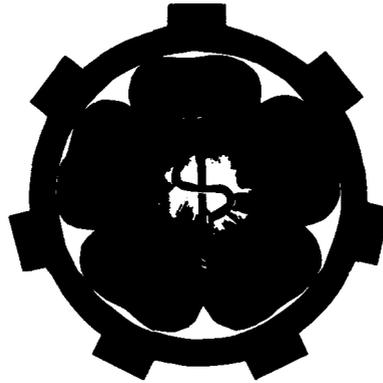


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# ALBERTA OCCUPATIONAL MEDICINE NEWSLETTER

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**EDITORIAL COMMENTS**

Our first issue for 1998 begins with an article by Dr. Judy MacDonald, resident in Community Medicine at the University of Calgary. She discusses the prevention of Hepatitis C (HBC) from a population-based perspective, using a risk assessment and management framework. As she describes, the highest risk groups for this infection are intravenous drug users and recipients of contaminated blood products. Occupationally, the risk of transmission to health care staff from a 'significant' exposure (infectious source patient, percutaneous inoculation) is in the order of 3%. Hospital occupational health protocols for body fluid exposures should include testing of the source patient for HBC. Though there is no effective post-exposure prophylaxis, the rate of transmission of HBC is greater than for HIV, with comparable 'seriousness' of health consequences for both the source patient (most commonly asymptomatic) and health care staff. Whether testing is accomplished by mandatory testing under hospital policy or by informed consent of the source patient remains an issue.

Compensation Board introductory page, and a series of reprinted articles titled "Rash Statements: Skin the Workplace". Because a visitor's URL address provides limited demographic information (Figure 1), we have announced this website sequentially, beginning with bulletins to Alberta physicians and medical associations, followed by a series of announcements through Canadian national medical associations, and most recently listing the website with several commercial search engines and occupational medicine bulletin boards for a more 'international' audience. We hope that the growing interest in the website reflects its relevance and utility. Look for continuing improvements over the upcoming months, and send us your comments or ideas to:

blaikie@acs.ucalgary.ca.

Kenneth Corbet, MD, FRCPC  
 Editor

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**MANAGEMENT OF RISK FOR HEPATITIS C**

Judy MacDonald, BSc, MD\*

**Introduction**

Hepatitis C virus (HCV) is a blood borne pathogen that was definitively

characterized only in 1989, being referred to as non-A, non-B hepatitis for several decades prior to this. It affects the liver primarily, causing mild, often undetected disease initially, that progresses to chronic infection in most cases. HCV infection is the most common cause of chronic hepatitis, and the most common reason for liver transplant. While the prevalence of HCV infection varies worldwide, it is estimated to be about 1% in North America. In Canada, HCV prevalence is estimated at 90,000 to 300,000 cases. The chronic nature of this disease with its high morbidity and mortality, its normally asymptomatic presentation, and its prevalence make HCV an important public health issue.

This article will describe HCV using a risk assessment and management framework. It will briefly discuss the hazard and its associated health effects, outline the exposure pathways, and identify the groups most at risk for HCV infection. Options for management of the risk will be compared, and recommendations for the clinical management of HCV risk will be given.

**Risk Assessment**

- **Hazard Identification**

HCV, a simple RNA virus, is a biological hazard. It has at least six major genotypes worldwide. Within a given HCV-infected individual, many closely related viral subtypes or "quasispecies" exist that allow for an individual to be co-infected with,

and reinfected by, several different subtypes of HCV. The rapid formation of these quasispecies enables the virus to “escape” the immune response, and this may be the mechanism underlying the development of chronic disease.

#### • Health Effects

The symptoms of infection with HCV are often undetectable clinically for up to 20 years, at which time an HCV-infected individual may present with any of icterus, anorexia, nausea, or excessive fatigue. Only about 10% of individuals have any signs or symptoms of disease with the acute infection. Over 90% of individuals initially infected have persistent infection and many of these go on to develop chronic liver disease. The risk of chronic hepatitis C progressing to cirrhosis of the liver is estimated to be about 1% per year (that is, about **20% have cirrhosis at 20 years** from initial infection, 30% at 30 years, etc.). Cirrhosis is a known risk factor for hepatocellular cancer (HCC), and an unknown percentage of those infected with HCV can be expected to also develop HCC.

#### • Exposure Pathways

The major pathway of exposure to HCV is through infected blood. In Canada, injection drug use is the most important risk factor for HCV infection, which is acquired through sharing of contaminated needles and other drug-related equipment. The prevalence of HCV infection in injection drug users ranges from 60 to 90%.

Another risk factor for HCV infection is transfusion of blood components or receipt of blood products prior to 1990. Since April 1990, the Canadian blood supply has been screened for anti-HCV, using increasingly more sensitive and specific enzyme immunoassay tests (EIA), with confirmation of positive results by another EIA test or a very specific recombinant immunoblot assay (RIBA). The risk of a blood product containing HCV now is estimated at 1 in 103,000 units, primarily because of the “window” period between infection with the virus and detection of host antibody to the virus (70 days). The risk of exposure to HCV through receipt of blood components or products is very low, as long as adequate

screening is in place. Other possible routes of exposure to HCV from blood include tattooing, body piercing and acupuncture with contaminated equipment.

There is considerable controversy regarding the significance of other routes of transmission of HCV. Sexual transmission of HCV is plausible but very inefficient, and various studies report rates of transmission in this manner ranging from 0 to 15%. Vertical transmission of HCV from infected mother to infant is also very low, ranging from 0 to 5%, with higher rates in those co-infected with HIV. There is no evidence of HCV infection acquired through breastfeeding. Interestingly, some 20-40% of cases have no identified risk factors for HCV. It is speculated that these “community-acquired” cases may have been exposed through household contact with an HCV-positive person, or may be the result of injection drug use even once in the past.

#### • Risk Factors

The population most at risk for HCV infection is injection drug users (past or current), and these individuals comprise the largest affected group. Persons receiving blood prior to 1990 are also at increased risk, and hemophiliacs as a group have been most vulnerable. Increased HCV risk is experienced by hemodialysis patients secondary to parenteral exposure to contaminated equipment.

Health care workers are at increased risk for acquiring HCV through direct percutaneous exposure to blood. In this group, the risk for HCV infection from needlestick exposure to a known positive HCV source is estimated to be about 3%, intermediate between that of Hepatitis B (30%) and HIV (0.3%).

Various cofactors have been found to augment or accelerate damage to the liver. An increased risk of severe liver disease is associated with Hepatitis B co-infection or consumption of excessive amounts of alcohol. There is a 10-fold increased risk for cirrhosis **in those individuals with HCV who also consume alcohol**. These persons should be advised to remain abstinent from alcohol as a result.

## Risk Management

Risk management involves development of options for controlling a risk, analysis of the options, selection of a combination of options for implementation, and ongoing evaluation and review. A useful approach to the development of options is to consider them under the categories of regulatory, advisory, technological, and economic measures. Possible options **in each of these categories will be outlined, and their feasibility for management of Hepatitis C will be discussed.**

## Option Development, Analysis, and Evaluation

### • Regulatory

Regulatory measures are legislated rules and regulations at the federal, provincial, and municipal levels that are often used **when the hazard demands absolute adherence to safety measures. Hepatitis C is a notifiable disease under the Communicable Diseases Regulations of the Public Health Act of Alberta, 1985. Any case of HCV must be reported to the Medical Officer of Health (MOH) of the local regional health authority by any source (physician, laboratory, etc.) using the prescribed notification form. The MOH has the legislated authority to treat the disease in those already infected, protect those not exposed, break the chain of transmission, and remove the source of infection. To control HCV by reducing or preventing transmission, regulatory options might include the following:**

- **treat all known cases (mandatory requirement),**
- **exclude infected individuals from donation of blood, tissue or organs,**
- **isolate infected individuals,**
- **test all blood components and products before use (mandatory requirement),**
- **trace contacts of an infected individual identified through testing of donated blood.**

Mandatory treatment of HCV would not be efficient because the current treatment results in a sustained response (not necessarily a cure) in less than 20-25% of those treated; the majority of

HCV infection is still untreatable. Legislating exclusion of HCV-infected individuals from donating blood, tissues or organs is a reasonable option but likely to be inefficient in preventing the majority of new cases of HCV which is acquired through injection drug use. Isolation of HCV-infected individuals would be impossible, because of logistics and the prevalence of asymptomatic infection, and unnecessary because of the mode of transmission of HCV. It is important, though, that Hepatitis C remain a notifiable disease for surveillance purposes.

Testing of all blood donations for anti-HCV is currently done by the blood system operator. While it may seem unnecessary to legislate mandatory testing, it is probably prudent to reassure the public, in view of the recent "tainted blood" scandal. Tracing of contacts, as is done with sexually transmitted disease, would not be practical for HCV because of the often prolonged asymptomatic period, and the negative reporting bias in those who acquired the infection through illicit drug activity. Tracing requires a great deal of time because of problems in linking records. While tracing efforts may identify persons who were unaware of their HCV infection, this is not likely to be beneficial for several reasons. The majority of individuals so identified will most likely be drug users and they may not be motivated to change their behaviour. Because of the lack of effective treatment currently for HCV in the majority of cases, there is little benefit to be gained in knowing about HCV infection before symptoms develop. Finally, individual notification is very expensive.

- Advisory

Advisory measures are directed at the risk producer or consumer, or between management agencies. They consist of information, advice and product standards designed either to increase consumer awareness and facilitate informed decision-making, or to exert pressure on risk producers to decrease the risk. There are several ways that practitioners and medical associations might use to inform and advise about the risk for HCV, including:

- conduct a general public awareness campaign,

target specific high risk groups for HCV through active distribution of pamphlets or posters,

advise health practitioners on how to assess the risk for HCV in their patients, and how to counsel and refer patients with HCV or at high risk for acquiring it,

obtain informed consent whenever transfusion of blood or use of blood products is required,

advise health care workers with HCV risk from occupational exposure to use universal precautions, minimize risk of percutaneous exposure by proper needle disposal, and be aware of post exposure procedures at their health facility.

When a public health issue is widespread and affects people unknowingly like HCV does, it is most efficient to mount a public awareness campaign to advise the general population of the risk and what to do if they think they have been exposed. Information aimed specifically at high risk groups for HCV such as injection drug users is also a good option, but the benefits may not be realized in the short-term. It is also important to provide health professionals with information about HCV and guidelines for management at the same time through bulletins and continuing education programs. While specific informed consent for blood transfusions may not be formally required now, it could be considered as a way of providing patients with an opportunity to discuss treatment options more completely with their physicians. All health care workers, including those in dentistry, must be well-informed of and practice universal precautions.

- Technological

Designs or devices that remove the source of the hazard, decrease its release and dispersion, or reduce its absorption are categorized as technological measures. For the prevention of HCV, technological options might include:

- use a vaccine to create host immunity to HCV,
- use immunoglobulin for post-exposure prophylaxis, particularly in occupational settings,
- develop needle exchange programs to provide injection drug

users with clean needles, thus preventing transmission,

- use medical treatment such as alpha-interferon or combination alpha-interferon/ribavirin drug therapies to treat and cure HCV
- use screening methods to identify those infected but asymptomatic, with the intent of providing early treatment to decrease morbidity or mortality,
- transplant livers to limit the impact of the disease.

The development of a vaccine for HCV is a difficult challenge because of genomic variability, the high rate of mutation within hypervariable regions (which produces quasispecies), and the poor humeral response to HCV. Research in this field should be encouraged because this ~~approach~~ has the potential to be very efficient at preventing HCV disease, and immunization is generally accepted by the public. The use of immunoglobulin for passive immunization following exposure to HCV has been found to be ineffective at preventing disease, probably because of the varied genomes and quasispecies characteristic of HCV, and is not recommended for post-exposure prophylaxis. Needle exchange programs have been successfully used as a harm-reduction strategy for HIV in many cities in North America. Since HCV is more prevalent than HIV in the injection drug population, it is reasonable to provide needle exchange as a safe alternative for these users.

Treatment of HCV with effective drugs is currently not a feasible option for most patients. Research to develop new treatment drugs should be supported, and further study into the use of alpha-interferon should continue. Screening of the general population to identify asymptomatic cases of HCV is unlikely to provide sufficient benefit to justify the economic cost to society and the psychological costs to individuals. Because there is no effective treatment available and little that can be done to slow the progression of disease, apart from abstention from alcohol, population-based screening is not recommended in the Hepatitis Consensus Statement prepared by The Canadian Association for Study of the Liver.

Liver transplants are often indicated in individuals with HCV. Unfortunately,

this procedure does not provide a cure since HCV usually recurs in the transplanted liver over time. This option may be reasonable for individuals (assessed on a case by case basis), but is not suitable as a population-based management strategy because of the shortage of donor livers for transplantation.

· Economic

Economic measures include liability insurance or other compensatory plans, levies/taxes/extra charges, and direct financial support or subsidies. The intention is to financially compensate risk consumers for adverse effects, or to provide risk producers with financial incentives to reduce risk. Economic options for the control of HCV could include the following options:

- require adequate liability insurance for those agencies involved in supplying blood components and products,
- establish a no-fault compensation fund, financed by general tax revenues or employers,
- provide subsidies or tax incentives to companies engaged in research drugs and vaccines,

It may be financially prohibitive or even impossible for a blood supply agency to obtain liability insurance against HCV infection in recipients of blood products. Since 1985, the Red Cross was able to obtain only restricted liability insurance because of high costs. Thus, liability insurance is not a viable risk management option because of cost. Compensation could still be paid through a no-fault compensation scheme. Justice Krever recommended that each province and territory establish a statutory no-fault compensation scheme to compensate blood-injured persons promptly and adequately. Such schemes have been used successfully in compensating vaccine-injured persons in many countries, often financed by an excise tax on the price of the vaccine. Financial incentives to companies engaged in research into HCV vaccines or drugs for treatment would be an effective way to support and encourage this research. These incentives might take the form of subsidies or tax breaks provided by government.

### Recommendations for Management of Hepatitis C

HCV is a serious public health issue whose impact on the population has yet to be realized. The risk for HCV is best managed with a combination of regulatory, advisory, technological and economic options:

1. HCV should continue to be a notifiable disease for surveillance purposes. Contact tracing is not recommended, nor is population-based screening.
2. Exclusion of HCV-infected individuals from donation of blood, tissues or organs should be legislated.
3. Any blood supply agency should be legislated to adequately screen potential donors for HCV risk factors and test all blood for anti-HCV, using the best available tests.
4. An HCV public awareness campaign for the general public should be developed, with provision of specific information and guidelines for health professionals. Other high risk groups can be specifically targeted for information and counselling. Health care workers must always use universal precautions, and properly dispose of needles.
5. The implementation of informed consent specifically for blood transfusions should be considered.
6. Continued research into effective drugs and a vaccine for HCV should be supported and encouraged through financial incentives.
7. Needle exchange programs should be implemented or expanded where appropriate.
8. No-fault compensation schemes should be considered for those sustaining blood-related injury now and in the future.

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\*Resident in Community Medicine Residency Training Program, Department of Community Health Sciences, University of Calgary, Calgary, Alberta.

*References available upon request.*

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### Canadian Centre for Occupational Health and Safety (CCOHS) News

#### OSH Answers

*(A New Information Service from CCOHS)*

The Canadian Centre for Occupational Health and Safety (CCOHS) has launched a free occupational health and safety information service on its website, [www.ccohs.ca](http://www.ccohs.ca). The CCOHS Inquiries Service staff have compiled their most frequently asked questions (along with the answers), creating a data base which is both browsable via a cross-referenced Main Headings Index, and searchable, using the provided search engine.

Some of the main headings include: Chemicals & Materials; Ergonomics/Human Factors; Diseases, Disorders and Injuries; Personal Protective Equipment; Canadian H&S Legislation; Information Resources & Referrals. The answers reviewed by this writer were at a basic, or introductory level, and well presented. The chemical profiles would be particularly useful for the health practitioner to share with a concerned patient.

#### Upcoming Courses

• ***Using the Internet to Access Health and Safety Resources***

A one day introductory course includes lecture, demonstration and hands-on exploration, in Hamilton. June 10, September 23 and November 18, 1998. cost: \$195.00

\****Using the Internet for Health and Safety Research and Networking***

A one day opportunity to learn to make best use of search engines and directories, access regulatory information; research reports, chemical hazard documents, network with other H&S professionals, and learn the fundamentals of presenting their own H&S information on the Web. June 11, September 24 and November 19, 1998. Cost \$195.00 or \$340.00 for both courses

*For more information contact CCOHS' Inquiries Service at 1-800-263-8466 or e-mail [inquiries@ccohs.ca](mailto:inquiries@ccohs.ca). or just surf the site at [www.ccohs.ca](http://www.ccohs.ca).*

## SECOND NORTH AMERICAN OCCUPATIONAL SAFETY AND HEALTH WEEK

Some 820,000 accidents and more than 700 deaths. Some \$10 billion in direct and indirect costs. That is the total annual cost of industrial accidents and occupational illness in Canada. Progress has been made in recent years, but the situation is still unacceptable.

As a result of signing the North American Agreement on Labour Cooperation (NAALC) -an agreement that complements the NAFTA (the North America Free Trade Agreement)-Canada, the United States and Mexico have joined forces to organize The North American Occupational Safety and Health Week in order to make their respective populations aware of the importance of preventing industrial accidents and occupational illness.

In Canada, the event replaced Canadian Occupational Health and Safety Week, which has been held in this country for the past ten years.

The theme for the second North American Occupational Safety and Health Week, May 18 to 24, 1998 is "Occupational Safety and Health: Partners Together in Safety". The partner countries chose this theme with an objective "To focus the attention of employers, employees, the general public and all partners in occupational safety and health on the importance of preventing injury and illness in the workplace". Canada will be focusing its campaign on "Young Workers", 15 to 29 years old.

In Canada, the Labour Program at Human Resources Development Canada (HRDC) is responsible for promoting the week nationally and has joined forces in the task with its main occupational safety and health partners, the Canadian Society of Safety Engineering (CSSE) and the Canadian Centre for Occupational Health and Safety (CCOHS). These organizations have prepared promotional and other material to help businesses, unions, governments and other partners mark the event.

On average, a person is injured on the job every 9 seconds, and 1 worker in 15 is liable to have an accident in the coming year. Even more disturbing is that one third of compensable time-loss

accidents involve young workers between the ages of 15 and 29.

All of us-employees, employers, union leaders and politicians-should take advantage of North American Occupational Safety and Health Week

to take a renewed interest in this critical issue.

*(Adapted from Canadian Centre for Occupational Health & Safety News Release March 7 1998)*

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### SOUTHERN ALBERTA OCCUPATIONAL MEDICINE PAGE

<http://www.med.ucalgary.ca/oemweb/>

Figure 1

File Requests per Month  
(April 97 - March 98)

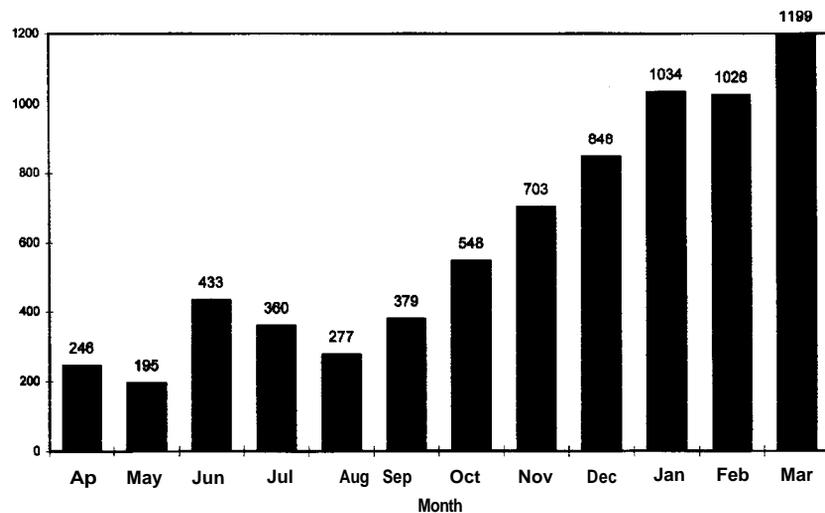
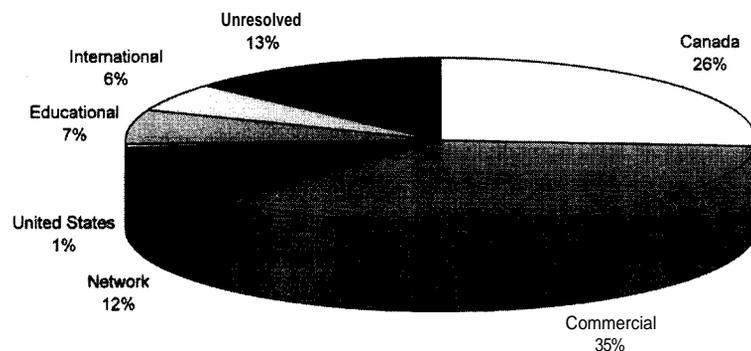


Figure 2

Transfer Requests by Client Domain  
(April 97 - March 98)



## UPCOMING COURSE

### **Principles of Occupational Health** (Occupational Health I - MDSC 645.07) Department of Community Health Sciences - University of Calgary

Instructor: Dr. Ken Corbet  
Dates: Fall Session 1998 - Sept. - Dec. 98  
Time: Wednesday evenings 1900 - 2130 hours  
Place: Room G383 Heritage Medical Research Building

This graduate level course is intended for those new to the practice of occupational health, including physicians, nurses, other health-related practitioners, and professionals in engineering, management or law. It will link three conceptual models: the hazard control model (identification, evaluation, control), the medical model (absorption, effect, and disease), and the social model (impairment, disability, and handicap).

In this course students will :

gain an appreciation of the inter-disciplinary nature of occupational health;

analyze basic problems relating to occupational hygiene, ergonomics, toxicology, medicine, rehabilitation, and occupational health programs;

discuss issues in occupational health such as fitness to work, ethics and confidentiality, reproductive hazards, carcinogenesis, and drug testing.

This course may be taken for university credit or as an audit through the Department of Community Health Sciences. For further information call 220-3362 or E-mail [blaikie@acs.ucalgary.ca](mailto:blaikie@acs.ucalgary.ca)

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## UPCOMING CONFERENCES

### CANADA:

- **Mental Health in the Work Environment: Occupational and Environmental Medical Association of Canada Sixteenth Annual Scientific Conference and Postgraduate Workshops**  
October 5-7, 1998  
Quebec City, PQ  
Contact:  
Mrs. Jocelyne Lessard at  
Phone: (514) 344-1662 (AMTQ)  
Mrs. Lise Jamieson at  
Phone: (519) 439-7970 (OEMAC)  
E-mail: [oemac@esc.net](mailto:oemac@esc.net)
- **Rural Health and Safety in a Changing World**  
(Hosted by the Centre for Agricultural Medicine, University of Saskatchewan)  
October 18-22, 1998  
Saskatoon, Saskatchewan  
Contact:  
Symposium Office  
Centre for Agricultural Medicine  
103 Hospital Drive  
P.O. Box 120, Royal University Hospital  
Saskatoon, Saskatchewan, S7N 0W8  
Phone: (306) 966-7888  
Fax: (306) 966-8378  
E-mail: [symposium.98@usask.ca](mailto:symposium.98@usask.ca)  
Web: <http://www.usask.ca/medicine/agmedicine/symp98.html>

*With several companion conferences including:*

- *1998 Canadian Farm Safety and Health Conference, Canadian Coalition for Agricultural Safety and Rural Health*
- *Pre-conference Workshop on Industrial Hygiene and Control Technologies*