

## Short Communication

# Prevalence of infectious diseases among Mongolian blood donors

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### Abstract

**Objectives:** This study estimates the prevalence of screened infections: human immunodeficiency (HIV), hepatitis B (HBV) virus, hepatitis C (HCV) virus, brucellosis, and syphilis among Mongolian blood donors.

**Methods:** This report is based on routine data collected from simple questionnaires completed by a sample of consecutive donors visiting the Blood Center between August 2004 and February 2005.

**Results:** Seropositivity rates were as follows: HIV 0%, HBsAg 8.1% (n=185), anti-HCV 8.7% (n=195), brucellosis 3.3% (n=75), and syphilis 2% (n=44). HBsAg seropositivity was concentrated among young donors less than 20 years of age ( $P<0.01$ ) while anti-HCV seropositivity tended to increase significantly with age.

**Conclusion:** The prevalence of HBV and HCV among Mongolian donors is very high and appears to be differentially distributed by age. The data suggests further studies are warranted to identify key risk factors for blood-borne infections and to develop population-specific interventions to interrupt transmission.

**Key Words:** Blood donors, HBsAg, Anti-HCV, Prevalence, Mongolia.

*J Infect Developing Countries* 2008; 2(1):73-75.

Received 2 August 2007 - Accepted 21 January 2008.

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### Introduction

Hepatitis B (HBV) and hepatitis C (HCV) are known public health problems in Mongolia, yet no official data exists for prevalence of hepatitis or other sexually transmitted diseases. High rates of HBV (10% - 28.7%) and HCV (16% - 48%) were reported in studies among different population groups [1,2]. Like other former socialist countries, Mongolia is transitioning to a democratic government with a market economy. This transformation typically leads to severe economic hardship, social dislocation, uncontrolled commercial sex and a dramatic reduction of health care expenditures [3,4,]. Poor economic conditions also place some persons at risk due to a shortage of disposable needles, syringes and medical equipment resulting in unsafe and/or multi-use of these products. Because hepatitis infection is often a precursor to HIV transmission and other blood-borne pathogens, more data are needed to determine the burden of these diseases both in the general population and in specific subgroups.

The purpose of this study was to estimate the prevalence of serological markers of HIV, HBV, HCV, brucellosis and syphilis among a convenience sample that would allow us to study the association of these blood-borne pathogen markers with other demographic characteristics.

### Materials and Methods

This study was conducted at the Blood Center of the Mongolian Ministry of Health in Ulaanbaatar, the capital city. The Blood Center is the leading specialized provider of blood transfusion services throughout the country and manages 75% of the national blood supply. In Ulaanbaatar alone, the Blood center tests over 12,000 donations each year. Since 1994, paid whole-blood donations for clinic use were stopped and all citizens between the ages of 18 and 50 years, who meet the donor eligibility criteria set by the Ministry of Health, are encouraged to donate voluntarily without payment [5]. Two groups of donors exist in Mongolia: repeat donors and altruistic volunteers recruited from

universities, factories or other organizations during donation campaigns.

This report is based on data collected among consecutive donors visiting the Blood Center between August 2004 and February 2005. A total of 2,250 donors completed a simple questionnaire to capture demographic characteristics. All blood donations were routinely screened for five infectious diseases: HBV surface antigen (hepatitis B) and antibodies against HCV (hepatitis C), HIV (human immunodeficiency virus), *Treponema pallidum* (syphilis), and *Brucella melintensis* (brucellosis) using standard laboratory tests (Beijing Wantai Biological Pharmacy Enterprise CO., LTD). Questionnaire data and screening test results were entered into a Microsoft® Access database and analyzed using SAS (SAS Institute, Cary, NC). We used descriptive data analysis methods, including computing frequencies and percentages for demographic characteristics of blood donors. Prevalence ratios with 95% confidence intervals were calculated using chi-square tests to assess the association between the seroprevalence of infection and demographic characteristics.

**Results**

Among 2,250 donors, seropositivity rates were as follows: HIV 0% (n=0), HBsAg 8.1% (n=185), anti-HCV 8.7% (n=195), brucellosis 3.3% (n=75), and syphilis 2% (n=44). Hepatitis B and C co-infection was present in 15 (0.6 %) donors.

A total of 832 (37%) donors were male; 1,930 (91%) lived in the Capital City; 1,220 (55%) were single; 41% were married; 1,614 (74%) had high school and 398 (18%) had some college education. The participants were young, with a mean age of 25 years. Men were about one and a half times as likely to be infected with HBV as women; no association was noted between gender and HCV. Females were more likely to test positive for syphilis and brucellosis, but these differences did not reach statistical significance. Donors over 40 years had the highest rate of brucellosis (5.6%) and donors in the 30 to 39 years age group had the highest rate of syphilis (4%). HBsAg seropositivity was concentrated among young donors less than 20 years of age (P<0.01) while anti-HCV seropositivity tended to increase significantly with age.

HBsAg was more often detected in single donors whereas anti-HCV, syphilis and brucellosis were more often in married donors. Higher education level was associated with anti-HCV, syphilis and brucellosis positive donors but the opposite was true for HBsAg positive donors (Table 1).

**Discussion**

The endemicity of viral hepatitis in Mongolia is thought to be among the highest in the world, and the impact of chronic hepatitis remains a major health problem for the country. At present, incidence rates of liver cirrhosis and hepatocellular

**Table 1.** Prevalence of infections and prevalence ratio (95% c.i.) by demographic characteristics.

Infections Characteristics	HBsAg+		Anti-HCV+		Syphilis+		Brucellosis+	
	%	Prevalence Ratio 95% CI	%	Prevalence Ratio 95% CI	%	Prevalence Ratio 95% CI	%	Prevalence Ratio 95% CI
Age		0.69 (0.57-0.83)		1.34 (1.16-1.56)		1.24 (0.91-1.67)		1.26 (1.01-1.59)
18-19	11.8		5.7		1.1		2.7	
20-29	7.6		8.2		2.0		3.1	
30-39	6.2		9.8		4.0		3.1	
40-49	4.0		13.3		1.6		5.6	
50+	6.2		18.7		0		6.2	
Sex								
Male	11.0	1.87 (1.37-2.55)	8.7	1.01 (0.74-1.38)	1.5	0.64 (0.33-1.25)	2.6	0.67 (0.40-1.12)
Female	6.2		8.5		2.3		3.8	
Education								
=<High school	8.6		8.1		0.5		3.1	
College	5.5	0.62 (0.38-1.00)	11.3	1.45 (1.0-2.09)	2.0	1.06 (0.45-2.41)	4.0	1.30 (0.71-2.35)
Marital status								
Married	6.2		11.1		2.2		3.4	
Single	9.3	1.54 (1.09-2.18)	6.4	0.55 (0.40-0.75)	1.4	0.62 (0.31-1.25)	3.0	0.85 (0.51-1.43)
Reside								
Not in the Capital City	11.9	1.60 (1.00-2.42)	8.8	1.16 (0.72-1.88)	2.6	1.32 (0.58-3.30)	2.1	0.66 (0.24-1.78)
In the Capital City	7.4		7.6		2.0		3.1	

carcinoma (HCC) as sequels of chronic hepatitis infections are very high and show a tendency to continue to rise. The number one cancer in the country is primary liver cancer, with an annual incidence of 1,267 (52 per 100,000) [6]. Over 35% of newly registered cancer cases were HCC between 2000-2005 and 33.5% of patients with HCC were positive for HBsAg and 45.2% for anti-HCV [7]. Our report found that the prevalence of infectious diseases (specifically HBV and HCV) among donors found is very high compared to that of other countries [8], but lower than prevalences cited in other published reports specific to various Mongolian subgroups [1,2]. A 29% HBsAg positivity and 48% anti-HCV positivity were reported among 150 outpatients at two hospitals in Ulaanbaatar [1]. HBV and HCV rates similar to rates in our study were reported by Tsatsralt-Od *et al.* (7.4% HBsAg and 10.7% anti-HCV among 403 blood donors at the same center) [9]. They evaluated the screening tests used at the Blood Center and indicated a proportion of hepatitis viremic blood donors were missed with the present screening test. As of our study, we used results of the currently used screening tests at the center and there was no opportunity to evaluate the sensitivity of the screening tests. However 30% of the anti-HCV positive donors and 11% of HBsAg positive donors in our study reported that they donated in the past, which raises concern that infected blood products are entering the national supply. Although no cases of transfusion-associated hepatitis infections were reported to the Blood Center, such cases may simply be undetected or unreported. Therefore, we support the recommendation by Tsatsralt-Od *et al.* to improve screening tests with improved sensitivity, to reduce residual risks of transfusion transmitted hepatitis infections in Mongolia.

In our study, young men were more likely to be infected with HBsAg than their female counterparts. This age- and gender-specific association with HBsAg might be explained by vertical or horizontal transmission of HBV during childhood, or other more recent risk factors which need to be investigated. Differences in age and gender specific rates of hepatitis infections suggest different transmission routes for HBV and HCV in Mongolia. Observed different infection

rates associated with education and marital status are most likely due to age differences.

The good news is there were no cases of HIV among Mongolian donors in this sample. However, the high prevalence of hepatitis infections and STDs in Mongolia serves as a sentinel warning for public health professionals. The data suggests further studies are warranted to identify key risk factors for blood-borne infections and to develop population-specific interventions to interrupt transmission. Such programs have the potential to avert an HIV epidemic entirely in Mongolia, and reduce the overall burden on an already fragile health care system.

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**Conflict of interest:** No conflict of interest is declared.