

General review

# HIV, HCV, HBV and syphilis rate of positive donations among blood donations in Mali: Lower rates among volunteer blood donors

*Fréquence des infections par le virus de l'immunodéficience humaine, le virus de l'hépatite C, le virus de l'hépatite B et la syphilis dans les dons de sang au Mali : une incitation au recrutement de donneurs volontaires et bénévoles*

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## Abstract

Good data on background seroprevalence of major transfusion transmitted infections is lacking in Mali. We gathered data on the rate of positive donations of human immunodeficiency virus (HIV), hepatitis C virus (HCV), hepatitis B virus (HBV) and syphilis among blood donations in Mali for calendar year 2007. Donations with repeatedly reactive results on screening enzyme immunoassay (EIA) were considered to be seropositive. Rate of positive donations per blood unit collected was 2.6% for HIV, 3.3% for HCV, 13.9% for hepatitis B surface antigen (HBsAg) and 0.3% for syphilis. For HIV, HBsAg and syphilis, rate of positive donations was significantly ( $p < 0.001$ ) higher among donations from replacement donors than those from volunteer donors, while HCV rate of positive donations was similar in the two groups. Rate of positive donations was also significantly ( $p < 0.0001$ ) lower in blood units from regular than from first-time donors. These data reinforce WHO recommendations for increasing the number of regular, volunteer blood donors in Africa.

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**Keywords:** Transfusion safety; Blood-borne agents; Blood donors; HIV; HCV; HBV; Syphilis

## Résumé

La fréquence des agents infectieux transfusionnels majeurs a été déterminée au cours de l'année 2007 pour tous les dons de sang effectués au Centre national de transfusion sanguine du Mali. Les prévalences élevées de ces agents (2,6 % pour le virus de l'immunodéficience humaine, 3,3 % pour le virus de l'hépatite C, 13,9 % pour le virus de l'hépatite B [antigène HBs] et 0,3 % pour la syphilis) dans les dons de sang, surtout dans ceux effectués par des donneurs de remplacement, justifient une politique de sécurisation basée notamment sur le recrutement de donneurs volontaires et bénévoles, qui ont un plus faible risque de transmission des agents transmissibles par le sang.

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**Mots clés :** Sécurité transfusionnelle ; Agents transmissibles par le sang ; Donneurs de sang ; VIH ; VHC ; VHB

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While blood transfusion is a crucial medical intervention in Africa because of anemia due to malaria, peripartum haemorrhage and trauma, blood transfusion in Africa carries a particularly high risk of transfusion-transmitted infections

(TTIs) [1]. Systematic testing of donated blood for human immunodeficiency virus (HIV), hepatitis C virus (HCV), hepatitis B virus (HBV) and syphilis has been recommended in all blood donations in Africa for a number of years [2]. Nonetheless, the high prevalence of these infections among the general population of Mali and therefore among blood donors leads us to believe that the residual risk of TTIs must be high. Estimates of residual risk, which require data on the incidence

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of these infections among blood donors, need to be performed more widely in Africa in order to guide policy decisions. However, a first step in limiting TTIs is to determine the prevalence of the principal transfusion transmitted infections among different types of blood donations in each country.

One of the missions of the National Centre for Blood Transfusion (CNTS) of Mali, which is located in the capital, Bamako, is to ensure that blood transfusions throughout the country are safe from an immunologic and infectious point of view. The CNTS is responsible for the collection, processing and distribution of blood products, and it collects approximately 25,000 units of blood and distributes approximately 17,000 units. We now present the results of a cross-sectional study aimed at determining reliable rate of positive donations of HIV, HCV, HBV and *T. pallidum* in all of the units of blood collected by the CNTS of Mali during a 12-month period from January through December 2007.

## 1. Methods

### 1.1. Study design and population

Blood donors at the CNTS of Mali are comprised of:

- voluntary donors who donate blood for the community, not for their parent or relative, and consisting of new donors and regular donors (those who have donated at least three times previously in their life);
- replacement donors, namely those who give blood designated for a member of their family, or for medical reasons, or at the time of enlistment into the military.

First-time versus repetitive donor status was defined according to whether the donor presented a blood donor card.

Blood collection is done either at a fixed site at the headquarters of the CNTS or at mobile collections organized within the city of Bamako. The current study includes all blood donations given during calendar year 2007 by individuals who gave their consent and to satisfy the current national blood donation criteria, namely: aged between 18 and 60 years, body weight above 55 kg, and good physical and mental health. Excluded from donation were: persons with chronic illnesses, women currently breast-feeding or menstruating, vaccination within the three weeks before donation and persons at risk of sexually transmitted diseases. Screening of donors is done by physicians at the blood centre. Due to the lack of a database containing demographic data for individual

donors, it was not possible to calculate rate of positive donations by sex and age.

### 1.2. Infectious disease testing

Testing was performed on blood tubes taken after each donation, and consisted of the measurement of antibodies for HIV-1 and HIV-2 (Genscreen VIH1/2 version 2, BioRad, France), HCV (Murex, Abbott, France), hepatitis B surface antigen (HBsAg) (Monolisa AgHBS plus, BioRad, France) and *T. pallidum* (VDRL). All initial positive results were confirmed by performing of a second test using the same assay on a blood sample from a second phlebotomy. Confirmatory or supplemental testing, such as western blot for HIV, was not performed since such testing is not practiced in Africa.

### 1.3. Statistical analysis

Data analysis was performed using EpiInfo software (vers. 6.04, Centres for Disease Control, Atlanta, Georgia). All analyses were done using the denominator of blood units rather than blood donors. Differences between rate of positive donations values were tested with the Chi Square test with a level of significance set at  $p < 0.05$ .

## 2. Results

There were a total of 25,543 donations at the CNTS during calendar year 2007, including 17,449 (68%) from replacement donors and 8094 (32%) from voluntary donors. The majority (22,153 or 87%) of donations were obtained at the fixed site at CNTS headquarters, while remaining 3390 (13%) at mobile collections sites. Age distribution was as follows: 39% of blood donations from donors aged between 18 and 25, 36% between 26 and 35, 17% between 36 and 45 and 8% between 46 and 60. The positive rate of the four TTIs in blood units collected in 2007 was as follows: 660 (2.6%) positive for HIV; 831 (3.3%) positive for HCV; 3548 (13.9%) positive for HBsAg and 84 (0.3%) positive for syphilis. Table 1 shows the positive rate of these four TTIs according to replacement versus voluntary donor status. Positive rate of TTI was significantly higher in blood units collected from replacement versus volunteer donors for the following three agents: HIV, HBsAg and syphilis (all  $p < 0.001$ ), but not for HCV which had approximately equal rate of positive donations for both two types of donations.

Table 2 shows the positive rates of the four TTIs among blood units donated by volunteer donors according to whether

Table 1  
Seroprevalence of four TTIs according to donor status.

Type of donor donations	No. (%) of HIV+ donations	No. (%) of HCV+ donations	No. (%) of HBsAg+ donations	No. (%) of syphilis+ donations
Replacement donors ( $n = 17,449$ )	550 (3.2)*	583 (3.3)	2,521 (14.4)*	74 (0.4)*
Volunteer donors ( $n = 8,094$ )	110 (1.4)	248 (3.1)	1,027 (12.7)	10 (0.1)
Total ( $n = 25,543$ )	660 (2.6)	831 (3.3)	3,548 (13.9)	84 (0.3)

\*  $p < 0.001$ .

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