Interim Report

Ontario's Use of Funding provided by the Federal Hepatitis C Undertaking Agreement

November 24, 2004

Ontario

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Executive Summary

The Federal Hepatitis C Undertaking Agreement was signed in January 2002. Its objectives included:

- Addressing the "unique circumstances surrounding the infections of persons with Hepatitis C through the blood system before January 1, 1986 and after July 1, 1990";
- Increasing "the capacity of publicly financed healthcare programs to ensure that all Canadians infected with Hepatitis C through the blood system have reasonable access to healthcare services used for the treatment of Hepatitis C."

The Agreement differs from the Ontario Hepatitis C Assistance Plan (OHCAP) and the 1986-1990 Class Action Settlement Agreement in that it *offers care rather than cash payments* to affected individuals. By 2014/15, the Agreement will provide a total amount of $132.6 million to Ontario. As of March 31st, 2004, the province has received $66.3 million and is scheduled to receive a further $22.1M in 2004/05. The Agreement notwithstanding, Ontario provides healthcare to everyone affected by Hepatitis C.

The Ministry of Health and Long-Term Care (MOHLTC) has undertaken a preliminary review of the funds in order to estimate the expenditures incurred in the treatment and care of persons with Hepatitis C for the 24 months since the Agreement was signed.

As part of the review, a study group of 29,898 individuals with Hepatitis C was identified using a number of databases (Ontario Drug Benefit Plan, Hospitals, Ambulatory Care, Ontario Health Insurance Plan, Ontario Hepatitis C Assistance Plan, and Public Health Laboratories). It is not possible to determine when and how individuals were infected by HCV from the information available in the records used. As a result, the proportion of the study group infected through the blood system rather than through other risk factors cannot be absolutely determined.

The study group represents approximately 43 per cent of the 70,000 reported cases of Hepatitis C in Ontario. An estimated 8,000 to 15,000 individuals (11 per cent to 21 per cent of the 70,000) were infected through the blood system before 1986 and after 1990. It is also believed that an additional 35,000 to 60,000 individuals may be infected in Ontario with Hepatitis C but not yet diagnosed. The projected number of undiagnosed individuals will be reviewed and the recently announced Hepatitis C Task Force will help develop strategies to encourage them to undergo screening.

The health numbers of the study group were used to identify health services received during a period of two years, following the signing of the Federal Hepatitis C Undertaking Agreement (April 1, 2002 through March 31, 2004). The total costs for this 24-month period follow.

Total Expenditures April 1, 2002 to March 31, 2004[1] and projected to June 30, 2004 (30 months)

Sector	Definite Expenditures (M)	Probable Expenditures (M)	Total Expenditures (M)
Laboratories	$14.7	$6.8	$21.5
Drugs	$12.5	$0.0	$12.5
Hospital	$27.3	$7.4	$34.7
OHIP	$10.7	$10.1	$20.8
Home Care	$0.4	$0.2	$0.6
Public Health	$0.2	$0.0	$0.2
Total (24 months)	$65.8	$24.5	$90.3
Extrapolation (30 months)	$82.2	$30.7	$112.9

There are two types of expenditures: those definitely associated with Hepatitis C (HCV) and those related to medical conditions that are probably but not necessarily associated with HCV, such as chronic kidney failure. The "definite" HCV-related healthcare expenditures for a study group of approximately 30,000 individuals for whom expenditure categories were available were found to be a minimum of $66 million during the 24-month period and possibly as high as $90 million when "probable" costs are included. If extrapolated to cover the 30 month period from the signing of the Federal Hepatitis C Undertaking Agreement to the present (January 2002 to June 2004), the estimated expenditures range from $82M to $113M.

Furthermore, the review identified a sub-group of 2,632 health numbers representing individuals who had applied and been approved for the Ontario Hepatitis C Assistance Plan (OHCAP). The sub-group includes only individuals infected through the blood system before1986 and after 1990, one of the key groups targeted by the Federal Hepatitis C Undertaking Agreement. The results for the sub-group are shown on the next page.

[1] Numbers may not add due to rounding.

Total Expenditures – OHCAP Eligible Group April 1, 2002 to March 31, 2004[2] and projected to June 30, 2004 (30 months)

Sector	Definite Expenditures (M)	Probable Expenditures (M)	Total Expenditures (M)
Laboratories	$1.3	$0.6	$1.9
Drugs	$0.6	$0.0	$0.6
Hospital	$2.6	$0.6	$3.2
OHIP	$1.0	$0.8	$1.8
Home Care	$0.05	$0.03	$0.08
Public Health	$0.02	$0.0	$0.02
Total (24 months)	$5.5	$2.1	$7.6
Extrapolation (30 months)	$6.9	$2.6	$9.5

For this group, costs over the two-year period range from a minimum of $5.5 million for "definite" expenditures to as high as $7.6 million when "probable" costs are included. If extrapolated to a 30 month period, they range from $6.9M to $9.5M.

These estimates are believed to be inclusive for HCV-related antiviral drug therapy. However, the completeness of costs for laboratory services, hospital services, OHIP costs and home care costs are uncertain because their HCV-related codes are less specific. The estimates do not include chronic/long-term care costs or treatment of liver cancer provided through Cancer Care Ontario. They do not include the costs of physician care funded by alternate payment programs (non fee-for-service) for which service records (shadow billings) are not captured. As a result, overall expenditures are underestimated. Other limitations are described within the report.

While the overall study group of 29,898 individuals represents about 43 per cent of the approximately 70,000 persons diagnosed with HCV in Ontario, it is unlikely to represent the population of "average" HCV-infected individuals as it was created based primarily on information about individuals using health services. ("Average" HCV individuals would represent the most common course of treatment received.) Since there is no standard against which to judge how representative the study group was of the HCV-infected population as a whole, it is not possible to use the expenditures for the study group to calculate expenditures for the full HCV-infected population.

It is also not possible to compare expenditures before and after the signing of the Federal Hepatitis C Undertaking Agreement as two years is too short a time to differentiate between a random fluctuation in costs and true change. Ideally, a control group should be established in order to differentiate between changes over time in the costs of treating Hepatitis C and healthcare costs for the general population.

A more sophisticated analysis is needed to estimate the resources required by the entire HCV-infected population. The preliminary review will ensure that an improved methodology is put in place well ahead of the 2007 deadline for the Government's first report to the public as required under the Federal Hepatitis C Undertaking Agreement.

[2] Numbers may not add due to rounding.

Background

Hepatitis C in Ontario

More than 70,000 cases of Hepatitis C in Ontario have been reported through the Ministry of Health and Long-Term Care's Reportable Disease Information System (RDIS) and there are an estimated 35,000 to 60,000 undiagnosed individuals infected with Hepatitis C.[3] For most people, Hepatitis C infection is a chronic disease that remains present indefinitely unless successfully treated. Current treatment can cure 55 to 60 per cent of individuals. Untreated or unsuccessfully treated Hepatitis C leads to the development of cirrhosis, liver failure and liver cancer.

Hepatitis C is primarily transmitted through blood-to-blood contact. The most common route of transmission today is through the use of shared injection needles during injection drug use. In the past, blood transfusion accounted for a small but significant proportion of all infections. Additional possible routes of infection include tattooing, transmission during sexual contact, or from an infected mother to her newborn child, although these activities do not carry a high risk of transmission. Many Hepatitis C infected individuals who were born elsewhere acquired their disease by transmission from improperly sterilized syringes and needles used for medical procedures in their countries of origin.

Hepatitis C and the Canadian Blood System

The existence of Hepatitis C (HCV) was postulated in 1974 and was known as “non-A, non-B” Hepatitis until 1988 when the virus was discovered and named. Hepatitis C was likely present in the blood system from the time Canada's national blood transfusion service was established in 1947 until 1990 when HCV antibody screening was introduced. The introduction of nucleic acid testing (NAT) in 1999 further improved the discovery rate of HCV in donated blood.

In 2000 the courts ordered the federal, provincial and territorial governments to contribute a maximum of $1.18B to settle a class action lawsuit launched by plaintiffs representing individuals infected through the blood system between 1986 and1990.[4] With the knowledge that the class-action lawsuit would be settled, the Ontario Government focused on people infected through the blood system prior to 1986 and after 1990, providing each of them with $10,000 in financial assistance. The payments were increased to $25,000 to each eligible recipient in May 2000. The Ministry of Health and Long-Term Care's Ontario Hepatitis C Assistance Plan (OHCAP) administers these payments.

[3] Dr. Morris Sherman. A Managed Care Plan for Viral Hepatitis in Ontario. Unpublished manuscript and personal communication. 2004.

[4] The United States introduced surrogate (indirect) testing in 1986. Canada did not use this test but instead introduced the HCV Antibody Test when it became available in 1990.

The federal government provided for a transfer of a maximum of $300M to provincial and territorial governments to assist them in providing healthcare. The terms and conditions of this transfer funding are outlined in the Federal Hepatitis C Undertaking Agreement (see Appendix A). This Agreement was intended to address the "unique circumstances surrounding the infections of persons with Hepatitis C through the blood supply system before January 1, 1986 and after July 1, 1990" but also to "increase the capacity of publicly financed healthcare programs to ensure that all Canadians infected with Hepatitis C through the blood system have reasonable access to healthcare services used for the treatment of Hepatitis C." By 2014/15, the Agreement will provide a total amount of $132.6 million to Ontario. As of March 31, 2004, the province has received $66.3 million and is scheduled to receive a further $22.1 M in 2004/05.

In 2000, Dr. Robert Remis, an Associate Professor with the Department of Health Sciences, University of Toronto, estimated that between 8,000 and 15,000 individuals were infected with Hepatitis C through the blood system prior to 1986 and after 1990 in Ontario. Given the 70,000 reported cases of Hepatitis C in the province as of March 2000, it can be estimated that 11 to 21 per cent of these were infected through the blood system before 1986 and after 1990. This proportion will decrease over time as the number of new infections grows, primarily through injection drug use, and as immigrants from other countries with high occurrence of Hepatitis C take up residence in Ontario.

Federal Hepatitis C Undertaking Agreement

The Federal Hepatitis C Undertaking Agreement was signed in January 2002 by the Minister of Health and Long-Term Care committing the federal and Ontario governments to a shared policy objective noted above. Specifically the transfer funds from the federal government are to be used for:

"healthcare services indicated for the treatment of Hepatitis C infection, and medical conditions directly related to it, such as current and emerging antiviral drug therapies, other relevant drug therapies, immunization and nursing care."

In accordance with this agreement, the Government of Ontario is to report to the public five years from the date of execution of the agreement and every five years thereafter. Given the Agreement was signed in January 2002, the first report to the public is due in January 2007.

To ensure that our healthcare dollars are spent appropriately, the Ministry of Health and Long-Term Care has undertaken a preliminary review of the expenditures to date of funds from this Agreement related to the treatment and care of people infected with Hepatitis C. Reviewing these expenditures now will lead to a more sophisticated methodology for the analysis of the resources utilized by the entire HCV-positive population for the 2007 report.

Objectives of the Review

The objectives of the review were to develop estimates of expenditures incurred for publicly funded healthcare programs associated with Hepatitis C (HCV) treatment and care between January 2002 and March 2004, and to estimate the additional costs incurred.

The review was to:

1. collect information about the services provided and their costs from Ministry of Health and Long-Term Care database records including the Drug Programs Branch, Health Services Division, Laboratories Branch, Acute Services Division, Community Health Division, Public Health Division and any other relevant areas;
2. correlate the above information with the number of persons infected with HCV;
3. develop models to estimate costs where cost information is not clear;
4. recommend a methodology to account for expenditures on the treatment of HCV that could be applied in 2007 for the report to the public on the use of the Federal Undertaking funds.

Methodology and Findings

Creation of the HCV Study Group

The creation of a study group of HCV individuals, identified by their health numbers, was the first step to estimating HCV-related healthcare expenditures. The study group was generated by selecting specific attributes from cases within a variety of administrative health information systems. The selected timeframes described below were chosen to generate the most complete and reliable study group.

- **Ontario Drug Benefits (ODB) Plan**
  Health numbers were selected that had an ODB claim for HCV specific drugs, namely Rebetron, Unitron PEG, Pegetron, and Pegasys. The selection period was from April 1999 through March 2004 and identified unique health numbers for **2,383** HCV individuals.

- **Hospital Discharge Abstract Database, Inpatient/Day Procedure (DAD)**
  Health numbers were selected from cases with an ICD-10 diagnosis code of Acute Hepatitis C (B17.1); Chronic Hepatitis C (B18.2); or Carrier of Hepatitis C (Z22.51). This ICD-10 diagnostic coding system was implemented in Ontario on April 1, 2002. Previous years of data were coded using the ICD-9 coding system that did not uniquely identify HCV patients. Thus, only two fiscal years of data, April 1, 2002 through March 31, 2004 were used to identify HCV individuals. This method identified **5,404** unique health numbers.

- **National Ambulatory Care Reporting System (NACRS)**
  Health numbers were selected from cases with the same three ICD-10 diagnosis codes as used for the DAD above. Once again, the ICD-10 diagnostic coding system was implemented in Ontario on April 1, 2002. Previous years of data were coded using the ICD-9 coding system that did not uniquely identify HCV patients. Thus, only two fiscal years of data, April 1, 2002 through March 31, 2004 were used. The 2002 fiscal year's file included only emergency department data, while the 2003 year's file also included day procedures. This method identified **2,903** unique health numbers.

- **Ontario Health Insurance Plan (OHIP)**
  Health numbers were selected from claims with fee schedule codes of K026 or K027, which relate to certification of medical eligibility for the Ontario Hepatitis C Assistance Plan. The selection period was from December 1998, when the code came into effect, to March 31, 2004, and identified **2,247** unique health numbers.

- **Ontario Hepatitis C Assistance Plan (OHCAP)**
  Electronic records for individuals who applied for the Ontario Hepatitis C Assistance Plan (OHCAP) from December 1998 to March 2004 were used to identify 5,201 unique health numbers. These records included individuals who were deemed to be eligible for OHCAP as well as those who could demonstrate a positive HCV test but were not eligible for the plan.

- **Public Health Laboratories (PHL)**
  All HCV individuals are captured within Labyrinth, the Public Health Laboratories (PHL) database, which became operational in 1999. A total of **21,094** of these records included the health number of the individuals, although it is not mandatory for the field to be completed, and were entered into the database prior to March 31, 2004.

- **Reportable Disease Information System (RDIS)**
  While Health Units must report all cases of Hepatitis C to RDIS, a provincial information system, it could **not** be used as a source of health numbers for persons with HCV as no identifying information is maintained at the provincial level.

The resulting list of health numbers was then "cleaned" to remove duplicate numbers, invalid numbers, and numbers for individuals who had died prior to the beginning of the period of study (using the Registered Persons Data Base). This resulted in a study group of 29,898 health numbers for which health expenditures could be estimated. Of these 29,898 individuals, 22,531 were present in only one databaseand 7,367 were found to be present in more than one database (see Table 1). Deaths of 1,304 members of the study group occurred during the study period. The analysis was carried out using health numbers, and not names, in order to maintain the confidentiality of information about the members of the study group. Access to health numbers was restricted to a very small number of Ministry of Health and Long-Term Care staff.[5]

It is not possible to determine when and how individuals were infected by HCV from the information available in the database records used. As a result, it cannot be determined what proportion of the study group was infected through the blood system rather than other means, or what proportion was infected before 1986 and after 1990 rather than between 1986 and 1990. It is also unlikely that members of the study group accurately represent the whole HCV population because they only include those members of the whole population who used healthcare services during the study period.

[5] Section 42 (d) Freedom of Information and Protection of Privacy Act authorizes the disclosure of personal information within a ministry where the disclosure is made to "an officer or employee of the institution (i.e. MOHLTC) who needs the record in the performance of his or her duties and where disclosure is necessary and proper in the discharge of the institution's functions.

It is known that there were 5,201 unique health numbers within the study group that had been retrieved from the OHCAP database. This included both eligible and ineligible applicants to the program. Within this was a sub-group of 2,632 individuals who had applied for and been approved for OHCAP. The results for this sub-group will be highlighted separately in the ***Conclusions*** section as this group, infected through the blood system before 1986 and after 1990, represents one of the key groups originally targeted by the Federal Hepatitis C Undertaking Agreement. These individuals may have already experienced symptoms at the time that they applied for OHCAP or may have undergone screening for HCV because they were aware that they had received a blood transfusion or blood products during the pre-86/post-90 time period. As with the larger study group, it is also not possible to determine how representative this sub-group may be of the "average" HCV positive population infected through the blood system before 1986 and after 1990.

Table 1: Data Sources for Study Group

Data Source	**Number of Unique Cases**
Hospital Discharge Abstract Database (DAD)	2,025
National Ambulatory Care Reporting System (NACRS)	666
Ontario Hepatitis C Assistance Plan (OHCAP)	2,287
Ontario Hospital Insurance Plan (OHIP)	978
Ontario Drug Benefits Plan (ODB)	869
Public Health Laboratories Database (PHL)	15,706
More than one Source	7,367
	29,898

As previously mentioned, more than 70,000 persons with HCV have been reported within Ontario through RDIS with an estimated 35,000 to 60,000 additional undiagnosed individuals infected with Hepatitis C. Using the 70,000 reported cases as a conservative estimate, the study group of 29,898 health numbers can be seen to represent approximately 43 per cent of the number of reported cases.

Table 2 (below) shows that a greater proportion of the identified study group was male (61.9%) and the majority of the individuals were between 20 and 64 years of age. The demographics of this group likely mirror the demographics of the entire HCV-infected population. The big difference in the male/female ratio in the 20 to 44 and 45 to 64 age groups is likely due to higher injection drug use by males in the 1960s and 1970s. Although the demographic of the HVC-infected population in Canada is not accurately known, reports from the US and Europe suggest a similar demographic.

Table 2: Age and Sex Distribution of Study Group

Age Group	Female	Male	Total
0-19	211	208	419
20-44	4,863	7,979	12,842
45-64	4,476	8,799	13,275
65-74	1,003	873	1,876
75+	852	634	1,486
Total	11,405	18,493	29,898

Review of Expenditures

The health numbers of the study group of 29,898 individuals were then used to identify health services received during a period of two years, following the signing of the Federal Hepatitis C Undertaking Agreement (April 1, 2002 through March 31, 2004).

The findings are summarized below:

- **Laboratories**
  HCV screening expenditures for 2002/03 through 2003/04 were based on the number of HCV Antibody tests per month performed in Public Health Laboratories, Private Laboratories, and Hospital Laboratories, and the estimated cost per test (see Appendix B) over the two-year period. As these tests are intended to determine if an individual has antibodies to HCV, not all of the individuals tested and included in the costs below were found to be HCV positive.

Table 3: Laboratory Expenditures: HCV Antibody Screening

Lab Type	Screening Low Expenditures	Screening High Expenditures
Public Health Laboratories	$1,764,864	$1,764,864
Private Laboratories	$5,768,832	$11,468,160
Hospital Laboratories	$1,094,400	$2,217,600
Total	$8,628,096	$15,450,624

Individuals found to be HCV antibody positive by mEIA (Abbott) then receive additional testing from Public Health Laboratories, i.e. Supplemental HCV Antibody [Anti-HCV (Bayer) and Line Immunoassay (Innogenetics)], Hepatitis C genotyping (Innogenetics), HCV qualitative RNA and Hepatitis C Quantitative RNA (Roche). The associated expenditures of these tests for 2002/03 through 2003/04 is based on the estimated number of tests per year and the cost per test (see Appendix B).

Table 4: Laboratory Expenditures: Additional HCV Testing

Fiscal Year	Lab Expenditures
2002/03	$2,916,629
2003/04	$3,109,658
Total	$6,026,287

• Ontario Drug Benefit Program (ODB)

ODB expenditures were based on all claims made during the fiscal years 2002/03 and 2003/04 for HCV specific drugs, namely Rebetron, Unitron PEG, Pegetron and Pegasys. Pegetron was only introduced to the ODB in 2003/04 and resulted in a substantial increase in expenditures. These estimates include all HCV individuals receiving drugs through the ODB Program, as these drugs are only used for HCV care.

Table 5: HCV-Related Drug Expenditures

Fiscal Year	ODB Expenditures
2002/03	$4,807,029
2003/04	$7,718,458
Total	$12,525,487

• Hospital – Inpatient, Day Surgery, and Emergency Department

All inpatient, day surgery, and emergency department records involving the study group and taking place in 2002/03 and 2003/04 were selected from the DAD and NACRS. Clinical experts then identified the most responsible diagnoses and principal procedures that were "definitely" or "probably" associated with HCV care (see Appendix C). Experts were unaware of the costs of the services they reviewed. Records with definite diagnoses and/or procedures were used to estimate the definite expenditures using case weights (an assigned value based on the historic amount of resources required for individuals associated with a particular diagnosis or procedure) and case costs.[6] Probable expenditures (based on procedures and diagnoses that are probably but not necessarily associated with HCV) were also calculated using case weight and case costs but at half the cost of definite cases. This method more conservatively reflects the cost of HCV care where it may not be the primary reason for the patient's stay in hospital.

Table 6: Hospital Expenditures

Fiscal Year	Hospital Definite Expenditure	Hospital Probable Expenditure	Hospital Definite and Probable Expenditure
2002/03	$13,824,458	$3,723,810	$17,548,268
2003/04	$13,480,387	$3,698,170	$17,178,557
Total	**$27,304,845**	**$7,421,980**	**$34,726,825**

[6] Inpatient case costs were based on the Resource Intensity Weights and a unit cost of $3600 derived from FY2002/03 hospital inpatient acute care expenses. Day procedure costs were estimated using a cost per case of $543 (Finance and Information Management Branch, 2002/03).
Emergency room visit costs were estimated using a cost per visit of $139 (Finance and Information Management Branch, 2003/04). Per visit costs for 2002/03 were not available.

• Ontario Health Insurance Plan (OHIP)

All OHIP claims for the selected cohort during 2002/03 and 2003/04 were reviewed. Clinical experts then identified the fee schedule and diagnostic codes that were definitely or probably associated with HCV care (see Appendix D). Payments for claims with "definite" codes were then used to estimate "definite" expenditure. "Probable" expenditures were calculated using the same method but applying only half the payment amount recorded in the data base. For areas where OHIP uses "shadow billings" to record services provided through alternate payment plans (non fee-for-service), an average payment for the associated fee code was used. Where no average was available, the Schedule of Benefits was used. Because of the lack of HCV-related codes in the OHIP claims database, the completeness of the calculated expenditures is unknown.

Table 7: OHIP Expenditure

Fiscal Year	OHIP Definite Expenditures	OHIP Probable Expenditures	OHIP Definite and Probable Expenditures
2002/03	$5,050,375	$4,872,108	$9,922,483
2003/04	$5,624,851	$5,226,429	$10,851,280
Total	**$10,675,226**	**$10,098,537**	**$20,773,763**

• Home Care

All 2002/03 records within the Ontario Home Care Administrative System (OHCAS) for the selected sub-group were selected.[7] Clinical experts identified the codes that were definitely or probably associated with HCV care (see Appendix E). Cases with the "definite" codes were used to estimate the "definite" expenditures. Probable expenditures were calculated in the same way except at half the cost of "definite" cases. Home care expenditures included nursing visits at a rate of $54 per visit and homemaking services at a rate of $23 per hour.[8] Due to the lack of HCV-related codes in the OHCAS the completeness of the calculated expenditures is unknown.

Table 8: Home Care Expenditures

Fiscal Year	Home Care Definite Expenditures	Home Care Probable Expenditures	Home Care Definite and Probable Expenditures
2002/03	$208,934	$90,050	$298,984
2003/04	$208,934	$90,050	$298,984
Total	**$417,868**	**$180,100**	**$597,968**

• Public Health

Although a number of public health activities can be associated with HCV, the greatest part of the expenditure reflects case management costs, including the cost of entering data into the Reportable Disease Information System (see Appendix F). The estimated case management time per HCV case was one hour. Yearly expenditures were based on the total number of RDIS cases per year and a $37 average hourly rate for a public health nurse.[9] The province funds approximately 50% of public health unit expenditures.

[7] Data for the 2003/04 fiscal year were not available and so expenditure was based on 2002/03.
[8] Fiscal year 2002/03 Community Care Access Centre (CCAC) Summary Report (Finance and Information Management Branch)
[9] Based on $60,000 salary plus 20% benefits, divided by 1950 hours work per annum.

Table 9: Public Health Expenditures

Year	Public Health Expenditures	Public Health Expenditures Funded Provincially (50% of total)
2002	$201,541	$100,770
2003	$190,055	$95,028
Total	**$391,596**	**$195,798**

• Total Expenditures

For the study group of 29,898 HCV individuals, as well as all of the HCV screening, the total expenditures during 2002/03 through 2003/04 were estimated to be between $66 million and $90 million.

Table 10: Total Expenditures (April 1, 2002 to March 31, 2004)

Sector	Low and Definite Expenditures	High and Probable Expenditures
Laboratories	$14,654,383	$21,476,911
Drugs	$12,525,487	$12,525,487
Hospital	$27,304,845	$34,726,825
OHIP	$10,675,226	$20,773,763
Home Care	$417,868	$597,968
Public Health	$195,798	$195,798
Total	**$65,773,607**	**$90,296,752**

A similar analysis was carried out for the smaller study group of 2,632 individuals who applied for and were approved for OHCAP. These individuals, infected through the blood system before 1986 and after 1990, were one key group targeted by the Federal Hepatitis C Undertaking Agreement.

Table 11: Total Expenditures – OHCAP Eligible Study Group (April 1, 2002 to March 31, 2004)

Sector	Low and Definite Expenditures	High and Probable Expenditures
Laboratories[10]	$1,290,064	$1,890,669
Drugs	$557,446	$557,446
Hospital	$2,611,602	$3,213,030
OHIP	$965,563	$1,807,528
Home Care	$52,460	$80,532
Public Health[11]	$17,237	$17,237
Total	**$5,494,372**	**$7,566,442**

The Institute for Clinical Evaluative Sciences (ICES) reviewed the methodology used in this study to estimate treatment costs associated with Hepatitis C. ICES believes that the methodology was of sound quality and provides reasonable estimates of such costs. Further refinements to the study may include the addition of a suitable control group and a temporal assessment of changes in costs.

[10] Laboratory costing could not be determined for this specific sub-cohort. A proportion of 2632/29898 was calculated from Table 11 above.

[11] Public Health information could not be determined for this specific sub-cohort. A proportion of 2632/29898 was calculated from Table 11 above.

Limitations

The following limitations were identified in the methodology used:

1. While the expenditures estimated for HCV-related antiviral drugs are relatively complete, the completeness of the costs for laboratory services, hospital services, OHIP costs and home care costs are uncertain because their HCV-related codes are less specific.
2. The analysis does not include chronic/long-term care costs or treatment of liver cancer provided through Cancer Care Ontario. It does not include the costs of alternate payment programs (non fee-for-service) for which service records (shadow billings) are not captured. As a result, overall expenditures are underestimated.
3. Determining the costs associated with HCV is difficult, even with the implementation of the ICD-10 classification system, because many HCV-related services are not associated with an HCV service code. For example, care for end-stage liver disease is directly attributable to HCV but is usually assigned a code for hepatic encephalopathy, gastrointestinal bleeding, ascites, or bacterial infection. In order to correct for this coding, two clinical experts reviewed service codes based on their personal judgment in order to determine which ones should be included (as definite and probable) within the estimates of this report.
4. Aside from public health laboratories, the frequency of HCV screening in Ontario is unknown because Hepatitis A, B and C are currently billed under the same test code. Therefore the frequency was estimated based upon a survey by the Quality Management Program – Laboratory Services, Ontario Medical Association. This survey did not include the Canadian Blood Services.
5. The extent to which psychiatric or medical services "attributable" to HCV are provided to HCV individuals with multiple related illnesses is often unclear as HCV frequently coexists with psychiatric-related illnesses, HIV infection and other illnesses. HCV infection is associated with fatigue and a variety of ill-defined symptoms but the occurrence of substance abuse and other psychiatric disorders in this population is also high. Individuals also suffering from HIV infection may not receive antiviral therapy for HCV because of their HIV infection. Also, co-infection with HIV may accelerate the progression of HCV-related liver disease which will result in increased costs in the future. Thus, accurately estimating which costs are attributable to HCV requires a more sophisticated study design.
6. The total number of persons infected with HCV is uncertain with an estimated 35,000 to 60,000 additional individuals infected but not yet identified through blood testing. These individuals may be receiving treatment for psychiatric disorders, addiction, HIV infection or end-stage liver disease, conditions which may be worsened by their unidentified HCV infection. The costs of these services are not included in this analysis. The projected number of undiagnosed individuals will be reviewed and the recently announced Hepatitis C Task Force will examine the need for a cost-forecasting model for HCV costs over the next 10 to 15 years.

7. The study group represents 43 per cent of the total population of persons diagnosed with HCV, but is unlikely to represent the "average" member of the population. Because HCV individuals were identified based on their healthcare use, the selected study group is likely to consume greater healthcare resources than the remaining HCV population, which may not have required healthcare during the period studied. In fact, there is no standard against which to measure a study group to determine how representative it is. As a result, it is not possible to calculate a factor by which these estimated expenditures should be adjusted to reflect the full costs for all HCV individuals.

8. At this time, it is not possible to show changes in expenditure since the time of signing the Agreement. The reason for this is that the relatively large hospital and drug-related expenditures presented here are based on relatively rare events involving a small number of people within the study group. Grouping these relatively rare healthcare events into smaller units of time, such as fiscal quarters, could result in significant random variation. A two-year time period is too short to distinguish possibly random fluctuation from true change of expenditures, especially without a control cohort. As well, without a control group, we cannot differentiate between changes over time due to the treatment of Hepatitis C and increases in healthcare costs overall.

Conclusions

The “definite” HCV-related healthcare expenditures for a study group of approximately 30,000 HCV individuals were found to be between $66 million and $90 million during a 24-month period (Table 10). If these costs are projected to a 30-month time period to coincide with the time from the signing of the Federal Hepatitis C Undertaking Agreement to the present (January 2002 to June 2004), they range from $82 million to $113 million. On an annual basis, the costs are $33 million to $45 million.

Members of the study group, representing 43 per cent of the 70,000 known HCV-infected individuals, may consume more healthcare resources than “average” HCV individuals. Unfortunately, at this time, it is not possible to calculate a factor by which these costs should be adjusted to reflect the costs for all HCV positive individuals in Ontario.

For the 2,632 individuals who were eligible for OHCAP, and therefore confirmed as being infected through the blood system before 1986 and after 1990, the costs over the 24-month time period range from a minimum of $5.5 million to $7.6 million when “probable” expenditures are included (Table 11). These costs can be used to project expenditures of $6.9 million to $9.5 million over a 30-month period or represented as $2.25 million to $3.8 million on an annual basis. While it is estimated that this smaller group totals between 8,000 and 15,000 individuals (Remis), it is not possible to calculate a factor by which these costs should be adjusted to reflect the costs for all members of the pre-1986/post-1990 sub-group who were infected by the blood system.

In any event, it is anticipated that these costs will increase in coming years with the introduction of new treatment therapies and the large number of individuals who either currently or historically have shared needles during injection drug use but have not yet been diagnosed.

Finally, it is clear that more sophisticated methodology needs to be carried out to estimate the use of resources for the entire HCV population. This analysis is required for the public reporting due January 2007 under the terms of the Federal Hepatitis C Undertaking Agreement.

Recommendations for Future Analysis

1. While the methods employed in this study provide an estimate of HCV-related health resource use, a more inclusive sample of the HCV population is required. It is recommended that the health number be made a mandatory field within the Public Health Laboratory database records so that a larger HCV study group can be identified for future analysis.
2. Linking health number to healthcare records cannot provide an accurate estimate of the actual health resources utilized by the study group. That is because it is often difficult to determine the diagnoses and procedures "attributable" to HCV. As a result, the methodology required the expert judgment which is less reliable. A "net cost" method would be preferable; it would estimate the total healthcare costs for persons with HCV compared to a control group matched by age, gender, and other related diseases. By estimating the differences in total healthcare costs between persons with HCV and a comparison group, we can more accurately understand how HCV affects the cost of HCV-related care, as well as care associated with conditions that relate to HCV.
3. In order to determine if healthcare expenditures in Ontario have changed as a result of the Federal Hepatitis C Undertaking Agreement, future analyses should explore HCV-related expenditures over longer periods of time comparing HCV patients and a control group. Costs associated with the health resources in each time interval could be reviewed and the differences assessed. However, changes in the patterns of care, such as the recent increase in the use of antiviral drug therapy may make it difficult to distinguish changes in the costs of HCV-related healthcare expenditures related to policy.
4. A full economic accounting of HCV-related costs should include out-of-pocket costs borne by patients. These may be very substantial, as some drug costs and travel costs are borne by patients. In addition, a full accounting could include income supplements related to disability and an estimate of lost productivity due to HCV-related illness and premature death. These are real costs borne by individual Ontario residents, by other Ministries within the government, and by the province as a whole. Such an analysis was beyond the scope of this report, which tabulated only direct health expenditures.

Acknowledgements

The Ministry of Health and Long-Term Care would like to acknowledge the work of Dr. Murray Krahn and Dr. Morris Sherman, Department of Medicine, University Health Network; and Dr. Muhammad Mamdani, Senior Scientist, Institute for Clinical Evaluative Sciences for their invaluable assistance in preparing the information contained in this report.

Appendix A:
Federal Hepatitis C Undertaking Agreement

WHEREAS the Federal, Provincial and Territorial Ministers of Health announced on March 27, 1998 an offer of financial assistance for persons infected with Hepatitis C through the blood system between January 1, 1986 and July 1, 1990, and

WHEREAS the Governments of Canada wish to address the unique circumstances surrounding the infections of persons with Hepatitis C through the blood supply system before January 1, 1986 and after July 1, 1990, and

WHEREAS there are healthcare services for Hepatitis C that are not fully insured by publicly financed healthcare systems in Canada; and

WHEREAS the Governments of Canada aim to increase the capacity of publicly financed healthcare programs to ensure that all Canadians infected with Hepatitis C through the blood system have reasonable access to healthcare services used for the treatment of Hepatitis C, and

WHEREAS the Government of Canada is prepared to transfer to Provinces and Territories up to $300 million over a maximum of 20 years for publicly-financed healthcare services for the treatment of Hepatitis C, and

WHEREAS the Government of Ontario has agreed to accept financial transfers from the Government of Canada to assist in funding healthcare services for the treatment of Hepatitis C,

THEREFORE the Government of Ontario undertakes to use financial transfers provided pursuant to the present Undertaking as follows:

1. Shared Objectives

1.1 The parties agree that their shared policy objective is to ensure that persons infected with Hepatitis C through the blood system prior to January 1, 1986 and after July 1, 1990 have reasonable access to therapeutic healthcare services indicated for the treatment/cure of Hepatitis C.

2. Financial Transfers

2.1 To achieve the objectives described in clause 1.1., the Government of Canada will transfer $X in 2000-01, payments of $Y in 2001-02, 2002-03 and 2003-04, and payments of $Z in 2004-05, 2009-10 and 2014-15, subject to the provisions of the present Undertaking and upon necessary approvals of Parliament and the Treasury Board of Canada.

2.2 The federal contribution will be allocated to a participating jurisdiction on the basis of its percentage of national infection estimated by Health Canada as validated by independent experts and described in Annex A.

2.3 The levels and/or inter-jurisdictional allocation of Federal funding may be adjusted to reflect increases in knowledge about the numbers of individuals infected with Hepatitis C throughout Canada.

3. Services

3.1 The parties agree that the federal transfers will be used for healthcare services indicated for the treatment of Hepatitis C infection, and medical conditions directly related to it, such as current and emerging antiviral drug therapies, other relevant drug therapies, immunization and nursing care.

3.2 The parties acknowledge that these services will be provided such that there will be reasonable access to them by persons infected with Hepatitis C through the blood supply system before January 1, 1986 and after July 1, 1990.

3.3 Provinces and territories may endeavour to meet the shared policy objectives described in Clause 1.1 using the administrative means considered by them to be most appropriate.

3.4 The Government of Ontario agrees that any new programs funded in part pursuant to the present Undertaking in pursuit of the shared policy objectives described in Clause 1.1, will not require or allow a period of residence in the province to be set as a condition of eligibility for the receipt of program benefits.

3.5 Nothing in this document shall alter or diminish current federal programs and/or funding for health services for First Nations and Inuit people.

4. Accountability Framework

4.1 The Government of Ontario will prepare commencing 5 years from the date of execution of this agreement and every 5 years thereafter for as long as transfers continue, reports to the public on the nature of initiatives benefiting from federal funding pursuant to Clause 1.1.

4.2 The Government of Canada may reduce, adjust or terminate funding to the Government of Ontario if the Government of Ontario has not endeavoured to meet the objectives set out herein.

SIGNED on behalf of the Government of Canada at Ottawa this 21 day of February 2002.

_____
Minister of Health
(Canada)

SIGNED on behalf of the Government of Ontario at_____this 14 day of January 2002.

_____
Minister of Health
(Ontario)

Annex A: Undertaking Allocation of $300M by Province/Territory Based upon Infectivity Rate[12] in $M

	Ontario
%	44.2
Year	
2000/01 2001/02	44.20
2002/03	11.05
2003/04	11.05
2004/05	22.10
2009/10	22.10
2014/15	22.10
Total	**132.6**

Appendix B: Laboratory Costs

Hepatitis C Antibody Screening Costs (Anti-HCV mEIA), Jan 2002 - June 2004, excluding Canadian Blood Services

Testing Lab	Low Estimate/Month	High Estimate/Month
Public Health Laboratories	6,128	6,128
Private Laboratories*	16,600	33,000
Hospitals*	3,800	7,700
Total	**26,528**	**46,828**

*Source: Quality Management Program – Laboratory Services, Ontario Medical Association

[12] Percentage splits for provinces are based on "Estimating the Number of Blood Transfusion Recipients Infected by Hepatitis C Virus in Canada, 1960-85 and 1990-92" by Robert S. Remis.

Cost per Screening Test

PHL = $12
OHIP = $14.48
Hospital = unknown, used on PHL cost.

Additional HCV Testing

	Test	Number of Tests		Cost/Test	Totals	
Code		2002-2003	2003-2004		2002-2003	2003-2004
353	Hepatitis C genotyping	4,636	5,034	$150	$695,400	$755,100
367	Anti-HCV mEIA	70,912	76,169	$12	$850,944	$914,028
368	Supplemental HCV antibody	1,967	2,141	$60	$118,020	$128,460
369	HCV qualitative RNA	5,587	5,316	$100	$558,700	$531,600
377	Anti-HCV (UBI, Organon)	10,040	0	$15	$150,600	$0
378	Anti-HCV (Sanofi)	2,891	10,338	$15	$43,365	$155,070
386	Hepatitis C quantitative RNA	4,996	6,254	$100	$499,600	$625,400
Total					**$2,916,629**	**$3,109,658**

*Source: Public Health Laboratories

Appendix C: Definite and Probable Codes from the Hospital Databases

Table C1: Most Responsible Diagnosis Identified as Definitely Related to the Treatment of HCV

ICD-10 Code	ICD-10 Description
B171	ACUTE HEPATITIS C
B182	CHRONIC VIRAL HEPATITIS C
B189	CHRONIC VIRAL HEPATITIS, UNSPECIFIED
B199	UNSPECIFIED VIRAL HEPATITIS WITHOUT HEPATIC COMA
C220	LIVER CELL CARCINOMA
C229	MALIGNANT NEOPLASM OF LIVER UNSPECIFIED
D695	SECONDARY THROMBOCYTOPENIA
D696	THROMBOCYTOPENIA, UNSPECIFIED
D700	NEUTROPENIA
D731	HYPERSPLENISM
D891	CRYOGLOBULINAEMIA
E801	PORPHYRIA CUTANEA TARDA
G934	ENCEPHALOPATHY, UNSPECIFIED
I81	PORTAL VEIN THROMBOSIS
I850	OESOPHAGEAL VARICES WITH BLEEDING
I859	OESOPHAGEAL VARICES WITHOUT BLEEDING
I864	GASTRIC VARICES
K720	ACUTE AND SUBACUTE HEPATIC FAILURE
K721	CHRONIC HEPATIC FAILURE
K729	HEPATIC FAILURE, UNSPECIFIED
K730	CHRONIC PERSISTENT HEPATITIS, NOT ELSEWHERE CLASSIFIED
K731	CHRONIC LOBULAR HEPATITIS, NOT ELSEWHERE CLASSIFIED
K732	CHRONIC ACTIVE HEPATITIS, NOT ELSEWHERE CLASSIFIED
K738	OTHER CHRONIC HEPATITIS, NOT ELSEWHERE CLASSIFIED
K739	CHRONIC HEPATITIS, UNSPECIFIED
K740	HEPATIC FIBROSIS
K741	HEPATIC SCLEROSIS
K742	HEPATIC FIBROSIS WITH HEPATIC SCLEROSIS
K746	OTHER AND UNSPECIFIED CIRRHOSIS OF LIVER
K759	INFLAMMATORY LIVER DISEASE, UNSPECIFIED
K766	PORTAL HYPERTENSION
K767	HEPATORENAL SYNDROME
K769	LIVER DISEASE, UNSPECIFIED
K920	HAEMATEMESIS
K921	MELAENA
K922	GASTROINTESTINAL HAEMORRHAGE, UNSPECIFIED
L439	LICHEN PLANUS, UNSPECIFIED
R160	HEPATOMEGALY, NOT ELSEWHERE CLASSIFIED
R161	SPLENOMEGALY, NOT ELSEWHERE CLASSIFIED
R162	HEPATOMEGALY WITH SPLENOMEGALY, NOT ELSEWHERE CLASSIFIED
R17	UNSPECIFIED JAUNDICE
R18	ASCITES
R945	ABNORMAL RESULTS OF LIVER FUNCTION STUDIES
T86400	LIVER TRANSPLANT REJECTION
T86401	LIVER TRANSPLANT FAILURE
T86402	LIVER TRANSPLANT INFECTION
Z2251	CARRIER OF VIRAL HEPATITIS C
Z246	NEED FOR IMMUNIZATION AGAINST VIRAL HEPATITIS
Z526	LIVER DONOR
Z944	LIVER TRANSPLANT STATUS

Table C2: Post Responsible Diagnosis Identified as Probably Related to the Treatment of HCV

ICD-10 Code	ICD-10 Description
B178	OTHER SPECIFIED ACUTE VIRAL HEPATITIS
B188	OTHER CHRONIC VIRAL HEPATITIS
B24	HUMAN IMMUNODEFICIENCY VIRUS [HIV] DISEASE
C227	OTHER SPECIFIED CARCINOMAS OF LIVER
C833	LARGE CELL (DIFFUSE) NON-HODGKIN'S LYMPHOMA
C851	B-CELL LYMPHOMA, UNSPECIFIED
C859	NON-HODGKIN'S LYMPHOMA, UNSPECIFIED TYPE
D500	IRON DEFICIENCY ANAEMIA SECONDARY TO BLOOD LOSS (CHRONIC)
D509	IRON DEFICIENCY ANAEMIA, UNSPECIFIED
D561	BETA THALASSAEMIA
D598	OTHER ACQUIRED HAEMOLYTIC ANAEMIAS
D619	APLASTIC ANAEMIA, UNSPECIFIED
D62	ACUTE POSTHAEMORRHAGIC ANAEMIA
D648	OTHER SPECIFIED ANAEMIAS
D649	ANAEMIA, UNSPECIFIED
D66	HEREDITARY FACTOR VIII DEFICIENCY
D67	HEREDITARY FACTOR IX DEFICIENCY
E8310	HAEMOCHROMATOSIS
E877	FLUID OVERLOAD
F03	UNSPECIFIED DEMENTIA
F050	DELIRIUM NOT SUPERIMPOSED ON DEMENTIA, SO DESCRIBED
F058	OTHER DELIRIUM
F059	DELIRIUM, UNSPECIFIED
F320	MILD DEPRESSIVE EPISODE
F321	MODERATE DEPRESSIVE EPISODE
F328	OTHER DEPRESSIVE EPISODES
F329	DEPRESSIVE EPISODE, UNSPECIFIED
F339	RECURRENT DEPRESSIVE DISORDER, UNSPECIFIED
H160	CORNEAL ULCER
I841	INTERNAL HAEMORRHOIDS WITH OTHER COMPLICATIONS
I842	INTERNAL HAEMORRHOIDS WITHOUT COMPLICATION
I845	EXTERNAL HAEMORRHOIDS WITHOUT COMPLICATION
J90	PLEURAL EFFUSION, NOT ELSEWHERE CLASSIFIED
K290	ACUTE HAEMORRHAGIC GASTRITIS
K291	OTHER ACUTE GASTRITIS
K293	CHRONIC SUPERFICIAL GASTRITIS
K294	CHRONIC ATROPHIC GASTRITIS
K295	CHRONIC GASTRITIS, UNSPECIFIED
K296	OTHER GASTRITIS
K297	GASTRITIS, UNSPECIFIED
K298	DUODENITIS
K299	GASTRODUODENITIS, UNSPECIFIED
K625	HAEMORRHAGE OF ANUS AND RECTUM
K650	ACUTE PERITONITIS
K658	OTHER PERITONITIS
K659	PERITONITIS, UNSPECIFIED
K701	ALCOHOLIC HEPATITIS
K703	ALCOHOLIC CIRRHOSIS OF LIVER
K704	ALCOHOLIC HEPATIC FAILURE
K709	ALCOHOLIC LIVER DISEASE, UNSPECIFIED
K711	TOXIC LIVER DISEASE WITH HEPATIC NECROSIS
K715	TOXIC LIVER DISEASE WITH CHRONIC ACTIVE HEPATITIS
K716	TOXIC LIVER DISEASE WITH HEPATITIS, NOT ELSEWHERE CLASSIFIED
K754	AUTOIMMUNE HEPATITIS
K758	OTHER SPECIFIED INFLAMMATORY LIVER DISEASES
K768	OTHER SPECIFIED DISEASES OF LIVER
L959	VASCULITIS LIMITED TO SKIN, UNSPECIFIED
N032	CHRONIC NEPHRITIC SYNDROME, DIFFUSE MEMBRANOUS GLOMERULONEPHRITIS
N180	END-STAGE RENAL DISEASE
N188	OTHER CHRONIC RENAL FAILURE
N189	CHRONIC RENAL FAILURE, UNSPECIFIED
N19	UNSPECIFIED RENAL FAILURE
O98401	VIRAL HEPATITIS COMPLICATING PREGNANCY, CHILDBIRTH AND THE PUERPERIUM, DELIVERED, WITH OR WITHOUT MENTION OF ANTEPARTUM CONDITION

R040	EPISTAXIS
R1012	EPIGASTRIC PAIN
R104	OTHER AND UNSPECIFIED ABDOMINAL PAIN
R118	OTHER AND UNSPECIFIED NAUSEA AND VOMITING
R400	SOMNOLENCE
R401	STUPOR
R4029	COMA, UNSPECIFIED
R410	DISORIENTATION, UNSPECIFIED
R53	MALAISE AND FATIGUE
R601	GENERALIZED OEDEMA
R609	OEDEMA, UNSPECIFIED
R740	ELEVATION OF LEVELS OF TRANSAMINASE AND LACTIC ACID DEHYDROGENASE [LDH]
R749	ABNORMAL LEVEL OF UNSPECIFIED SERUM ENZYME
R799	ABNORMAL FINDING OF BLOOD CHEMISTRY, UNSPECIFIED
T86001	GRAFT-VERSUS-HOST REACTION OR DISEASE
T869	FAILURE AND REJECTION OF UNSPECIFIED TRANSPLANTED ORGAN AND TISSUE
Z000	GENERAL MEDICAL EXAMINATION
Z005	EXAMINATION OF POTENTIAL DONOR OF ORGAN AND TISSUE
Z017	LABORATORY EXAMINATION
Z018	OTHER SPECIFIED SPECIAL EXAMINATIONS
Z027	ISSUE OF MEDICAL CERTIFICATE
Z031	OBSERVATION FOR SUSPECTED MALIGNANT NEOPLASM
Z041	EXAMINATION AND OBSERVATION FOLLOWING TRANSPORT ACCIDENT
Z080	FOLLOW-UP EXAMINATION AFTER SURGERY FOR MALIGNANT NEOPLASM
Z082	FOLLOW-UP EXAMINATION AFTER CHEMOTHERAPY FOR MALIGNANT NEOPLASM
Z089	FOLLOW-UP EXAMINATION AFTER UNSPECIFIED TREATMENT FOR MALIGNANT NEOPLASM
Z21	ASYMPTOMATIC HUMAN IMMUNODEFICIENCY VIRUS [HIV] INFECTION STATUS
Z511	CHEMOTHERAPY SESSION FOR NEOPLASM
Z512	OTHER CHEMOTHERAPY
Z513	BLOOD TRANSFUSION WITHOUT REPORTED DIAGNOSIS
Z515	PALLIATIVE CARE
Z519	MEDICAL CARE, UNSPECIFIED
Z718	OTHER SPECIFIED COUNSELLING
Z719	COUNSELLING, UNSPECIFIED
Z722	DRUG USE
Z760	ISSUE OF REPEAT PRESCRIPTION
Z7680	ORGAN DONOR TRANSPLANT CANDIDATE

Table C3: Principal Procedure Code Identified as Definitely Related to the Treatment of HCV

CCI Code	CCI Description
1GV52HA	DRAINAGE, PLEURA USING PERCUTANEOUS NEEDLE APPROACH [INJECTION]
1NA13BA	CONTROL OF BLEEDING, ESOPHAGUS USING ENDOSCOPIC PER ORIFICE APPROACH
1NA13BABD	CONTROL OF BLEEDING, ESOPHAGUS USING ENDOSCOPIC PER ORIFICE APPROACH AND MECHANICAL BALLOON DILATOR
1NA13BAFA	CONTROL OF BLEEDING, ESOPHAGUS USING ENDOSCOPIC PER ORIFICE APPROACH AND ENCIRCLAGE DEVICE
1NA13BAX7	CONTROL OF BLEEDING, ESOPHAGUS USING ENDOSCOPIC PER ORIFICE APPROACH AND CHEMOCAUTERY AGENT
1NF13BABD	CONTROL OF BLEEDING, STOMACH USING ENDOSCOPIC PER ORIFICE APPROACH AND MECHANICAL BALLOON DILATOR
1OA59DAGX	DESTRUCTION, LIVER USING ENDOSCOPIC APPROACH AND DEVICE NEC
1OA59DAX7	DESTRUCTION, LIVER USING ENDOSCOPIC APPROACH AND CHEMOCAUTERY AGENT
1OA59HAX7	DESTRUCTION, LIVER USING PERCUTANEOUS NEEDLE APPROACH [INJECTION] AND CHEMOCAUTERY AGENT
1OA59LAAD	DESTRUCTION, LIVER USING OPEN APPROACH AND CRYOPROBE
1OA59LAGX	DESTRUCTION, LIVER USING OPEN APPROACH AND DEVICE NEC
1OA85LAXXK	TRANSPLANT, LIVER USING OPEN APPROACH AND HOMOGRAFT
1OA85WLXXJ	TRANSPLANT, LIVER USING OPEN APPROACH WITH SPLITTING TECHNIQUE AND LIVING DONOR HOMOGRAFT
1OA85WLXXK	TRANSPLANT, LIVER USING OPEN APPROACH WITH SPLITTING TECHNIQUE AND HOMOGRAFT
1OA87LA	EXCISION PARTIAL, LIVER USING OPEN APPROACH
1OA87LAAZ	EXCISION PARTIAL, LIVER USING OPEN APPROACH AND ULTRASONIC DEVICE
1OT52HA	DRAINAGE, ABDOMINAL CAVITY USING PERCUTANEOUS NEEDLE APPROACH [INJECTION]
2NA70BA	INSPECTION, ESOPHAGUS ENDOSCOPIC PER ORIFICE NOS
2NC70BA	INSPECTION, ESOPHAGUS WITH STOMACH ENDOSCOPIC PER ORIFICE NOS

2NF70BA	INSPECTION, STOMACH ENDOSCOPIC PER ORIFICE NOS
2NK70BA	INSPECTION, SMALL INTESTINE ENDOSCOPIC PER ORIFICE NOS
2OA71DA	BIOPSY, LIVER ENDOSCOPIC APPROACH NOS
2OA71HA	BIOPSY, LIVER PERCUTANEOUS (NEEDLE) APPROACH
2OA71LA	BIOPSY, LIVER OPEN APPROACH NOS
3OA30DA	ULTRASOUND, LIVER WITH ULTRASOUND ALONE
3OA30DC	ULTRASOUND, LIVER WITH ULTRASOUND AND DOPPLER
3OC30DA	ULTRASOUND, LIVER WITH SPLEEN WITH ULTRASOUND ALONE
3OT20WA	COMPUTERIZED TOMOGRAPHY [CT], ABDOMINAL CAVITY WITHOUT ENHANCEMENT
3OT20WC	COMPUTERIZED TOMOGRAPHY [CT], ABDOMINAL CAVITY WITH ENHANCEMENT
3OT20WE	COMPUTERIZED TOMOGRAPHY [CT], ABDOMINAL CAVITY WITH AND WITHOUT ENHANCEMENT
3OT30DA	ULTRASOUND, ABDOMINAL CAVITY WITH ULTRASOUND ALONE
3OT30DC	ULTRASOUND, ABDOMINAL CAVITY WITH ULTRASOUND AND DOPPLER
3OT30DD	ULTRASOUND, ABDOMINAL CAVITY WITH ULTRASOUND AND COLOR FLOW AND DOPPLER
3OT40WA	MAGNETIC RESONANCE IMAGING [MRI], ABDOMINAL CAVITY WITHOUT ENHANCEMENT
3OT40WC	MAGNETIC RESONANCE IMAGING [MRI], ABDOMINAL CAVITY WITH ENHANCEMENT

Table C4: Principal Procedure Code Identified as Probably Related to the Treatment of HCV

CCI Code	CCI Description
1GV52DA	DRAINAGE, PLEURA USING ENDOSCOPIC APPROACH
1GV52HAHE	DRAINAGE, PLEURA USING PERCUTANEOUS NEEDLE APPROACH [INJECTION] AND CLOSED DRAIN WITH UNDERWATER SEAL
1KX53HACH	IMPLANTATION OF INTERNAL DEVICE, VEIN NEC USING PERCUTANEOUS NEEDLE APPROACH [INJECTION] AND NEEDLE
1KX53HAFT	IMPLANTATION OF INTERNAL DEVICE, VEIN NEC USING PERCUTANEOUS NEEDLE APPROACH [INJECTION] AND CATHETER
1LZ19HHU1J	TRANSFUSION, CIRCULATORY SYSTEM NEC USING PERCUTANEOUS TRANSCATHETER APPROACH AND RED CELL CONCENTRATE AND LIVING DONOR HOMOGRAFT
1NA50BABD	DILATION, ESOPHAGUS USING ENDOSCOPIC PER ORIFICE APPROACH AND MECHANICAL BALLOON DILATOR
1NA50BABP	DILATION, ESOPHAGUS USING ENDOSCOPIC PER ORIFICE APPROACH AND RIGID OR TELESCOPING SOUND DILATOR
1NF13BA	CONTROL OF BLEEDING, STOMACH USING ENDOSCOPIC PER ORIFICE APPROACH
1NF52CAQN	DRAINAGE, STOMACH USING PER ORIFICE APPROACH AND SUCTION PUMP
1NF52CATL	DRAINAGE, STOMACH USING PER ORIFICE APPROACH AND SYRINGE
1ZZ35HAM9	PHARMACOTHERAPY, TOTAL BODY USING PERCUTANEOUS NEEDLE APPROACH [INJECTION] AND COMBINATION [MULTIPLE] ANTINEOPLASTIC OR IMMUNOMODULATING AGENTS
1ZZ35HAP2	PHARMACOTHERAPY, TOTAL BODY USING PERCUTANEOUS NEEDLE APPROACH [INJECTION] AND ANALGESIC AGENT
2NF71BA	BIOPSY, STOMACH ENDOSCOPIC PER ORIFICE NOS
2NK70DA	INSPECTION, SMALL INTESTINE ENDOSCOPIC APPROACH NOS
2ZZ13RA	SPECIMEN COLLECTION (FOR DIAGNOSTIC TESTING), TOTAL BODY VENOUS PUNCTURE
3OA70CA	DIAGNOSTIC NUCLEAR (IMAGING) STUDY, LIVER USING SCINTIGRAPHY
6AA10AD	COUNSELING, FOR MENTAL HEALTH FOR ADDICTION
6AA10BE	COUNSELING, FOR MENTAL HEALTH FOR BEHAVIOR
6AA10MA	COUNSELING, FOR MENTAL HEALTH FOR MOOD
6AA10ZZ	COUNSELING, FOR MENTAL HEALTH FOR OTHER NEC
7SP10VB	COUNSELING, PROMOTING HEALTH AND PREVENTING DISEASE FOR DRUG ABUSE
7SP10VG	COUNSELING, PROMOTING HEALTH AND PREVENTING DISEASE FOR SAFE SEXUAL PRACTICE
7SP40EH	IMMUNIZATION, PROMOTING HEALTH AND PREVENTING DISEASE FOR HEPATITIS B

Appendix D:
Definite and Probable Codes From the OHIP Database

Table D1: OHIP Diagnosis Code Identified as Definitely Related to the Treatment of HCV

OHIP Diagnosis Code	OHIP Diagnosis Description
070	VIRAL HEPATITIS

Table D2: OHIP Diagnosis Code Identified as Probably Related to the Treatment of HCV

OHIP Diagnosis Code	OHIP Diagnosis Description
287	PURPURA,THROMBOCYTOPENIA, OTHER HAEMORRHAGIA CONDITIONS
288	NEUTROPENIA, ACRANULOCYTOSIS, EOSINOPHILIA
452	PORTAL VEIN THROMBOSIS
571	CIRRHOSIS OF THE LIVER, E.G. ALCOHOLIC CIRRHOSIS
573	OTHER DISEASES OF THE LIVER

Table D3: OHIP Fee Schedule Code Identified as Definitely Related to the Treatment of HCV

FSC	FSC Description
A413A	MEDICAL SPECIFIC ASSESS. - GASTROENT
A414A	MEDICAL SPECIFIC RE-ASSESS. - GASTROENT.
A415A	CONSULTATION - GASTROENT.
A416A	REPEAT CONSULT. - GASTROENT.
A418A	PARTIAL-ASSESS. - GASTROENT.
C412A	SUBSEQ. VISITS/TO 5 WKS./GASTROENT. - HOSP.
C982A	PALLIATIVE/TERMINAL CARE A. TR. HOSP. (SPEC.)
E669A	WITH ESOPHAGOSCOPY, GASTROSCOPY AND MAY INCLUDE DUODENOSCOPY
E702A	OESOPH/GASTRO/DUODENOSCOPY/MULT BIOPSY 3/MORE LESION
E797A	MANAGEMENT OF UNCOMPLICATED UPPER GASTROINTESTINAL BLEEDING
E798A	MANAGEMENT OF COMPLICATED UPPER GASTORINTESTINAL BLEEDING
G254A	MANAGEMENT OF POST LIVER TRANSPLANT IMMUNOSUPRESSION PER VIS
J135B	DIAG. US. ABDOMEN/RETROPERITONEUM - ABDOM. SCAN, COMPLETE
J135C	DIAG. US. ABDOMEN/RETROPERITONEUM - ABDOM. SCAN, COMPLETE
J149B	DIAG. US. ULTRASONIC GUIDE BIOPSY/ASP./AMNIOCENTESIS/DRAINAG
J149C	DIAG. US. ULTRASONIC GUIDE BIOPSY/ASP./AMNIOCENTESIS/DRAINAG
J435B	DIAG. US. ABDOMEN/RETROPERITONEUM - ABDOM. SCAN, COMPLETE
J435C	DIAG. US. ABDOMEN/RETROPERITONEUM - ABDOM. SCAN, COMPLETE
L005A	Lab Med - Biochem - Albumin, Quantitative
L030A	Lab Med - Biochem - Bilirubin, Total
L067A	Lab Med - Biochem - Creatinine (Not with L068)
L107A	Lab Med - Biochem - Gamma Glutamyl Transpeptidase
L146A	Lab Med - Biochem - Lactic Dehydrogenase, Total
L191A	Lab Med - Biochem - Phosphatase, Alkaline
L201A	Lab Med - Biochem - Porphyrins, Quantitation-U etc.
L222A	Lab Med - Biochem - SGOT (AST)
L223A	Lab Med - Biochem - SGTP (ALT)
L445A	Lab Med - Haematology - Prothrombin Time
L462A	Lab Med - Haematology - Partial Thromboplastin Time
L600A	Lab Med - Immunol - Misc - Cryoglobulins - Qualitative
L639A	Lab Med - Microbiol - Cultures - Fluids (CSF,Joint,Pleur etc
L691A	Lab Med - Radioassays - Alphafetoprotein after 7/93 some Hos
L700A	Lab Med - Patient Documentation & Specimen Collection Fee
L720A	Lab Med - Anat Path,Hist,Cyt-Cyto-Surg Pathology per Specimen

L800A	Blood film interpretation (Romanowsky stain)
L810A	Fluids (pleural, ascitic, cyst, pericardial, CSF, urine/join
L817A	Anti-tissue antibodies, and interp.
L852A	Anatomical Pathology Surgery- complex or large specimen
S267A	EXC - HEPATECTOMY - COMPL LT/RT LOBECTOMY
S267B	EXC - HEPATECTOMY - COMPL LT/RT LOBECTOMY
S267C	EXC - HEPATECTOMY - COMPL LT/RT LOBECTOMY
S269A	EXC - HEPATECTOMY - LOCAL EXC LESION
S269C	EXC - HEPATECTOMY - LOCAL EXC LESION
S270A	EXC - HEPATECTOMY - LT. LAT SEGMENTAL EXC.
S270B	EXC - HEPATECTOMY - LT. LAT SEGMENTAL EXC.
S270C	EXC - HEPATECTOMY - LT. LAT SEGMENTAL EXC.
S271A	EXC - HEPATECTOMY - EXTEND RT LOBECTOMY
S271B	EXC - HEPATECTOMY - EXTEND RT LOBECTOMY
S271C	EXC - HEPATECTOMY - EXTEND RT LOBECTOMY
S274A	EXC - LIVER TRANSPLANT - DONOR
S274B	EXC - LIVER TRANSPLANT - DONOR
S274C	EXC - LIVER TRANSPLANT - DONOR
S275A	EXC - HEPATECTOMY - PARTIAL LOBECTOMY
S275C	EXC - HEPATECTOMY - PARTIAL LOBECTOMY
S294A	EXC - LIVER TRANSPLANT - RECIPIENT
S294B	EXC - LIVER TRANSPLANT - RECIPIENT
S294C	EXC - LIVER TRANSPLANT - RECIPIENT
S295A	LIVER TRANSPLANT - REPEAT
S295B	LIVER TRANSPLANT - REPEAT
S295C	LIVER TRANSPLANT - REPEAT
X126C	CTT - ABDOMEN - WITH/OUT I.V. CONTRAST
X410C	CTT - ABDOMEN - WITH I.V. CONTRAST
X451C	MAG. RES. IM. - ABDOMEN - MULTISLICE S.E. (1 OR 2 ECHOS)
Z341A	LUNGS & PLEURA - CL DRAIN EFFUSION/PNEUMOTHORAX
Z399A	OESOPHAGOSCOPY-GASTROCOPY W/OUT DUDENOSCOPY - ELECTIVE
Z399C	OESOPHAGOSCOPY-GASTROCOPY W/OUT DUDENOSCOPY - ELECTIVE
Z400A	OESOPHAGUS - FOR ACTIVE BLEEDING
Z400C	OESOPHAGUS - FOR ACTIVE BLEEDING
Z551A	LIVER - INC - BIOPSY, NEEDLE
Z551C	LIVER - INC - BIOPSY, NEEDLE
Z555A	ENDOSCOPY - SIGMOID/DESCENDING COLON
Z590A	ABD/PERIT/OMENT - PARACENTESIS - ASP FOR DIAGNOSTIC SAMPLE
Z591A	ABD/PERIT/OMENT - PARACENTESIS THERAPEUT DRAIN SAMPLE

Table D4: OHIP Fee Schedule Code Identified as Probably Related to the Treatment of HCV

FSC	FSC Description
A001A	MINOR ASSESS. - F.P./G.P.
A004A	GEN. RE-ASSESS. - F.P./G.P.
A005A	CONSULT. - F.P./G.P.
A006A	RE-CONSULT. - F.P./G.P.
A007A	INTERMED. ASSESS./WELL BABY CARE - F.P./G.P./PAED.
A008A	MINI ASSESSMENT - F.P./G.P.
A133A	MEDICAL SPECIFIC ASSESS. - INT. MED.
A134A	MEDICAL SPECIFIC RE-ASSESS. - INT. MED.
A135A	CONSULTATION - INT. MED.
A136A	REPEAT CONSULTATION - INT. MED.
A138A	PARTIAL-ASSESS. - INT. MED.
A411A	COMPLEX MEDICAL SPECIFIC RE-ASSESSMENT - GASTROENT.
A435A	LIMITED CONSULT. - INT. MED.
A471A	COMPLEX MEDICAL SPECIFIC RE-ASSESSMENT
A545A	LIMITED CONSULT. GASTROENT.
A905A	LIMITED CONSULT FAMILY/GENERAL PRACTICE
B914A	SP. VISIT SAT SUN HOL 7:00 AM TO 12 MIDNIGHT 1ST PATIENT
B990A	DAYTIME (MONDAY TO FRIDAY) FIRST PT.
B992A	EMERG. CALL/SACRIFICE OFFICE HOURS - FIRST PT.
B994A	NIGHTS (5 PM TO 12 MN), SAT/SUN/HOL - FIRST PT.
B996A	NIGHTS (12 MN TO 7 AM), FIRST PT.
C002A	SUBSEQ. VISITS - TO 5 WKS. - F.P./G.P. - HOSP.

C003A	GEN. ASSESS. - F.P./G.P.- HOSP.
C004A	GEN. RE-ASSESS. - F.P./G.P. - HOSP.
C005A	CONSULT. - F.P./G.P. - HOSP.
C007A	SUBSEQ. VISITS/6TH TO 13TH WK. INCL. F.P./G.P./HOSP.
C008A	CONCUR. CARE - F.P./G.P. - (MINOR ASSESS.) HOSP.
c009a	subseq. visits/after 13th wk./f.p./g.p. - hosp.
c010a	support care - f.p./g.p. - hosp.
c032a	subseq. visits/to 5 wks./gen. surg./hosp.
c033a	specific assess. - gen. surg. - hosp.
c034a	specific re-assess. - gen. surg. - hosp.
c035a	consultation - gen. surg. - hosp.
c036a	repeat consultation - gen. surg. - hosp.
c037a	subseq. visits/6th to 15th wk. incl./hosp.
c038a	concur. care - gen. surg. - (minor assess.) hosp.
c039a	subseq. visits/after 13th wk./hosp.
c132a	subseq. visits/to 5 wks./int. med. - hosp.
c133a	medical specific assess - intern med - hosp.
c134a	medical specific re-assess. - int. med. - hosp.
c135a	consultation - int. med. - hosp.
c136a	repeat consultation - int. med. hosp.
c137a	subseq. visits/6th to 13th wk. incl./hosp.
c138a	concur. care - int. med. - hosp.
c139a	subseq. visits/after 13th wk./hosp.
c413a	medical specific assess. - gastroent. - hosp.
c414a	medical specific re-assess. - gastroent. - hosp.
c415a	consultation - gastroent. - hosp.
c416a	repeat consult. - gastroent. - hosp.
c417a	subseq. visits/6th to 13th wk. incl./hosp.
c418a	concur. care - gastroent. - hosp.
c419a	subseq. visits/after 13th wk./hosp.
c435a	limited consult. - int. med. - hosp.
c545a	limited consult. - gastroent. - hosp.
c933a	gen. practice - on call admission - re-assessment
e696a	eosophagus-dilatat's eosophagus in assoc with z399 - add
g381a	inj/inf.chemotherapy(marrow suppress.)single inj.
j832b	nucl. med. liver spleen scintigraphy
j832c	nucl. med. liver spleen scintigraphy
j878b	nucl. med. - labelled rbcs
j878c	nucl. med. - labelled rbcs
l015a	lab med - biochem - ammonia
l031a	lab med - biochem - bilirubin, conjugated
l226a	lab med - biochem - sodium
l251a	lab med - biochem - urea nitrogen (b.u.n.)
l253a	lab med - biochem - urinalysis, routine etc.
l254a	lab med - biochem - urinalysis, one or more parts of above
l319a	lab med-radioassays-hepat b antigen/antibody,prenatpub lab/ls
l329a	lab med - radioassays - ferritin
l341a	lab med - radioassays - tsh
l398a	lab med - haematology - reticulocyte count
l535a	lab med - immunol - fluor antib tests - antimitochondrial
l544a	lab med - immunol - fluor antibod test - serum - anti-nuclea
l554a	lab med - immunol - miscellaneous proteins - transferrin
l555a	lab med - immunol miscellaneous proteins - alpha-1-antitrys
l575a	lab med - immunol - gel diff tech - immunoelectrophoresis
l624a	lab med - microbiol - cultures - blood
x409c	ctt - abdomen - without i.v. contrast
z515a	oesophagoscopy with/out biopsy
z515c	oesophagoscopy with/out biopsy
z527a	stomach - endoscop - gastroscopy (w/out biopsy/photo)
z527c	stomach - endoscop - gastroscopy (w/out biopsy/photo)
z528a	subseq (within 3 months following prev gastroscopy

Appendix E:
Definite and Probable Codes from the OHCAS (Home Care) Database

Table E1: Diagnosis Code Identified as Definitely Related to the Treatment of HCV

ICD-9 Code	ICD-9 Description
0705	VIRAL HEPATITIS, OTH SPCFD VIRAL HEPATITIS WMEN HEPATIC COMA
0709	VIRAL HEPATITIS, UNSPCFD VIRAL HEPATITIS WMEN HEPATIC COMA
1550	MALIGNANT NEOPLASM OF LIVER, PRIMARY
1552	MALIGNANT NEOPLASM OF LIVER, NOT SPCFD AS PRIMARY/SECONDARY
5714	CHRONIC LIVER DISEASE & CIRRHOSIS, CHRONIC HEPATITIS
5719	CHRONIC LIVER DISEASE & CIRRHOSIS, UNSPCFD CHRONIC LIVER DIS
5722	LIVER ABSCESS & SEQUELAE OF CHRONIC LIVER DISEASE, HEPATIC C
5728	OTH SEQUELAE OF CHRONIC LIVER DISEASE
5731	OTH DISORDERS OF LIVER, HEPATITIS IN VIRAL DISEASES CLSSFD E
V427	ORGAN/TISSUE REPLACED BY TRANSPLANT, LIVER

Table E2: Diagnosis Code Identified as Probably Related to the Treatment of HCV

ICD-9 Code	ICD-9 Description
5712	CHRONIC LIVER DISEASE & CIRRHOSIS, ALCOHOLIC CIRRHOSIS OF LIVER
5715	CHRONIC LIVER DISEASE & CIRRHOSIS, OF LIVER WMEN ALCOHOL
5733	OTH DISORDERS OF LIVER, HEPATITIS UNSPCFD
5738	OTH DISORDERS OF LIVER, OTH
5739	OTH DISORDERS OF LIVER, UNSPCFD
5789	GASTROINTESTINAL HAEMORRHAGE, OF GASTROINTESTINAL TRACT, UN
5850	CHRONIC RENAL FAILURE
7800	GENERAL SYMPTOMS, COMA & STUPOR
7807	GENERAL SYMPTOMS, MALAISE & FATIGUE

Table E3: Procedure Code Identified as Definitely Related to the Treatment of HCV

ICD-9	ICD-9 Description
6219	OTHER DESTRUCTION OF LESION OF LIVER
6220	LOBECTOMY OF LIVER
6249	OTHER TRANSPLANT OF LIVER
6691	PERCUTANEOUS ABDOMINAL PARACENTESIS

Table E4: Procedure Code Identified as Probably Related to the Treatment of HCV

CCP	CCP Description
0251	COMPUTERIZED AXIAL TOMOGRAPHY OF ABDOMEN
5093	OTHER VENOUS CATHETERIZATION

Appendix F:
Public Health Unit HCV Activities

York Region Health Services – an example of activities

Case Management

1. Receiving all Hepatitis C positive lab reports for residents of York Region by a team of 4 Public Health Nurses and 1 clerk
2. Surveillance by letter to doctors
3. Data entry to Reportable Disease Information System
4. Providing education packages to clients on request of doctor and/or client
5. Forwarding information to Canadian Blood Services regarding past transfusions or blood donations in Canada
6. Consultation with clients and doctors in relation to surveillance by phone; occasional home visit made

Client Services

7. Phone counseling/consultation with people affected by Hepatitis C (clients, doctors, workplaces, long-term care facilities and family/friends)
8. Promotion of free Hepatitis A & B vaccine to people with Hepatitis C and provision of such to doctors for clients
9. Free counseling, assessment of risk factors and testing for Hepatitis C when needed through Sexual Health and Sexually Transmitted Infection clinics

Health Promotion in Community

10. Education Forums for doctors in York Region.
11. Responding to community requests - workshops requested and offered to workplaces in 3 languages (English, Cantonese and Farsi) - “Blood Borne Pathogens” workshop includes information on Hepatitis C, and often the request is initiated due to an employee or resident who has Hepatitis C – education materials provided upon request
12. Offering needle exchange from the Street Outreach Van and through a local methadone clinic by Public Health staff
13. Promotion of Hepatitis C chapter meetings through regional newspapers on regular basis – raises awareness in the community
14. Education of emergency services workers about Hepatitis C through Designated Officers training offered ongoing by Public Health Nurses
15. Including information about Hepatitis C in the post exposure guidelines
16. Providing education through the Sexual Health Information Line.

Ontario