4.97), to be in worse health status as compared to ten years ago (OR = 1.60; 95% CI: 1.30, 1.96), to have a higher illness intrusiveness rating (OR = 1.35; 95% CI: 1.25, 1.46), and to be younger (OR = 0.97; 95% CI: 0.95, 0.98) than those not living with this virus.

Conclusion — In conclusion, our study demonstrates important differences in current socioeconomic profile, health status, symptomatology, and health care use and expenditures between transfusion recipients with and without Hepatitis C. However, like a reflection in a mirror, the study's results will never be able to show us the personal hardships people with Hepatitis C have faced or how their poor health status has affected their lifestyle and well being.

1. INTRODUCTION

Hepatitis C is one of the most important known causes of liver disorder and is believed to be an important cause of chronic liver disease, cirrhosis of the liver, and liver cancer <1>. This disease is not always severe or progressive <2>. In fact, the majority of persons with the infection remain asymptomatic and will only be diagnosed with the disease when their liver enzymes are found to be abnormal after a blood donation or routine medical examination <1, 3 , 4>. There are approximately two hundred and fifty-thousand persons currently infected with Hepatitis C in Canada. Approximately one-fifth of these individuals are transfusion recipients <5>.

After initial exposure, RNA can be detected in the blood of a Hepatitis C infected person within 1 to 3 weeks. Within an average of 50 days, most patients develop liver cell injury, as indicated by elevation of serum alanine aminotransferase levels (ALT) <6>. Hepatitis C is self-limiting in approximately 15 percent of cases <3, 6>. Recovery is characterized by the disappearance of Hepatitis C RNA from the blood and return of liver enzymes to normal levels. The remaining 85 per cent of Hepatitis C infected individuals fail to clear the virus within six months and develop chronic hepatitis <3>. Data on the clinical course of chronic Hepatitis C are limited, because the onset of infection is often unrecognized and the date of infection is only known for persons infected through blood transfusions or occupational exposure <4, 6>. Additionally, the natural history of the disease appears to differ according to geography, alcohol use, virus characteristics, co-infection with other viruses, and other unexplained factors <6, 7, 8>.

Although the majority of persons with Hepatitis C may be asymptomatic during the first two decades following infection, it has been estimated that approximately 10 to 20 percent of persons with the disease will develop certain non-specific symptoms <3>. Among these, malaise, weakness, fever, and fatigue are the most common <1>. Other reported symptoms include nausea, vomiting, muscle and joint aches, abdominal pain, skin rashes, and weight loss <3>. Many cases of Hepatitis C go undiagnosed because these symptoms resemble a flu-like illness, or the symptoms may be so mild that the person is unaware of anything unusual. In addition to these physical symptoms, persons infected with Hepatitis C have been found to have a significantly lower quality of life <9>.

A large number of persons with Hepatitis C who experience more advanced chronic symptoms develop them well over a decade after infection <2>. Symptoms related to cirrhosis and liver failure may include swelling of the abdomen, legs, or ankles, internal bleeding, mental confusion, or jaundice <3>. Development of cirrhosis and end-stage liver disease rapidly after infection occurs rarely, and most often among individuals with concomitant alcohol use <6, 8, 10>.

1.1 PURPOSE OF THE STUDY

The main purpose of this survey was to compare the current socioeconomic profile, health status, symptomatology, and health care use and expenditures of transfusion recipients who did and did not contract Hepatitis C. In particular, we were interested in determining whether persons with Hepatitis C had a lower annual income, poorer health status, exhibited more clinical symptoms, and used or spent more on health care services than those without Hepatitis C. This survey was intended to provide

important baseline socioeconomic and health information for persons who acquired Hepatitis C from a blood transfusion during the period August 1, 1986 to June 30, 1990.

2. METHODS

The study was conducted jointly by the British Columbia Centre for Excellence in HIV/AIDS and the Provincial Blood Coordination Agency. The project arose out of the need to characterize the health and socioeconomic status of Hepatitis C positive transfusion recipients. The study team was made up of persons with expertise in biostatistics, demography, epidemiology, transfusion services, and virology. Advice on study design and survey development was also sought from an external team of researchers with expertise in hepatology and quality of life issues as well as from a community advisory board. Another advisory board, made-up of persons from the British Columbia Ministry of Health, Health Canada, the Ministry of the Attorney General of British Columbia, the Attorney General of Canada, and lawyers for the Hepatitis C class action lawsuit, also provided the investigators with advice on study design and assistance in issues relating to confidentiality, participant recruitment and generalizability.

The study was conducted over the period of October 1998 to February 1999. Letters of invitation containing an explanatory cover letter and consent form were mailed by registered mail to all eligible individuals. Participants interested in being interviewed for the study were asked to return a signed consent form with their correct contact information. Telephone and in-persons interviews were completed on a random sample of persons who returned the consent form. The interview was approximately 30 to 45 minutes in length. Study participants were given a $25 honorarium for completing the questionnaire. All contact information identifying study participants was destroyed at the end of the study.

2.1 STUDY SUBJECTS

In this case-control analysis, study subjects were transfusion recipients who tested negative or positive for Hepatitis C and received a blood transfusion in British Columbia during the period August 1, 1986 to June 30, 1990. Cases were defined as subjects who were Hepatitis C positive and part of the class action suit; while the comparison group were a random sample of Hepatitis C negative transfusion recipients identified from the British Columbia Blood Recipient Notification Program. Cases and controls also had to be aged 18 years and over, to have self-reported that they had a transfusion between August 1, 1986 and June 30, 1990, and completed an interview that the interviewer felt was of satisfactory quality.

We estimated *a priori* that we would need a minimum sample size of 212 cases and 212 controls to provide an accurate estimate of the proportion of individuals with symptoms and signs. This sample size calculation was based on the estimation of a single proportion from a finite population. The proportion of all Hepatitis C positive recipients with symptoms and signs was assumed to be 20 percent. Based on this hypothesized target proportion of symptoms and signs, our observed estimate would lie within 5 percent of the true value nineteen times out of twenty.

2.2 DATA COLLECTION INSTRUMENT

As previously noted, the development of the questionnaire was overseen by the study investigators, an external advisory panel of physicians with expertise in hepatology and quality of life issues, and community advisory board. The questionnaire was pre-tested on persons with Hepatitis C who were not part of the class action suit. Interview and data entry techniques were also standardized to ensure the quality of the data. All data were entered and stored in an Oracle relational database.

Study participants who completed a consent form were asked to complete an interview in-person or over the phone. The survey instrument used in this interview elicited information about the participant's demographic characteristics, employment and educational history, personal and household income in 1997, health status, social support, transfusion history, restriction of activities and disabilities, fatigue and sleeping disorders, disease symptomatology, health service use and costs, and alcohol use. The questionnaire also provided a section for the respondent as well as the interviewer to rate the quality of the interview.

In order to conduct a comprehensive analysis that would allow us to look at the individual influence of occupation on social status, we divided the study population into social levels using a modified classification system. For this analysis, individuals were divided into three social class levels based on occupation using an adaptation of the UK Registrar General's Social Class Scale <11>. In this classification system persons with professional and technical occupations are assigned to social class one, while unskilled manual employees are assigned to social class three.

A number of self-reported health and illness intrusiveness scales were incorporated into the survey instrument. Self-reported health status was measured by the RAND 36-item Health Survey <12>. This 36-item questionnaire provided information on eight broad health concepts: physical functioning, bodily pain, role limitation due to physical health problems, role limitations due to personal or emotional problems, emotional well-being, social functioning, energy/fatigue, and general health perceptions. Each sub-scale is scored independently from 0 to 100. A high score indicates better health status for that component.

The survey instrument also included three illness intrusiveness scales. The first, the Epworth Sleepiness Scale, a set of eight questions, rates the chances that the subject would doze off or fall asleep during eight different situations commonly encountered in daily life <13 ,14 ,15 ,16 >. The term sleepiness was used to refer to the propensity to doze or fall asleep when intending to remain awake. This is to be distinguished from subjective feelings of tiredness or fatigue that are not always related to sleepiness <17>. Participants were asked, "How likely are you to doze off or fall asleep in the following situations (rather than just feeling tired)?" (1) sitting and reading, (2) watching television, (3) sitting inactive in a public place (for instance, a theatre or meeting), (4) riding as a passenger in a car for at least an hour, (5) lying down to rest in the afternoon, (6) sitting and talking to someone, (7) sitting quietly after a lunch without alcohol, and (8) in a car, while stopped for a few minutes in traffic. For each situation, responses were recorded on a four point scale as: 0 = never doze; 1 = slight chance; 2 = moderate chance; or 3 high chance. The Epworth Sleepiness Scale for each participant was calculated by summing the individual scores of the eight responses (range 0 – 24).

The second measure of fatigue and sleepiness used in this study was the Fatigue Severity Scale <18>. The Fatigue Severity Scale is a 10-item, 7-point Likert scale, which was originally developed and tested on patients having either systemic lupus erythematosus or multiple sclerosis. Each item is rated from 1 = strongly disagree to 7 = strongly agree. The Fatigue Severity Scale score was calculated by taking the mean item score over the 10 items. The average Fatigue Severity Scale score ranges from 1 to 7 with higher scores indicating greater fatigue.

The Illness Intrusiveness Rating Scale was the final scale used to examine fatigue and sleepiness in this study <19, 20>. This scale is a 13-item self-report index used to measure the extent to which an illness interferes with the 13 life domains important to quality of life. Each domain is rated along a 7 point Likert scale, range from 1 = not very much to 7 = very much. These domains relate to general aspects of life such as health, diet, passive/active recreation, work, financial situation, self expression/ self-improvement, family relations, relations with spouse, sex life, other social relations, religious expression and community and civic involvement. Subjects were asked to rate each domain with respect to their current life situation. Along with individual domain scores a total illness intrusiveness score was calculated by summing all individual domain scores. An individual's total illness intrusiveness score could range from 13 to 91 with higher scores indicating a greater degree of intrusiveness.

2.3 OTHER SOURCES OF DATA

In addition to the participant survey instrument, the study used two external sources of data. First, 1996 Canadian census data for British Columbia were acquired to allow for the comparison of respondents and non-respondents in the study. Using a postal code conversion file, we were able to determine which Census Subdivision and Census Tract a respondent or non-respondent was located in. Statistics Canada defines Census Subdivisions as municipalities, or geographic areas that have been created as equivalents of municipalities for the dissemination of statistical data, and Census Tracts as smaller geographic units representing urban or rural neighborhood communities.

The province of British Columbia is divided into 713 Census Subdivisions. Unlike Census Subdivisions which cover the entire province, only the six largest urban areas in British Columbia are covered by Census Tracts. For the six urban areas for which Census Tract data were available, we conducted our analysis at this scale. For areas outside these zones, we conducted our comparisons of respondents and non-respondents at the Census Subdivision level. The 77 Subdivisions that are covered by Census Tracts were excluded from the analysis and replaced by the province's 486 Census Tracts, bringing the total number of geographic areas available for analysis to 1199. In this comparison, we excluded census Subdivisions and Tracts that had a population of less than 250 persons, because Statistics Canada does not compile area profile data for them.

In order to compare the differences between respondents and non-respondents a socio-demographic profile of each relevant Census Subdivision and Census Tract in the province was generated. In addition, to assess the socio-demographic characteristics of respondents and non-respondents, certain variables were acquired from the 1996 census of Canada. Variables were selected if they could be assumed to be similar to variables already contained in the survey instrument, or if

they had been previously recognized in epidemiological research as being indirect indicators of population health.

Secondly, data from the National Population Health Survey were used to compare cases with other Canadian transfusion recipients. The National Population Health Survey, conducted every two years by Statistics Canada, is designed to collect information related to the health of the Canadian population. In the most recent survey, taken between June 1996 and August 1997, over 80,000 Canadians participated in the in-depth questionnaire. The target population for the National Population Health Survey included household residents in all provinces, with the principal exclusion of populations on Native Reservations, Canadian Forces Bases, and some remote areas in Ontario and Quebec. Among the objectives of the National Population Health Survey was to provide data for analytic studies that will allow the possibility of linking to other survey data.

In each household, the National Population Health Survey collects some limited information from all household members and one person, aged 12 years and over, is randomly selected for a more in-depth interview. The questionnaire includes components on health status, use of health services, risk factors and demographic and socio-economic status. Demographic and socio-economic information includes age, gender, education, ethnicity, household income, and labour force status. Health status is measured through questions on self-perception of health, functional ability, chronic conditions, and activity restriction. The use of health services was measured through questions on visits to health care providers, hospital care and drug use. Behavioural risk factors include smoking, alcohol use and physical activity. In addition, the survey measures psycho-social factors that may influence health, such as stress, self-esteem, and social support.

Among the questions in the National Population Health Survey is a question that asks whether the respondent has ever had a blood transfusion between the years 1978 and 1985. By restricting the National Population Health Survey data to those Canadians in the 1996-1997 study who reported having had a blood transfusion during this period we were able to obtain an additional control group to compare with the Hepatitis C positive transfusions recipients in this study. Our comparison was limited to questions in the survey instrument that were also found in the 1996-1997 round of the National Population Health Survey. Based on this restriction we were able to compare a number of demographic, socio-economic, psycho-social, and health related differences between the two groups.

2.4 STATISTICAL ANALYSES

Comparisons of hepatitis C positive and negative transfusion recipients were conducted using both parametric and distribution-free methods. Bivariate categorical data were analyzed using Pearson's chi-square test or Fisher's exact test for contingency tables in which 25 percent or more of the expected cell frequencies were less than 5. Continuous variables were analyzed using the Wilcoxon rank sum test. Odds ratios and test-based confidence limits were obtained using Mantel-Haenszel methods. Stepwise multivariate logistic regression was used to identify independent predictors of Hepatitis C infection and to adjust for potential confounding variables. In addition, we also used logistic regression to identify independent predictors of an elevated illness intrusiveness rating.

An elevated illness intrusiveness rating was defined a priori as the upper quartile of ratings for all respondents. All variables included in the multivariate models were observed to be statistically significant ($p \leq 0.05$) in the bivariate analyses. Subjects with missing values for variables of interest were excluded from the bivariate and multivariate analysis. All reported p-values are two-sided.

3. RESULTS

Three hundred and twenty cases and 306 controls agreed to participate in the study and 267 (83.4%) cases and 255 (83.3%) controls were interviewed. For this analysis, 26 control and 33 cases who completed questionnaires were excluded because they did not self-report that they had a transfusion between August 1, 1986 and June 30, 1990 or the interviewers felt the interview was of poor quality. After removing these individuals, the final study sample consisted of 241 cases and 222 controls.

Tables 1 and 2 compare responders and non-responders in terms of socio-demographic characteristics taken from the 1996 Canadian Census for those who could be linked to census tracts or subdivisions. As noted in the first table, 208 cases were no different than other 1,021 Hepatitis C transfusion recipients identified through the Blood Recipient Notification Program between January 1, 1986 and June 30, 1990 with respect to living in census tracts of subdivision with similar proportions of women ($p = 0.157$) and persons with a university education ($p = 0.192$) or unemployed ($p = 0.321$). As well, there was no difference with respect to median income ($p = 0.117$) between the two groups. Similar results were noted for responding and non-responding control subjects. As with cases, there was no statistical difference between the 199 responders and 731 non-responders with respect to proportions of women ($p = 0.547$), persons with a university education ($p = 0.150$) and unemployment ($p = 0.638$) in a census tract or subdivision. The median income of responders and non-responders was also similar ($p = 0.993$).

Table 3 compares cases and controls with respect to interviewer feedback. As noted here, cases were more likely to have had a longer interview duration (median 46.5 versus 35.0 minutes; $p<0.001$), to have used a proxy (3.3% versus 0.5%; $p =0.038$) and less likely to have provided information of high quality (77.9% versus 90.4%; $p = 0.001$) or given an interview of high quality (79.5% versus 91.3%; $p = 0.001$). There was no difference between the two groups with respect to the type of interview given. The vast majority of cases and controls were interviewed over the phone rather than in person.

3.1 SOCIOECONOMIC STATUS

There are number of notable differences in the sociodemographic characteristics of cases and controls. As shown in Table 4, cases were more likely to be males (52.3% versus 41.0%; $p = 0.015$), younger in age (median 50 versus 65 years; $p < 0.001$), to have been born in Canada (80.9% versus 74.3%; $p = 0.008$), and to have resided longer in British Columbia ($p = 0.050$), and less likely to be married (49.8% versus 65.3%; $p = 0.001$). There was no difference between the two groups with respect to ethnic or cultural origin, the number of adults and children residing in the household, age at arrival into Canada, or the number of years of primary, secondary, or post-secondary education or acquisition of a high school diploma and most post-secondary degrees and diplomas.

Differences in employment status for those aged 18 to 64 years, and personal and household income are described in Tables 5 and 6. As indicated in the first table, cases were less likely to be employed than controls ($p = 0.001$). Among those unemployed subjects, cases were also more likely to self-report that they were not currently working because they were disabled or recovering from illness (64.0 % versus 37.8%; $p < 0.001$) than controls. Examination of the respondent's employment history since 1990 revealed no differences between the two groups with respect to those employed full-time, part-time or self-employed, and social class. With respect to income, cases reported a lower median household income ($30,000 versus $31,400; $p = 0.046$) than controls. There was no difference in individual income between the two groups ($p = 0.201$) (Table 6). Cases were more likely to obtain income from social assistance and welfare (20.3% versus 4.5%; $p = 0.001$) and long-term disability insurance (9.5% versus 4.1%; $p = 0.020$). Cases were less likely to have obtained income from Canada pension plan (32.4% versus 52.7%; $p = 0.001$), savings (14.5% versus 25.7%; $p = 0.003$) and other retirement pension plans (18.3% versus 44.6%; $p = 0.001$) than controls (Table 6). The primary source of income for both cases and controls was wages and salaries.

Finally, we examined differences in personal and household income among cases and controls aged 18 to 64 years. Although there was no statistical difference in personal income between the two groups (median income $12,000 versus $20,160; $p = 0.202$), we did observe a statistically significant difference in household income between cases and controls (median income $30,000 versus $45,000; $p = 0.047$). Cases aged 18 to 64 years were also less likely to receive income from wages and salaries (48.1% versus 61%; $p = 0.002$) and savings (9.3% versus 19.8%; $p = 0.012$), and more likely to receive income assistance (24.2% versus 4.7%; $p = 0.001$) than controls of the same age.

3.2 HEALTH STATUS

Tables 7 through 10 characterize differences in health status between the cases and controls. As noted in Table 7, there were significant differences in self-reported health status between the two groups. Cases were much less likely to report that their current health status was excellent or very good (7.1% versus 37.9 %; $p < 0.001$) than controls. Compared to health status in the past, cases were also less likely to report being either much or somewhat better now than one year ago (9.6% versus 15.8%; $p < 0.001$). A similar pattern held when the health status of cases and controls was compared to what it was 10 years ago (14.1% versus 31.6; $p < 0.001$). Table 8 compares patterns of long-term disabilities or handicap among cases and controls. As noted here, cases were significantly more likely to report that they had a long-term disability or handicap (68.2% versus 42.7%; $p < 0.001$) compared with the control group. Cases were also more likely to report that this condition was caused by a disease of illness (79.9% versus 70.7%; $p = 0.028$), however, there appeared to be no difference between the two groups with respect to the daily activities with which the respondents needed assistance. Among cases the major underlying reasons for this disability were Hepatitis C (45.4%) and illnesses attributed to musculoskeletal system (17.8%). Table 9 provides a detailed comparison of the eight sub-scales of the RAND 36-item Health Survey (version 1.0). As noted here, cases had significantly lower scores for all eight broad health component, indicating that in terms of health status and well being they were much

worse off than controls (all at $p < 0.001$). Finally, Table 10 describes of the differences in the social functioning of cases and controls. As note here, cases were significantly worse off with respect to someone to confide in ($p = 0.012$), someone to count on ($p < 0.001$), and someone who makes one feel loved and cared for ($p = 0.034$).

3.3 ILLNESS INTRUSIVENESS

Tables 11 through 14 provide comparisons of cases and controls with respect to measures of fatigue, sleepiness and illness intrusiveness. As indicated in Table 11, cases were more likely to nap during the day (58.3% versus 37.8%; $p < 0.001$), to have trouble going to sleep or staying asleep (61.9% versus 44.3%; $p < 0.001$), and to have difficulty sometimes or most of the time staying awake when they want (52.7% versus 60.0%; $p < 0.001$). Of the two groups, cases were also less likely to find sleep refreshing (36.3% versus 69.8%; $p < 0.001$). There was no difference between the two groups with respect to the median number of hours of sleep per night ($p = 0.808$). The next three tables summarize the findings from the Illness Intrusiveness Rating Scale (Table 12), Epworth Sleepiness Scale (Table 13), and the Fatigue Severity Scale (Table 14). As characterized in these tables, cases were significantly worse off than controls with respect to the total scale scores and most scores for the individual domains found in these three scales. With regards to the Illness Intrusiveness Rating Scale, cases had significantly higher scores than controls for all domains expect for religious expression (all at $p < 0.001$). For the other two scales, cases had significantly higher scores than controls for all domains (all at $p < 0.001$).

3.4 CLINICAL STATUS AND SYMPTOMS

The clinical status and symptomatology of cases and controls are characterized in Tables 15 through 18. As indicated in Table 15, all participants in this study had at least one blood transfusion during the period 1986 through 1990. During this five year period, cases were more likely to have had transfusions because of an underlying accidental cause (23.2% versus 11.7%; $p = 0.001$), such as a motor vehicle accident, than controls. Furthermore, we found controls to be more likely to have had a transfusion because of an underlying heart condition (24.8% versus 14.9%; $p = 0.008$) than cases. In regards to the other conditions listed there was no difference between the two the groups.

Table 16 compares cases and controls with respect to medical illnesses and hospital procedures. With respect to medical illnesses, cases were more likely to have ever been diagnosed with cirrhosis of the liver (13.3% versus 0.5%; $p < 0.001$), Hepatitis B (10.0% versus 2.7%; $p = 0.002$), and haemophilia (2.1% versus 0.0%; $p = 0.031$). Cases were also more likely to have undergone a liver biopsy (25.1% versus 1.4%; $p < 0.001$). However, they were less likely to have ever been diagnosed with heart disease (18.9% versus 32.0%; $p = 0.001$)

Differences between cases and controls with respect to clinical symptoms are highlighted in Table 17. Cases were more likely to report gastrointestinal (74.3% versus 42.3%; $p < 0.001$), general (95.4% versus 60.8%; $p < 0.001$), liver function (48.1% versus 6.3%; $p < 0.001$), skin (53.9% versus 23.0%; $p < 0.001$), muscle and skeletal (75.5% versus 62.6%; $p = 0.003$), and metabolic (44.0% versus 31.1%; $p = 0.004$) problems than controls. Cases and controls were similar with respect to cardiovascular

conditions (34.4% versus 38.7%; p = 0.337).

The final table in this section provides a brief overview of the treatment history of cases. Although over half of the cases reported having abnormal liver enzymes, only 10.0% were currently taking interferon, ribavirin, and amantadine alone or in combination. Furthermore, only 15.1% of cases have ever taken any of these three therapies. Seventeen percent of cases had also been informed by their physician or the Ministry of Health that they were not a suitable candidate for these antiviral therapies.

3.5 HEALTH SERVICE USE AND EXPENDITURE

Differences in health service use and expenditure between cases and controls are outlined in Tables 19 through 22. The first three tables in this group provide details on health service use (Table 19), the average length of health service visit (Table 20), and health service expenditure (Table 20). In comparison to controls, cases on average visit health service providers more often (mean 23.7 versus 11.7 visits; p < 0.001), spend more time with health providers (mean 5.9 versus 4.6 hours; p < 0.001), and more money on health services (mean $1,039 versus $485; p <0.001) per year. Cases were on average more likely to visit family physicians (mean 11.7 versus 6.0 visits; p <0.001), other medical doctors (mean 2.6 versus 1.3 visits; p <0.001), nurses (mean 1.5 versus 0.3 visits; p = 0.002), social workers (1.3 versus 0.4 visits; p = 0.008), psychologist (0.4 versus 0.3 visits; p = 0.018), and visits to the emergency department (mean 0.6 versus 0.3; p <0.001) than controls in the past 12 months. Cases spent more money on alternative therapies (mean $185 vs. $59; p = 0.004) and travel and accommodation (mean $114 vs. $48; p <0.001) compared to the control group. The final table in this section compared the types of insurance or insurance coverage held by cases and controls (Table 22). As indicated here, cases were more likely to have been refused insurance coverage (19.6% vs. 8.6%; p = 0.002) and less likely to hold insurance for specialized medical equipment (21.6 vs. 32.9%; p = 0.005).

3.6 ALCOHOL USE

Table 23 compares alcohol use between cases and controls. As indicated here, cases were less likely to have ever consumed beer, liquor or any other alcoholic beverages in the last 12 months (58.6% versus 74.8%; p < 0.001). Among cases and controls who reported drinking alcohol during this interval of time, cases were less likely to report daily consumption compared to controls (5.1% versus 17.6%; p = 0.016). There was no difference between the two groups with respect to high frequency of alcohol consumption.

3.7 MULTIVARIATE ANALYSIS

Independent predictors of Hepatitis C positivity are reported in Tables 24 and 25. As indicated here, Hepatitis C positivity was independently associated with currently having two or more clinical symptoms (Odds Ratio [OR] = 3.53; 95% CI: 1.44, 8.70), being male (OR = 2.86; 95% CI: 1.65, 4.97), having worse health status as compared to ten years ago (OR = 1.60; 95% CI: 1.30, 1.96), having a worse illness intrusiveness rating (OR = 1.35; 95% CI: 1.25, 1.46), and being younger in age (OR = 0.97; 95 % CI: 0.95, 0.98). In this model, clinical symptoms refer to the major clinical categories listed in Table 17

such as cardiovascular, gastrointestinal, or general problems. No significant interactions between these variables were detected.

Multivariate predictors of an elevated illness intrusiveness rating are presented in Table 25. An elevated illness intrusiveness rating was independently associated with Hepatitis C positivity (OR = 8.04; 95% CI: 4.22, 15.32), current unemployment (OR = 3.03; 95% CI: 1.64, 5.56), increased medical expenses as measured by $100 increments (OR = 1.01; 95% CI: 1.00, 1.02), and younger age (OR = 0.97; 95% CI: 0.94, 0.98). Thus after adjusting for differences in age, medical expenses, and current unemployment, Hepatitis C positivity was associated with an eight-fold increase in the likelihood of reporting an elevated illness intrusiveness rating.

3.8 NATIONAL POPULATION HEALTH SURVEY

Tables 26 through 31 compare differences between cases and Canadian transfusion recipients with respect to specific questions taken from the 1996/97 National Population Health Survey. Tables 26 and 27 characterize the baseline socio-demographic characteristics of cases and transfusion recipients identified by the National Population Health Survey. As noted in Table 26, cases were more likely to be male ($p = 0.002$), to be older in age ($p < 0.001$), separated, divorced or widowed ($p < 0.001$) and less likely to be Caucasian ($p = 0.010$) and have received a high school diploma ($p < 0.001$) than other transfused Canadians. With regards to employment and income, cases were less likely to be employed ($p < 0.001$) than Canadians who received transfusions during 1978 to 1985 (see Table 27). For those currently not working, cases were more likely to report that they could not work because of being disabled or recovering from an illness ($p < 0.001$). Cases were also less likely to have a high household income ($p = 0.010$).

Tables 28 through 30 compare the health status and social support of cases and Canadians transfused from 1978 to 1985. Table 27 provides information on body mass index and current health status. As noted here, cases were more likely to be in fair or poor health ($p < 0.001$) than Canadians transfused during the period 1978 to 1985 (see Table 28). There was no difference with respect to body mass index between the two groups. In terms of social support, cases were less likely to have someone that they can count on in a crisis situation ($p = 0.016$), to give them personal advice ($p = 0.012$), and makes them feel loved and cared for ($p < 0.001$) (see Table 29).

Patterns of health service use in the last 12 months for cases and Canadian transfusion recipients are summarized in Table 30. Cases were more likely to have stayed in hospital or a nursing home ($p < 0.001$), and visited an alternative therapist ($p < 0.001$), a family physician ($p < 0.001$), other medical doctors ($p < 0.001$), a nurse ($p < 0.001$), physiotherapist ($p < 0.001$), social worker ($p < 0.001$), a psychologist ($p = 0.002$), and speech, audiology or occupational therapist ($p < 0.001$). There was no difference between the two groups with respect to visits to an eye specialist and dentist or orthodontist. The final table comparing cases and Canadian transfusion recipients examined alcohol use in the past 12 months (Table 31). As shown here, cases were less likely than Canadian transfusion recipients to have consumed alcohol during this period ($p < 0.001$). However, among individuals in either group that drank there was little difference in the frequency of use of alcohol.

4. DISCUSSION

This study demonstrated significant differences in health and quality of life between Hepatitis C positive and negative transfusion recipients. We have shown that Hepatitis C positivity was associated with an eight-fold increase in high illness intrusiveness rating, after adjusting for differences in age, medical expenses, and current unemployment. Furthermore, those persons with Hepatitis C are more likely to have two or more clinical symptoms, be male, have worse health status as compared to ten years ago, have a higher illness intrusiveness rating, and be younger in age.

In general, our findings were confirmed when we compared cases with the estimated seven hundred and fifty thousand people in Canada who had a blood transfusion from 1978 to 1985. In this comparison we observed similar differences between cases and the general transfusion population, except for country of birth, highest level of education, social support, visits to alternative therapists and physiotherapists, and frequency of alcohol use. In most of these instances, cases were found to be worse off or to use more services than other Canadian transfusion recipients. Overall, these findings are somewhat surprising considering that Canadian recipients were transfused on average 7 years prior to cases in our study.

In this analysis, age and gender are important predictors of Hepatitis C positivity. Differences in age and gender between cases and controls are likely related to two factors. First, cases were more likely to have had a transfusion that was related to an accidental event, like a motor vehicle accident. In general population, these type of events are most likely to occur among young men than any other group. Second, cases likely had a much higher rate of mortality prior to the onset of the study, because on average they likely have received more units of blood than cases <5, 21>. This higher rate of pre-study mortality could have helped to reduce the number persons at older ages who were originally infected between 1986 and 1990, but did not live to be part of the survey population.

In this study, it is also reassuring that our findings regarding the relationship between Hepatitis C positivity and quality-of-life are consistent with the limited published literature in this area. In the most recent comprehensive study, Foster et al. <9> clearly demonstrate that chronic infection with Hepatitis C virus is associated with a significant reduction in quality of life, as measured by the SF-36 questionnaire, in persons without cirrhosis. The difference remained even after adjustment for the degree of liver inflammation or mode of acquisition of the infection. Davis et al. <22> has also shown, using the sickness impact profile questionnaire, that persons with chronic Hepatitis C infection perceived themselves as being unwell and having a reduced quality of life.

Finally, our findings indicate that the current socio-demographic profile of Hepatitis C transfusion recipients is clearly linked to their poor health status. Most importantly we have shown that illness severity in this study was associated with being unemployed and spending more on health-related services. The association with employment status and health service expenditure is not surprising, since they are both indicative of the effect of downward drift that has been documented among persons with HIV and mental illnesses <23, 24>.

Caution is advised in the interpretation of some of our results. Most notably, the non-random sampling of Hepatitis C positive transfusion recipients from lawyers handling the compensation case

was a potential source of referral bias, as men and women who progressed further along may have been more likely to have come forward. Thus, the true prevalence and full array of outcomes of Hepatitis C infection may have been overestimated in this population. However, the effect of this bias on this study is likely to have been small. First, nearly two-thirds of the approximately 1,200 eligible Hepatitis C transfusion recipients in this province have come forward for compensation. Second, there are no significant differences between cases and other transfusion recipients eligible during this period with respect to select socio-demographic characteristics. Third, the proportion of individuals in our study who have developed progressive or symptomatic liver disease, like cirrhosis of the liver and cancer, was in a range that is consistent with what is known about the natural history of Hepatitis C. Fourth, our study sample does not likely include those with the most severe disease or near death as these individuals would have self-selected themselves out of the study due to the severity of their illness. Another potential limitation of this study is that the differences in health status and quality of life between cases and controls could be attributed mainly to their underlying disease and transfusion history. It has already been hypothesized that Hepatitis C positive transfusion recipients would likely have received more units of blood than recipients that did not acquire Hepatitis C <5>. However, it is unlikely that the individuals who received the most units of blood would be part of this study sample, because based on length of time since transfusion and the patterns of mortality observed among transfusion recipients, these individuals would likely be dead or extremely ill <21>. Finally, one other potential bias is the fact that the public release of the interim compensation package may have adversely affected the way cases responded to survey, especially with regard to questions on socio-economic status and use of health services. Again, we believe the effect of this potential bias on our study results is likely limited, because over eighty percent of cases were interviewed prior to the announcement of this package in December 1998. Furthermore, if cases were deliberately misrepresenting their true socio-economic status we would have expected to have seen cases having significantly lower personal incomes than controls. However, even after adjusting for age in our analysis no statistical difference in total personal income was observed between the two groups.

5. CONCLUSION

In conclusion, our study demonstrates important differences in current socioeconomic profile, health status, symptomatology, and health care use and expenditures between transfusion recipients with and without Hepatitis C. In this study, transfusion recipients with Hepatitis C were eight times more likely to a high illness intrusiveness score, even after taking account for differences in age, medical expenses, and current unemployment. Furthermore, those persons with Hepatitis C are more likely to have two or more clinical symptoms, be male, have worse health status as compared to ten years ago, have a higher illness intrusiveness score, and be younger in age than those transfusion recipients without the virus. Our results were unchanged even we compared cases with the estimated seven hundred and fifty thousand people in Canada who had a blood transfusion from 1978 to 1985. However, like a reflection in a mirror, the study's results will never be able to show us the personal hardships people with Hepatitis C have faced or how their poor health status has affected their lifestyle and personal well being.

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TABLES
1 – 31

TABLE 1: Comparison of 1,229 Hepatitis C positive transfusion recipients from January 1986 to June 1990 according to census characteristics, by participation status

Tract/ subdivision*	Participated in current study: Yes (n=208)	No (n=1,021)	p-value
Population size of tract or subdivision	6,596	6,456	0.238
Proportion of women in tract or subdivision	51.0	50.6	0.157
Personal income	$19,293	$18,984	0.117
Proportion with university education	10.1	10.9	0.192
Unemployment rate (%)	9.7	10.0	0.321

* *Based on census tract or subdivision population profiles for British Columbia taken from the 1996 Canadian Census. All indicators are reported as medians. Excludes 33 cases and 21 other British Columbian Hepatitis C positive transfusion recipients who did not have valid postal code information. Eleven other individuals were excluded, because of incomplete census data.*

TABLE 2: Comparison of randomly selected 930 Hepatitis C negative transfusion recipients from August 1986 to June 1990 according to census characteristics, by participation status

Tract/ subdivision*	Participated in current study: Yes (n=199)	No (n=731)	p-value
Population size of tract or subdivision	6,420	6,247	0.304
Proportion of women in tract or subdivision	51.0	50.7	0.547
Personal income	$19,293	$19,675	0.993
Proportion with university education	9.9	11.2	0.150
Unemployment rate (%)	9.6	9.5	0.638

* *Based on census tract or subdivision population profiles for British Columbia taken from the 1996 Canadian Census. All indicators are reported as medians. Excludes 22 cases and 17 other British Columbian transfusion recipients who did not have valid postal code information.*

TABLE 3: Comparison of interviewer feedback between cases and controls

Variable	Cases n (%)	Controls n (%)	p-value
Length of interview (minutes)			
Median	46.5	35.0	<0.001
Interquartile range	40 - 59	30 - 45	
Type of interview			
On the telephone	230 (95.4)	212 (95.5)	0.975
In person	11 (4.6)	10 (4.5)	
Proxy respondent			
Yes	8 (3.3)	1 (0.4)	0.038
No	233 (96.7)	221 (99.6)	
Quality of information provided by respondent			
High quality	187 (77.9)	198 (90.4)	0.001
Medium quality	53 (22.1)	21 (9.6)	
Overall quality of interview			
High quality	190 (79.5)	200 (91.3)	0.001
Medium quality	49 (20.5)	19 (8.7)	

TABLE 4: Comparison of socio-demographic characteristics between cases and controls

...CONTINUED ON NEXT PAGE...

Variable	Cases n (%)	Controls n (%)	p-value
Gender			
Male	126 (52.3)	91 (41.0)	0.015
Female	115 (47.7)	131 (59.0)	
Age in years			
Median	50	65	<0.001
Interquartile range	41-64	49-76	
Duration of residence in British Columbia			
Less than one year	0 (0)	1 (0.5)	0.050*
1 to 9 years	3 (1.2)	0 (0)	
10 to 19 years	29 (12.0)	16 (7.2)	
20 or more years	209 (86.7)	205 (92.3)	
Marital status			
Legally married	120 (49.8)	145 (65.3)	0.001
Separated or divorced	52 (21.6)	33 (14.9)	
Widowed	13 (5.4)	26 (11.7)	
Common-law arrangement	23 (9.5)	6 (2.7)	
Never married	33 (13.7)	12 (5.4)	
Ethnic or cultural origin			
Caucasian	213 (88.4)	205 (92.3)	0.151 †
First Nations, Inuit and Metis	13 (5.4)	6 (2.7)	
Asian/ South Asian	11 (4.6)	9 (4.1)	
Hispanic	2 (0.8)	2 (0.9)	
Black	1 (0.4)	0 (0.0)	
Middle Eastern	1 (0.4)	0 (0.0)	

* *Based on comparison of 20 or more years of residence in B.C. versus less than 20 years*

† *Based on comparison between Caucasian and non-Caucasian respondents*

TABLE 4: Comparison of socio-demographic characteristics between cases and controls

...CONTINUED FROM PAGE 18...

Variable	Cases n (%)	Controls n (%)	p-value
Country of birth			
Canada	195 (80.9)	165 (74.3)	0.008 *
Europe	30 (12.5)	40 (18.0)	
U.S.A.	3 (1.2)	10 (4.5)	
Asia (East and South East)	4 (1.7)	5 (2.2)	
Asia (South)	4 (1.7)	2 (0.9)	
Africa	1 (0.4)	0 (0.0)	
Oceania	3 (1.2)	0 (0.0)	
Middle East	1 (0.4)	0 (0.0)	
Age at arrival in Canada †			
Median	22	24	0.298
Interquartile range	10 - 28	17 - 29	
Housing arrangements			
Detached, semi-detached house	152 (63.1)	164 (73.9)	0.099 §
Condo or apartment	58 (24.1)	41 (18.5)	
Nursing home	2 (0.8)	2 (0.9)	
Hotel or rooming house	1 (0.4)	1 (0.5)	
Shelter or hostel	1 (0.4)	0 (0)	
Other	27 (11.2)	14 (6.3)	

* *Comparison of respondents who were born in Canada with those born outside of Canada*

† *Restricted to those born outside of Canada*

§ *Based on Fisher's exact test*

TABLE 4: Comparison of socio-demographic characteristics between cases and controls

...CONTINUED FROM PAGE 19...

Variable	Cases n (%)	Controls n (%)	p-value
Number of adults residing in household*			
1	66 (27.4)	50 (22.5)	0.171†
2	144 (59.8)	147 (66.2)	
3	20 (8.3)	21 (9.5)	
4	9 (3.7)	3 (1.4)	
More than 4	2 (0.8)	1 (0.5)	
Number of dependant children residing in or outside the household			
0	200 (83.0)	195 (87.8)	0.328†
1	10 (4.2)	9 (4.1)	
2	23 (9.5)	15 (6.8)	
3	6 (2.5)	2 (0.9)	
More than 3	2 (0.8)	1 (0.5)	
Other person(s) in household§			
Children	57 (23.7)	55 (24.8)	0.778
Other family member	21 (8.7)	19 (8.6)	0.953
Partner or lover	13 (5.4)	13 (5.9)	0.829
Roommate	11 (4.6)	3 (1.4)	0.044
Spouse**	123 (51.0)	135 (60.8)	0.034

* *Includes respondent*

† *Based on Fisher's exact test*

§ *Not mutually exclusive events*

** *When the category was compared with marital status, 109 cases with a spouse in their household were found to be legally married, 4 to be separated, 1 to be never married, and 9 in common-law arrangements. In comparison, 127 controls with a spouse in their household were found to be legally married, 4 to be separated, 1 to be never married, and 3 to be in common-law arrangements.*

TABLE 4: Comparison of socio-demographic characteristics between cases and controls

...CONTINUED FROM PAGE 20...

Variable	Cases n (%)	Controls n (%)	p-value
Years of primary and secondary education			
Median	12	12	0.937
Interquartile range	10-12	10-12	
Years of post-secondary education			
Median	1	0.5	0.605
Interquartile range	0-2	0-2	
Certificates, diplomas or degrees*			
High school	102 (42.3)	111 (50.0)	0.098
Trades certificate	39 (16.2)	25 (11.3)	0.125
CEGEP, College, institute of technology certificate	23 (9.5)	37 (16.7)	0.023
Undergraduate university degree	20 (8.3)	29 (13.1)	0.096
Post-graduate university degree	6 (2.5)	11 (5.0)	0.159
Never received a degree, diploma, or certificate	86 (35.7)	77 (34.7)	0.822

* *Categories not mutually exclusive*

TABLE 5: Comparison of employment status of cases and controls aged 18 to 64 years

Variable	Cases n(%)	Controls n(%)	p-value
Current employment status			
Full-time employment	43 (23.6)	51 (47.7)	0.001
Part-time employment	15 (8.2)	10 (9.4)	
Self-employed	9 (8.4)	11 (6.0)	
Not employed	113 (62.1)	37 (34.6)	
Main reason for not currently working*			
Disabled or recovering from illness	71 (64.0)	14 (37.8)	<0.001 †
Other reason	12 (8.1)	2 (5.4)	
Home or care duties	9 (8.1)	10 (27.0)	
Retired from job	7 (6.3)	9 (24.3)	
Looking for work	7 (6.3)	0 (0.0.)	
Student	3 (2.7)	0(0.0)	
Permanent or Temporary layoff	2 (1.8)	2 (5.4)	
Any full-time employment since 1990			
Yes	95 (52.2)	67 (62.6)	0.085
No	87 (47.8)	40 (37.4)	
Any part-time or self-employment since 1990			
Yes	54 (30.0)	33 (30.8)	0.834
No	128 (70.0)	74 (69.2)	
Social Class based on occupation§			
Class A	21 (30.4)	23 (33.3)	0.623
Class B	36 (52.2)	38 (55.1)	
Class C	12 (17.4)	8 (11.6)	

* *Restricted to respondents not currently working (113 cases, 37 controls)*
† *Based on Fisher's exact test*
§ *Restricted to respondents currently working.*

TABLE 6: Comparison of personal and household income in 1997 between cases and controls

Variable	Cases n(%)	Controls n(%)	p-value
Total individual income*			
Median	$13,947	$14,304	0.201
Interquartile range	7,850-30,000	1,560-29,500	
Total household income†			
Median	$30,000	$31,400	0.046
Interquartile range	13,200-48,300	20,000-60,000	
Sources of income§			
Wages and salaries	81 (33.6)	68 (30.6)	0.493
Canada Pension Plan (CPP)	78 (32.4)	117 (52.7)	0.001
Social assistance or welfare	49 (20.3)	10 (4.5)	0.001
Other retirement pensions	44 (18.3)	99 (44.6)	0.001
Savings (dividends and interest)	35 (14.5)	57 (25.7)	0.003
Long-term disability insurance	23 (9.5)	9 (4.1)	0.020
Income from self-employment	19 (7.9)	11 (5.0)	0.201
Unemployment insurance (UIC)	10 (4.2)	5 (2.3)	0.249
Alimony or child support ¶	9 (3.7)	3 (1.4)	0.107
Primary source of income			
Wages and salaries	75 (32.2)	65 (31.4)	0.751**
Canada Pension Plan (CPP)	43 (18.9)	58 (28.0)	
Social assistance or welfare	34 (14.9)	2 (1.0)	
Other retirement pensions	20 (8.8)	48 (23.2)	
Long-term disability insurance	19 (8.4)	5 (2.4)	
Income from self-employment	12 (5.3)	8 (3.9)	
Savings (dividends and interest)	7 (3.1)	8 (3.9)	
Alimony or child support ¶	3 (1.3)	1 (0.5)	
Unemployment insurance (UIC)	1 (0.4)	1 (0.5)	
Other sources	13 (5.7)	11 (5.3)	

* *Based on 235 cases and 217 controls*
† *Based on 191 cases and 171 controls*
§ *Not mutually exclusive events*
¶ *Includes child tax benefit.*
** *Comparison of wages and salaries, income from self-employment, and savings versus all other sources of income*

TABLE 7: Comparison of body mass index and health status between cases and controls

Variable	Cases n(%)	Controls n(%)	p-value
Body mass index*			
Median	24.4	24.7	0.255
Interquartile range	22.0-27.3	22.1-28.4	
Current health status			
Excellent	1 (0.4)	29 (13.1)	<0.001
Very good	16 (6.7)	55 (24.8)	
Good	59 (24.6)	87 (39.2)	
Fair	95 (39.6)	36 (16.2)	
Poor	69 (28.8)	15 (6.8)	
Current health status compared to status one year ago			
Much better now	4 (1.7)	9 (4.1)	<0.001
Somewhat better now	19 (7.9)	26 (11.7)	
About the same	111 (46.1)	146 (65.8)	
Somewhat worse now	85 (35.3)	38 (17.1)	
Much worse now	22 (9.1)	3 (1.4)	
Current health status compared to status ten years ago			
Much better now	14 (5.8)	35 (15.8)	<0.001
Somewhat better now	20 (8.3)	35 (15.8)	
About the same	12 (5.0)	58 (26.2)	
Somewhat worse now	64 (26.6)	62 (28.1)	
Much worse now	131 (54.4)	31 (14.0)	

* *Based on 458 respondents (238 cases, 220 controls)*

TABLE 8: Comparison of long-term disabilities or handicaps between cases and controls.

Variable	Cases n(%)	Controls n(%)	p-value
Long-term disability or handicap			
Yes	163 (68.2)	94 (42.7)	<0.001
No	76 (31.8)	126 (57.3)	
Primary cause of this condition*			
Disease or illness	115 (79.9)	53 (70.7)	0.028†
Injury from motor vehicle	12 (8.3)	2 (2.7)	
Work-related injury	7 (4.9)	5 (6.7)	
Natural aging process	5 (3.5)	10 (13.3)	
Existed at birth	3 (2.1)	4 (5.3)	
Psychological or physical abuse	2 (1.4)	1 (1.3)	
Activities in which respondent needs assistance*			
Doing heavy household chores	110 (67.5)	63 (67.0)	0.924
Shopping for groceries etc.	54 (33.1)	24 (25.5)	0.202
Preparing meals	37 (22.7)	17 (18.1)	0.382
Personal care	13 (8.0)	10 (10.6)	0.471
Moving about inside the house	9 (5.5)	8 (8.5)	0.353
Underlying medical reason for disability*			
Hepatitis C	74 (45.4)	0 (0.0)	<0.001§
Musculoskeletal system	29 (17.8)	43 (45.7)	
Other causes	18 (11.0)	7 (7.4)	
Heart disease	14 (8.6)	18 (19.1)	
Fatigue	11 (6.7)	1 (1.1)	
Respiratory and Digestive system	9 (5.5)	19 (20.2)	
Nervous system	8 (4.9)	6 (6.4)	

* *Restricted to persons with a long-term disability or handicap*
† *Based on Fisher's exact test*
§ *Based on comparison of Hepatitis C as underlying reason versus all other reasons*

TABLE 9: Comparison of SF-36 subscales between cases and controls

Subscale	Cases Mean, (SD)*	Controls Mean, (SD)*	p-value
Physical functioning	56.1 (28.7)	72.1 (27.7)	<0.001
Role limitations due to physical health	26.3 (37.4)	62.8 (42.6)	<0.001
Role limitations due to emotional problems	51.7 (43.7)	84.5 (32.3)	<0.001
Energy or fatigue	28.1 (21.0)	59.0 (25.0)	<0.001
Emotional well-being	62.2 (23.0)	80.7 (17.8)	<0.001
Social functioning	52.8 (31.6)	82.4 (26.4)	<0.001
Pain	55.6 (30.6)	75.6 (28.6)	<0.001
General health	29.4 (21.4)	64.3 (25.4)	<0.001

* *Mean Scores are expressed on a 0 - 100 scale. A higher score indicates better health status for that component.*

TABLE 10: Comparison of social support domains between cases and controls

Domain	Cases n(%)	Controls n(%)	p-value
Someone you can confide in, or talk to about your private feelings or concern			
Yes	211 (87.9)	210 (94.6)	0.012
No	29 (12.1)	12 (5.4)	
Someone you can really count on to help you out in a crisis situation			
Yes	216 (89.6)	217 (97.8)	<0.001
No	25 (10.4)	5 (2.2)	
Someone you can really count on to give you advice when you are making important personal decisions			
Yes	211 (87.9)	206 (92.8)	0.077
No	29 (12.1)	16 (7.2)	
Someone that makes you feel loved and cared for			
Yes	221 (91.7)	214 (96.4)	0.034
No	20 (8.3)	8 (3.6)	

TABLE 11: Comparison of measures of fatigue and sleepiness between cases and controls

Variable	Cases n(%)	Controls n(%)	p-value
Hours of sleep per night			
Median	7	7	0.808
Interquartile range	6-8	6-8	
Nap during the day			
Yes	140 (58.3)	84 (37.8)	<0.001
No	100 (41.7)	138 (62.2)	
Hours of nap per day*			
Mean	1.4	1.0	<0.001
Standard deviation	0.8	0.7	
Trouble going to sleep or staying asleep			
Yes	148 (61.9)	98 (44.3)	<0.001
No	91 (38.1)	123 (55.7)	
Find sleep refreshing			
Most of the time	87 (36.3)	155 (69.8)	<0.001†
Sometimes	70 (29.2)	16 (7.2)	
Never	80 (33.3)	51 (23.0)	
Unsure or don't know	3 (1.3)	0 (0)	
Difficulty staying awake when want			
Most of the time	52 (21.6)	17 (7.7)	<0.001†
Sometimes	75 (31.1)	116 (52.3)	
Never	112 (46.5)	87 (39.2)	
Unsure of don't know	2 (0.8)	2 (0.9)	

* *Restricted to 211 respondents (135 cases, 83 controls) who reported napping during the day*

† *Based on Fisher's exact test*

TABLE 12: Comparison of Illness Intrusiveness across life domains between cases and controls

Domain	Cases Median	Controls Median	p-value
Active recreation	6	1	< 0.001
Health	5	1	< 0.001
Work	5	1	< 0.001
Other social relations	4	1	< 0.001
Family relations	3	1	< 0.001
Self-expression or improvement	3	1	< 0.001
Community and civic involvement	2	1	< 0.001
Diet	2	1	< 0.001
Passive recreation	2	1	< 0.001
Financial situation	2	1	< 0.001
Relationship with spouse	2	1	< 0.001
Sex life	2	1	< 0.001
Religious expression	1	1	< 0.001
Total score	46	13	<0.001

TABLE 13: Comparison of Epworth Sleepiness Scale across domains between cases and controls

Domain	Cases n(%)	Controls n(%)	p-value
Resting	141 (59.8)	78 (37.3)	<0.001
Watching television	84 (35.9)	30 (13.9)	<0.001
Sitting and reading	66 (28.5)	29 (13.2)	<0.001
Riding in a car	45 (19.3)	22 (10.1)	0.006
After lunch	30 (12.9)	12 (5.5)	0.005
In a public place	19 (8.4)	5 (2.3)	0.005
Stopped in traffic	8 (3.6)	1 (0.5)	0.038
Talking	3 (1.3)	1 (0.5)	0.625
Total score† (median)	9	5	<0.001

* *Number and percent of respondents reporting a high chance of dozing*

† *Total Epworth Sleepiness Score across all domains*

TABLE 14: Comparison of Fatigue Severity Scale across domains between cases and controls

Domain	Cases Median	Controls Median	p-value
One of three most disabling symptoms	7	4	< 0.001
Interferes with work, family or social life	7	4	< 0.001
Low motivation	7	4	< 0.001
Easily fatigued	6	4	< 0.001
Interferes with physical functioning	6	4	< 0.001
Causes frequent problems	6	4	< 0.001
Prevents sustained physical functioning	6	4	< 0.001
Interferes with certain duties and responsibilities	6	4	< 0.001
Exercise	5	4	< 0.001
Total score	52	36	<0.001

TABLE 15: Comparison of transfusion history between cases and controls

Variables	Cases n (%)	Controls n (%)	p-value
Ever had a blood transfusion			
Yes	241 (100)	222 (100)	1.000
No	0 (0)	0 (0)	
Hospital transfusion episodes			
Prior to the 1960s	1 (0.4)	6 (2.7)	0.059
1960 to 1969	14 (5.8)	4 (1.8)	0.026
1970 to 1979	16 (6.6)	20 (9.0)	0.341
1980 to 1985	30 (12.5)	20 (9.0)	0.240
1986 to 1990	241 (100)	222 (100)	1.000
1991 to 1995	24 (10.0)	11 (5.0)	0.042
1996 onward	11 (4.6)	12 (5.4)	0.685
Underlying medical reason*			
Respiratory and digestive system	57 (23.6)	38 (17.1)	0.082
Accidental cause	56 (23.2)	26 (11.7)	0.001
Other causes	38 (15.8)	34 (15.3)	0.893
Heart disease	36 (14.9)	55 (24.8)	0.008
Pregnancy	20 (8.4)	27 (12.2)	0.169
Musculoskeletal system	20 (8.3)	28 (12.6)	0.128
Cancer	15 (6.2)	10 (4.5)	0.413
Nervous system	4 (1.7)	5 (2.2)	0.743

* *Restricted to transfusion episodes between 1986 to 1990. Subjects can be represented once in each of the 8 listed categories*

TABLE 16: Comparison of medical illnesses and hospital procedures between cases and controls

Variables	Cases n (%)	Controls n (%)	p-value
Medical illnesses*			
Heart disease	45 (18.9)	70 (32.0)	0.001
Cancer (including liver)	36 (15.1)	32 (14.7)	0.893
Cirrhosis (liver)	32 (13.3)	1 (0.5)	0.001
Hepatitis B	24 (10.0)	6 (2.7)	0.002
Kidney disease	19 (8.0)	15 (6.8)	0.606
Auto immune disease	13 (5.4)	11 (5.0)	0.831
Haemophilia	5 (2.1)	0 (0.0)	0.031
Thalissemia	3 (1.2)	2 (0.9)	1.000
HIV/AIDS	0 (0.0)	1 (0.5)	0.481
Hospital procedures*			
Ultrasound or CT scan	203 (85.3)	187 (85.0)	0.930
Endoscopy or colonscopy	96 (40.2)	77 (34.8)	0.239
Liver biopsy	60 (25.1)	3 (1.4)	0.001
Fluid drained from abdomen	30 (12.6)	18 (8.1)	0.119
Liver transplant	4 (1.7)	0 (0.0)	0.125

* *Categories are not mutually exclusive*

TABLE 17: Comparison of clinical symptoms between cases and controls

...TABLE CONTINUED ON NEXT PAGE...

Variables	Cases n (%)	Controls n (%)	p-value
Cardiovascular problems*			
High blood pressure	75 (31.3)	80 (36.2)	0.261
Angina or heart diseases	53 (22.0)	65 (29.3)	0.072
Gastrointestinal problems*			
Abdominal pain or discomfort	136 (56.4)	77 (34.7)	<0.001
Nausea	122 (50.6)	25 (11.3)	<0.001
Difficult digestion or constipation	89 (36.9)	44 (19.8)	<0.001
Diarrhea	78 (33.1)	39 (17.6)	<0.001
Reflux problems	66 (27.4)	25 (11.3)	<0.001
Vomiting	59 (24.6)	12 (5.4)	<0.001
Stomach or intestinal ulcers	56 (23.2)	36 (16.3)	<0.062
Fluid in abdomen	35 (14.5)	9 (4.1)	<0.001
General problems*			
Fatigue or feeling tired	219 (91.3)	74 (33.3)	<0.001
Decreased concentration	154 (63.9)	40 (18.0)	<0.001
Insomnia or problems sleeping	134 (55.6)	66 (29.7)	<0.001
Short term memory loss	134 (55.6)	49 (22.1)	<0.001
Depression or suicidal feelings	126 (52.3)	30 (13.5)	<0.001
Dizziness	121 (50.4)	37 (16.7)	<0.001
Migraines	73 (30.4)	28 (12.7)	<0.001
Low grade fever	52 (21.7)	12 (5.4)	<0.001
Liver function*			
Pain or discomfort over liver	116 (48.1)	8 (3.6)	<0.001
Jaundice	55 (23.1)	20 (9.1)	<0.001

* *Categories are not mutually exclusive*

TABLE 17: Comparison of clinical symptoms between cases and controls

...TABLE CONTINUED FROM PAGE 31...

Variables	Cases n (%)	Controls n (%)	p-value
Metabolic problems*			
Weight loss	77 (32.1)	19 (8.6)	<0.001
Weight gain	52 (21.9)	30 (13.5)	0.019
Diabetes mellitus	31 (12.9)	23 (10.4)	0.402
Enlargement of breasts	14 (6.0)	4 (1.8)	0.024
Hypothyroidism	12 (5.0)	21 (9.5)	0.063
Testicular atrophy	8 (3.7)	6 (3.1)	0.712
Hyperthyroidism	8 (3.4)	9 (4.1)	0.680
Muscle and skeletal problems*			
Aches in joints and/ or muscles	169 (70.1)	118 (53.2)	<0.001
Arthritis or rheumatism	91 (37.8)	89 (40.1)	0.607
Haematomas	90 (37.7)	32 (14.6)	<0.001
Skin problems*			
Dry skin	105 (44.1)	41 (18.6)	<0.001
Skin rash	78 (32.9)	27 (12.4)	<0.001
Hives or itchy welts	49 (20.9)	17 (7.8)	<0.001

* *Categories are not mutually exclusive*

TABLE 18: Treatment regimens of cases

Variable	Yes n (%)	No n (%)
Enzymes Abnormal	140 (58.3)	100 (41.7)
Medications		
Currently taking		
Interferon	14 (5.9)	225 (94.1)
Ribavirin	7 (2.9)	232 (97.1)
Amantadine	3 (1.3)	236 (98.7)
Ever Taken*		
Interferon	24 (10.1)	215 (89.9)
Ribavirin	9 (3.7)	230 (96.3)
Amantadine	3 (1.3)	236 (98.7)
Informed by physician/Ministry of Health not to be a candidate		
Interferon	27 (11.4)	209 (88.6)
Amantadine	7 (3.0)	230 (97.0)
Ribavirin	6 (2.5)	231 (97.5)

* Includes cases who are currently taking the drug

TABLE 19: Comparison of health service use in the last 12 months between cases and controls

Health service visits	Cases Mean (SD)*	Controls Mean (SD)*	p-value
Emergency department	0.6 (2.3)	0.3 (1.7)	<0.001
Alternative therapists	0.4 (1.8)	0.3 (1.4)	0.958
Family physician	11.7 (10.7)	6.0 (5.4)	<0.001
Eye specialists	0.7 (1.1)	0.8 (1.1)	0.122
Other medical doctors	2.6 (5.0)	1.3 (3.2)	<0.001
Nurse for care or advice	1.5 (7.5)	0.3 (1.6)	0.002
Dentist or orthodontist	1.4 (2.1)	1.2 (1.4)	0.956
Physiotherapist	3.4 (17.7)	1.1 (3.6)	0.121
Social worker counselor	1.3 (5.6)	0.4 (1.8)	0.008
Psychologist	0.4 (2.3)	0.3 (3.4)	0.018
Speech, audiology or occupational therapist	0.1 (0.6)	0.1 (0.4)	0.909
Total visits	23.7 (28.2)	11.7 (10.8)	<0.001

* *Average number of visits*

TABLE 20 Comparison of average visit length in the last 12 months between cases and controls

Health service visit length (hours)	Cases Mean (SD)*	Controls Mean (SD)*	p-value
Emergency department	3.0 (26.6)	2.8 (21.2)	0.005
Alternative therapists	0.1 (0.7)	0.1 (0.3)	0.906
Family physician	0.6 (1.1)	0.5 (0.6)	0.089
Eye specialists	0.4 (0.7)	0.3 (0.3)	0.531
Other medical doctors	0.8 (5.8)	0.3 (0.5)	<0.001
Nurse for care or advice	0.1 (0.3)	<0.1 (0.3)	<0.001
Dentist or orthodontist	0.5 (0.5)	0.5 (0.5)	0.705
Physiotherapist	0.2 (1.3)	0.1 (0.3)	0.179
Social worker counselor	0.2 (0.7)	0.1 (0.2)	0.010
Psychologist	0.1 (0.5)	<0.1 (0.1)	0.016
Speech, audiology or occupational therapist	<0.1 (0.2)	<0.1 (0.1)	0.908
Total hours	5.9 (27.4)	4.6 (21.4)	<0.001

* *Average length of time in hours*

TABLE 21: Comparison of money spent on medically-related services in the last 12 months between cases and controls

Health service expenditure	Cases Mean (SD)*	Controls Mean (SD)*	p-value
Alternative therapies	$185 (487)	$59 (200)	0.004
Child care	$16 (146)	$0 (7)	0.072
Homecare or housekeeping	$267 (1,868)	$76 (397)	0.103
Institutional stay	$137 (1,138)	$72 (694)	0.492
Medical surcharges	$23 (116)	$21 (92)	0.293
Nursing services	$0 (4)	$0 (0)	0.174
Prescription drugs	$268 (596)	$158 (325)	0.968
Specialized medical equipment	$29 (125)	$50 (298)	0.085
Travel and accommodation	$114 (337)	$48 (222)	<0.001
Total amount of money	$1,039 (2,683)	$485 (1,063)	<0.001

* *Average length of time in hours*

TABLE 22: Comparison of types of insurance or insurance coverage between cases and controls

Types of insurance or insurance coverage	Cases n (%)	Controls n (%)	p-value
Ever refused insurance coverage?	47 (19.6)	19 (8.6)	0.002
Prescription medications	158 (65.8)	156 (70.6)	0.539
Dental expenses	132 (54.8)	114 (51.4)	0.762
Eye glasses or contact lenses	105 (43.6)	106 (47.8)	0.537
Extended hospital coverage	105 (43.6)	120 (54.1)	0.074
Life insurance	89 (36.9)	102 (46.0)	0.049
Disabilities or long term illness	72 (29.9)	81 (36.5)	0.289
Specialized medical equipment	52 (21.6)	73 (32.9)	0.005
Mortgage insurance	38 (15.8)	38 (17.1)	0.838
Home care coverage	37 (15.4)	43 (19.4)	0.283

* *Categories are not mutually exclusive*

TABLE 23: Comparison of alcohol use in past 12 months between cases and controls

Variable	Cases n (%)	Controls n (%)	p-value
Drank beer, wine, liquor or any other alcoholic beverage			
Yes	140 (58.6)	166 (74.8)	<0.001
No	99 (41.4)	56 (25.2)	
Frequency of alcohol use*			
Every day	7 (5.1)	29 (17.6)	0.016
4 to 6 times a week	2 (1.5)	8 (4.9)	
2 to 3 times a week	32 (23.2)	28 (17.0)	
Once a week	15 (10.9)	19 (11.5)	
2 to 3 times a month	18 (13.0)	16 (9.7)	
Once a month	17 (12.3)	16 (9.7)	
Less than once a month	47 (34.1)	49 (29.7)	
Frequency of occasions where 5 or more drinks of alcohol were consumed†			
Median	0	0	0.091
Interquartile range	0 - 2	0 - 0	

* *Based on 138 cases and 165 controls who reported drinking alcohol*
† *Based on 127 cases and 163 controls who reported drinking alcohol*

TABLE 24: Multivariate Model Number One — Independent predictors of Hepatitis C positivity

Variable	Beta	Standard Error	Odds Ratio	95% CI
Two or more clinical symptoms	1.26	0.46	3.53	[1.44, 8.70]
Male	1.05	0.70	2.86	[1.65, 4.97]
Health compared to 10 years ago*	0.47	0.11	1.60	[1.30, 1.96]
Illness Intrusiveness Rating†	0.30	0.04	1.35	[1.25, 1.46]
Age in years§	-0.04	0.01	0.97	[0.95, 0.98]

* *Expressed on an ordinal scale (1, 2, 3, 4, 5).*
† *Expressed as an ordinal scale (per 5 point increase).*
§ *Per 1 year increase in age*

TABLE 25: Multivariate Model Number Two — Independent predictors of an elevated Illness Intrusiveness Rating*

Variable	Beta	Standard Error	Odds Ratio	95% CI
Hepatitis C positivity	2.08	0.33	8.04	[4.22, 15.32]
Currently unemployed	1.11	0.31	3.03	[1.64, 5.56]
Medical expenses†	0.01	0.01	1.01	[1.00, 1.02]
Age in years§	-0.04	0.01	0.95	[0.94, 0.98]

* *Elevated Illness Intrusiveness Rating defined as a score of greater than or equal to 50 (i.e. upper quartile of all respondents)*
† *Per $100 increment*
§ *Per 1 year increase in age*

Table 26: Comparison of baseline demographic characteristics of cases and Canadian transfusion recipients taken from the National Population Health Survey (NPHS)

Variable	Cases n (%)	NPHS n (%)	p-value
Gender			
Male	126 (52.3)	317,521 (42.2)	0.002
Female	115 (47.7)	434,023 (57.8)	
Age in years			
18-34	20 (8.3)	105,556 (14.0)	<0.001
35-44	58 (24.1)	200,225 (26.6)	
45-54	59 (24.5)	162,251 (21.6)	
55-64	45 (18.7)	135,855 (18.1)	
65-74	28 (11.6)	98,751 (13.1)	
75+	31 (12.9)	48,905 (6.5)	
Marital status			
Married or common law	143 (59.3)	537,862 (71.7)	<0.001
Separated, divorced or Widowed	65 (27.0)	125,873 (16.8)	
Never married	33 (13.7)	86,566 (11.5)	
Ethnic or cultural origin			
Caucasian	213 (88.4)	694,600 (92.7)	0.010
Other	28 (11.6)	54,966 (7.3)	
Country of birth			
Canada	195 (80.9)	621,857 (82.8)	0.430
Other	46 (19.1)	128,903 (17.2)	
Length of time in Canada*			
1-4 years	0 (0.0)	3,731 (3.1)	0.123
5-9 years	1 (2.3)	8,194 (6.9)	
10+ years	42 (97.9)	107,667 (90.0)	
Highest level of education			
High school	7 (29.9)	141,378 (18.9)	<0.001
Trades certificate	39 (17.4)	142,507 (19.1)	
Undergraduate university degree	16 (7.1)	80,592 (10.8)	
Post-graduate university degree	6 (2.7)	23,679 (3.2)	
Never received a degree, diploma, or certificate	82 (36.6)	189,417 (25.4)	
Some post-secondary education	14 (6.3)	169,298 (22.7)	

* *Restricted to respondents who were born outside Canada.*

Table 27: Comparison of employment status and income of cases and Canadian transfusion recipients taken from the National Population Health Survey (NPHS)

Variable	Cases n(%)	NPHS n(%)	p-value
Currently employed*			
Yes	69 (37.9)	390,986 (65.6)	<0.001
No	113 (62.1)	205,236 (34.4)	
Main reason for currently not working*†			
Disabled or recovering	71 (64.0)	73,514 (35.8)	<0.001
Retired from job	7 (6.3)	37,607 (18.3)	
Home or care duties	9 (8.1)	44,189 (21.5)	
Looking for work	7 (6.3)	11,252 (5.5)	
Student	3 (2.7)	17,617 (8.6)	
Permanent or Temporary layoff	2 (1.8)	15,919 (7.8)	
Other reason	12 (10.8)	5,138 (2.5)	
Total household income			
<10,000	28 (14.7)	25,756 (4.0)	0.010
10-19,999	35 (18.3)	104,356 (16.1)	
20-29, 999	30 (15.7)	87,951 (13.6)	
30-39, 999	34 (17.8)	127,088 (19.7)	
40-49, 999	17 (8.9)	73,876 (11.4)	
50-59, 999	13 (6.8)	73,213 (11.3)	
60-80, 999	20 (10.5)	71,146 (11.0)	
80,000+	14 (7.3)	83,360 (12.9)	

* *Restricted to persons aged 18-64 years.*
† *Restricted to persons who were not currently employed.*

Table 28: Comparison of body mass index and health status of cases and Canadian transfusion recipients taken from the National Population Health Survey (NPHS)

Variable	Cases n (%)	NPHS n(%)	p-value
Body mass index *			
0-19	20 (9.5)	48,132 (8.3)	0.130
20-24	97 (46.0)	240,466 (41.4)	
25-27	37 (17.5)	90,208 (15.5)	
27+	57 (27.0)	202,127 (34.8)	
Current health status			
Excellent	1 (0.4)	96,309 (12.8)	<0.001
Very good	16 (6.7)	261,559 (34.8)	
Good	59 (24.6)	248,816 (33.1)	
Fair	95 (39.6)	100,564 (13.4)	
Poor	69 (28.8)	44,296 (5.9)	

* *Based on respondents aged 20-64, excluding pregnant women.*

Table 29: Comparison of social support of cases and Canadian transfusion recipients taken from the National Population Health Survey (NPHS)

Variable	Cases n(%)	NPHS n(%)	p-value
Someone you can confide in, or talk to about your private feelings or concern			
Yes	211 (87.9)	648,859 (86.8)	0.616
No	29 (12.1)	98,503 (13.2)	
Someone you can really count on to help you out in a crisis situation			
Yes	216 (89.6)	698,953 (93.5)	0.016
No	25 (10.4)	48,866 (6.5)	
Someone you can really count on to give you advice when you are making important personal decisions			
Yes	211 (87.9)	689,604 (92.3)	0.012
No	29 (12.1)	57,798 (7.7)	
Someone that makes you feel loved and cared for			
Yes	221 (91.7)	720,345 (96.4)	<0.001
No	20 (8.3)	27,114 (3.6)	

Table 30: Comparison of health service use in the last 12 months of cases and Canadian transfusion recipients taken from the National Population Health Survey (NPHS)
...CONTINUED ON NEXT PAGE...

Variable	Cases n(%)	NPHS n(%)	p-value
Overnight in hospital or Nursing home			
None	178 (74.2)	642,358 (85.5)	<0.001
1-6	29 (12.1)	62,757 (8.4)	
7+	33 (13.8)	46,088 (6.1)	
Visits to alternative therapists			
Yes	57 (23.9)	64,114 (8.5)	<0.001
No	181 (76.1)	686,952 (91.5)	
Visits to family physician			
0	15 (6.3)	128,085 (17.1)	<0.001
1-4	60 (25.3)	392,172 (52.4)	
5-9	61 (25.7)	108,390 (14.5)	
10-19	65 (27.4)	89,963 (12.0)	
20+	36 (15.2)	29,705 (4.0)	
Visits to eye specialist			
0	144 (59.8)	465,293 (62.0)	0.464
1+	97 (40.2)	284,687 (38.0)	
Visits to other medical doctors			
0	109 (45.2)	484,154 (64.6)	<0.001
1-4	93 (38.6)	217,752 (29.1)	
5+	39 (16.2)	47,590 (6.3)	

Table 30: Comparison of health service use in the last 12 months of cases and Canadian transfusion recipients taken from the National Population Health Survey (NPHS)

...CONTINUED FROM PAGE 39...

Variable	Cases n (%)	NPHS n (%)	p-value
Visits to nurse for care or advice			
0	190 (79.2)	693,233 (92.4)	<0.001
1-4	27 (11.2)	36,589 (4.9)	
5+	23 (9.6)	20,554 (2.7)	
Visits to dentist or orthodontist			
0	103 (42.9)	334,594 (44.6)	0.838
1-4	125 (52.1)	382,146 (50.9)	
5+	12 (5.0)	33,686 (4.5)	
Visits to physiotherapist			
0	192 (81.0)	678,640 (90.4)	<0.001
1-4	13 (5.5)	23,924 (3.2)	
5+	32 (13.5)	48,109 (6.4)	
Visits to social worker counselor			
0	200 (83.7)	722,521 (96.2)	<0.001
1-4	22 (9.2)	14,344 (1.9)	
5+	17 (7.1)	14,062 (1.9)	
Visits to psychologist			
0	225 (94.1)	731,187 (97.4)	0.002
1+	14 (5.9)	19,739 (2.6)	
Visits to speech, audiology or occupational therapist			
0	230 (96.6)	745,094 (99.2)	<0.001
1+	8 (3.4)	5,910 (0.8)	

Table 31: Comparison of alcohol use in past 12 months of cases and Canadian transfusion recipients taken from the National Population Health Survey (NPHS)

Variable	Cases n (%)	NPHS n (%)	p-value
Drank beer, wine, liquor or any other alcoholic beverage			
Yes	140 (58.6)	573,175 (76.6)	<0.001
No	99 (41.4)	175,067 (23.4)	
Frequency of alcohol use			
< 1 time/month	47 (34.1)	163,657 (28.6)	0.103
1-3times/month	35 (25.4)	129,293 (22.6)	
1-3 times/week	47 (34.1)	206,842 (36.1)	
>4 times/week	9 (6.5)	72,456 (12.7)	
Frequency of occasions where 5 or more drinks of alcohol were consumed*			
Never	87 (68.5)	371,238 (65.1)	0.281
< 1 time/week	36 (28.4)	163,239 (28.6)	
1+ times/week	4 (3.2)	35,383 (6.2)	

* *On average*