

New Epidemiologic Data on Hepatitis B and C

Based on a presentation by Ian Williams, PhD, MS

Presentation Summary

Hepatitis B virus (HBV) and hepatitis C virus (HCV) are major causes of both acute and chronic hepatitis and chronic liver disease in the United States. The incidence of hepatitis B has decreased dramatically in the past decade, in large part because of nationwide efforts to eliminate HBV transmission. The National Health and Nutrition Evaluation Survey (NHANES) administered by the Centers for Disease Control and Prevention (CDC) conservatively estimates that 3.9 million people in the United States are positive for antibodies to HCV (anti-HCV). The incidence of new cases of hepatitis C has declined since the

introduction of surrogate testing of blood donors and the use of first- and second-generation anti-HCV tests. However, the overall prevalence of HCV remains high. Seventy percent of patients with acute hepatitis C will develop chronic hepatitis, most of whom will become persistently infected. Data from the CDC suggest that the coming years will see a large increase in HCV-associated mortality and chronic liver disease reflective of the typical 20- to 30-year period from initial infection to development of chronic liver disease.

In addition to the published references cited herein, this report is based on unpublished data as of November 1996 from the CDC.

Hepatitis B and C viruses are the major causes of both acute and chronic hepatitis and chronic liver disease in the United States today. Chronic viral hepatitis is the principal cause of chronic liver disease, cirrhosis, and hepatocellular carcinoma worldwide and is the chief reason for liver transplantation. The following discussion, based on a presentation by Dr. Ian Williams from the Centers for Disease Control and Prevention

(CDC), focuses on current hepatitis B and C epidemiologic data.

... HEPATITIS B VIRUS ...

Incidence and Disease Prevention

Although hepatitis B vaccination became available in 1981, the incidence of acute hepatitis B continued to rise, peaking in 1985 with about 250,000 new cases reported in the United States that year. Fortunately,

the trend has reversed, and by 1995 new cases had decreased to approximately 100,000 to 150,000 per year. This dramatic decline is due to nationwide efforts, established in 1990, to eliminate hepatitis B virus (HBV) transmission. These efforts have included: (1) routine vaccination of all infants, (2) screening of pregnant women, and (3) use of hepatitis B immune globulin injection at birth in addition to HBV vaccine for infants born to carrier mothers. Certain high-risk groups have been targeted for vaccination, such as children who were born in Asian-Pacific islands, Alaskan Inuit children, and adolescents engaged in sexual activity.¹ More recently, vaccination has been advocated for all children by age 12.

Additionally, changes such as safer sex practices in general and safer needle practices in the highest-risk group, intravenous recreational drug users, have probably contributed to the decrease in the incidence of hepatitis B.¹

Risk Factors

According to data from the CDC, risk factors that accounted for the majority of reported cases of hepatitis B in 1995 were heterosexual contact with infected individuals (33%), injection drug use (17%), and homosexual activities (16%). In Dr. Williams' presentation of epidemiologic data on hepatitis, he pointed out that recent analysis has been conducted on patients who have been previously defined as having "unknown" risk factors. Historically, as much as 30% to 40% of reported cases of acute hepatitis B in the United States occurred in patients with no known risk factors within the past 6 months (the typical maximum incubation period for hepatitis B). When reported cases in 1995 were examined in detail for risk factors that patients may have been exposed to over the course of their lives, only 3% were associated with an unknown risk factor, while the rest of the cases that were previously reported

as having unknown risk factors actually had traditional risk factors for hepatitis B including injection drug use, multiple sexual partners, and homosexual activity that occurred longer than 6 months ago. This suggests that patients previously categorized as having unknown risk factors may have acquired hepatitis B infection through these traditional routes but are not admitting having had such exposure when they are interviewed.

... HEPATITIS C VIRUS ...

Incidence and Etiology

The CDC's National Health and Nutrition Evaluation Survey (NHANES) of 1988 to 1994 estimates that 1.8% of the US population, or 3.9 million people, are positive for antibodies to hepatitis C virus (HCV). Non-Hispanic blacks and Mexican-Americans have even higher rates than the general population. This estimate of 3.9 million infected people may be conservative, because high-risk subgroups such as prisoners and homeless persons were not included. Seventy percent of people with acute hepatitis C will develop chronic hepatitis, and more than 85% of these will become persistently infected.

Two studies, one conducted in Birmingham, Alabama, and one in Harlem, New York, evaluated the cause of chronic liver disease and found that hepatitis C or hepatitis C and alcohol played a role in the etiology of approximately 40% to 60% of cases of chronic liver disease.

Disease Prevalence

It is predicted that the number of deaths attributable to HCV infections may rise from 12,000 in 1990 to 38,000 in 2010. The NHANES study suggests that the prevalence of hepatitis C starts to rise between the ages of 20 and 30 years, peaking at age 50, at which age it sharply declines. The average prevalence of hepatitis C in the 30- to 50-year age group in this study was 3.5%,

compared with 1.1% in the 50- to 70-year age group. The higher prevalence in the 30- to 50-year age group may be a result of high-risk behaviors that occurred many years earlier. Since it takes approximately 20 to 30 years for chronic liver disease to develop from the time of HCV infection, a large increase in HCV-related chronic liver disease may be observed in the coming years.

Risk Factors

With the increasing disease burden, it becomes crucial to define those at highest risk for hepatitis C. Dr. Williams underscored the importance of CDC data in his comment "the most frequently reported risk factor associated with acute hepatitis C is injection drug use, which accounted for 53% of all cases in 1994 and 1995." Other risk factors, which account for 25% of all cases in 1994 and 1995, include noninjection drug use, incarceration, or having had a sexually transmitted disease. Other risk factors include accidental injuries with needles (5%), multiple sexual partners (5%), sexual and household exposure to anti-HCV-positive individuals (ie, individuals who test positive for anti-HCV) [5%], blood transfusions (3%), unknown causes (3%), and hemodialysis (1%).¹

One cross-sectional study (1983 to 1988) in Baltimore, Maryland, showed that the prevalence of hepatitis C is much higher than that of either HBV or human immunodeficiency virus infection and that 80% to 90% of injection drug users become seropositive for hepatitis C within 6 to 12 months of their first injection. According to Dr. Williams, these results suggest that the prevalence of HCV infection among injection drug users is high and that they acquire it very rapidly, indicating that a history of casual injection drug use (one or two injections) may carry a substantial risk for hepatitis C.

Medical Cost and Disease Burden Associated With Acute and Chronic Hepatitis B and C

To determine the public health impact of hepatitis, it is important to estimate the disease burden and associated costs in the United States. As Table 1 shows, the costs of medical treatment and the costs associated with loss of work due to acute and chronic hepatitis B and C are staggering, especially for chronic hepatitis C—the combined annual costs of which were estimated to be \$512 million.

Prevention and Control of HCV Infection

The number of new cases of acute hepatitis C is declining and is currently estimated to be approximately 35,000 a year. This decline, which began in the late 1980s, is due to surrogate testing of blood donors and, since 1990, the use of first- and second-generation anti-HCV tests.

Despite the decreasing incidence, prevalence of hepatitis C remains high. There are approximately 4 million people with hepatitis C in the

Table 1. Estimated Disease Burden and Costs of Hepatitis B and Hepatitis C in the United States, 1992

	Hepatitis B*	Hepatitis C†
Acute disease (cases)	125,300	33,200
Medical costs	\$213 million	\$39 million
Work-loss costs	\$189 million	\$61 million
Chronic disease (deaths)	4900	10,000
Medical costs	\$60 million	\$512 million‡
Work-loss costs	\$196 million	
Total annual costs	\$658 million	\$612 million

*Source: Margolis HS, Coleman PJ, Brown RE, et al. Prevention of hepatitis B virus transmission by immunization: An economic analysis of current recommendations. *JAMA* 1995;274:1201-1208.

†Source: Data on file, Centers for Disease Control and Prevention.

‡\$512 million is the combined cost of medical treatment and work loss.

United States. To effectively address this problem, appropriately designed programs need to be developed and implemented to prevent and control hepatitis. The specific aims of these programs should focus on reducing the transmission of disease in groups most at risk for infection, and on providing a means of early detection of chronic HCV infection.

Knowledge of the associated risk groups is necessary for reducing transmission, and early detection requires an understanding of the epidemiology and natural history of the disease process. Little has been done in terms of prevention programs specifically targeting hepatitis C, so the first step is to educate the public, including health-care providers. The effectiveness of a widespread, comprehensive public education program depends on addressing all risk factors associated with HCV infection, especially injection drug use and blood transfusion prior to 1990 (when the first-generation anti-HCV test became available). In addition, the program should address the consequences of undetected HCV infection and the importance of early screening to identify individuals with chronic infection. As Dr. Williams pointed out, medical treatment and counseling will be more effective if individuals with chronic hepatitis infection are identified early in the course of their disease. A public education program should relay this message and provide education and resources for individuals who may have chronic HCV infection as well as for healthcare providers.

Unfortunately, several factors may limit the implementation and success of such a public education program. False-positive and false-negative test results can limit identification of individuals with chronic hepatitis.² Inaccurate diagnoses can also occur because of fluctuating or normal periods of alanine aminotransferase values

during infection. Another limiting factor is the effectiveness of current therapy for chronic hepatitis. Currently, only 10% to 20% of patients treated for chronic hepatitis have a sustained response.

Educational efforts to promote early detection of chronic hepatitis C may also be hampered by limited information regarding the natural course of the disease. Furthermore, reducing transmission in the group most at risk for hepatitis C, injection drug users, is a formidable task because this segment of the population is difficult to reach.

Conclusion

Although much has been learned about the risk factors associated with chronic viral hepatitis, there is still more to learn about disease transmission, such as the risks of sexual, household, and perinatal (including breast-feeding) transmission. Studies are currently being developed to further evaluate disease transmission and high-risk situations. Screening, early detection, and public education programs are recommended. Although the question of who will pay for such programs has not been resolved, the high medical costs associated with hepatitis C make these programs worthwhile. With 4 million people infected with hepatitis C in the United States today, the burden of this disease will probably fall on managed care organizations to pay for the treatment of chronic liver disease, the incidence of which may increase threefold to fivefold over the next 10 to 30 years.

... REFERENCES ...

1. Alter MJ, Mast EE. The epidemiology of viral hepatitis in the United States. *Gastroenterol Clin North Am* 1994;23:437-455
2. Alter MJ. Epidemiology of hepatitis C in the West. *Sem Liv Dis* 1995;15:5-14.