

## HEPATITIS B SCREENING IN PREGNANT WOMEN IN THE AUTONOMOUS PROVINCE OF VOJVODINA, SERBIA

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**Abstract** - The principal screening test for maternal infection is the serologic identification test for the hepatitis B surface antigen (HBsAg). Data of HBsAg testing surveillance from all public and private laboratories in the Autonomous Province of Vojvodina, Serbia, were collected. There were differences in the inclusion of pregnant women for HBsAg testing between the different counties in the province, ranging from 9% to 68% in Zapadnobački county and Severnobački county, respectively. Preventing perinatal transmission should be an important element in any national strategy for the control hepatitis B infection.

**Key words:** Hepatitis B, pregnant women, HBsAg screening.

### INTRODUCTION

Two billion people have been exposed to the hepatitis B virus (HBV), 5 million cases of acute hepatitis B occur annually, and over 350 million people have a chronic infection. In total, hepatitis B results in 500,000-1.2 million deaths annually (Lavanchy, 2005), the virus causing 60-80% of the world's hepatocellular carcinoma. The risk is 25-35 times higher among those with chronic HBV infection (Wands, 2004) causing 300,000-500,000 deaths each year (Lavanchy, 2005). Ninety percent of infants infected during the first year of life and 30-50% of children infected between the ages of 1 and 4 develop chronic hepatitis B (WHO, 2008).

The annual incidence of reported hepatitis B in Europe varies from <1 to 15/100,000, with the majority of countries reporting <5/100,000. Case definitions and classifications can play a role in this, as well

as inclusion criteria of chronic cases into the data (ECDC, 2010). The prevalence of positive HBsAg tests in the general population of Europe varies by country from 0.1% to 7% (ECDC, 2010).

Serbia is classified as a low prevalence country for hepatitis B virus (HBV) infection (Serbian Institute for Public Health, 2010). Vaccination is recommended for risk groups and children at birth (Regulation on the Method of Immunization and Drugs, 2006). The basic screening test for maternal infection is the serologic identification test of the hepatitis B surface antigen (HBsAg). Infection occurring during pregnancy, especially prior to delivery, is the main contributor to mother-to-child transmission. Screening for HBV infection in pregnant women could substantially reduce perinatal transmission and the subsequent development of chronic HBV infection, and it is obligatory in our country.

## MATERIALS AND METHODS

The data on HBsAg testing were obtained from the surveillance of HBsAg testing in all public and private laboratories in the Autonomous Province of Vojvodina, Serbia, during the period 2007-2010. To estimate the frequency of pregnant women tested, the number of live newborns was used as denominator.

## RESULTS AND DISCUSSION

In women who are seropositive for both HBsAg and HBeAg, vertical transmission is approximately 90%. In patients with acute hepatitis B vertical transmission occurs in up to 10% of neonates when infection occurs in the first trimester, and in 80-90% of neonates when acute infection occurs in the third trimester (ACOG, 2007). Chronic infection occurs in about 90% of infected infants, 30% of infected children aged <5 years, and 2%-6% of adults. Among persons with chronic HBV infection, the risk of death from cirrhosis or hepatocellular carcinoma is 15%-25% (Workowski et al., 2006). HBV infection does not appear to cause birth defects, but there appears to be a higher incidence of low birth weight among infants born to mothers with acute infection during pregnancy (Shepard, 1998). In one small study, acute maternal hepatitis (type B or non-type B) had no effect on the incidence of congenital malformations, stillbirths, abortions, or intrauterine malnutrition. However, acute hepatitis did increase the incidence of prematurity (Hieber et al., 1977). The risk of fetal hepatitis B infection through amniocentesis is low. However, knowledge of the maternal hepatitis B antigen status is valuable in the counseling of risks associated with amniocentesis.

Hepatitis B virus (HBV) infection in a pregnant woman poses a serious risk to her infant at birth. Without postexposure immunoprophylaxis, approximately 40% of infants born to HBV-infected mothers in the United States will develop chronic HBV infection, approximately one-fourth of whom will eventually die from chronic liver disease (CDC, 2010).

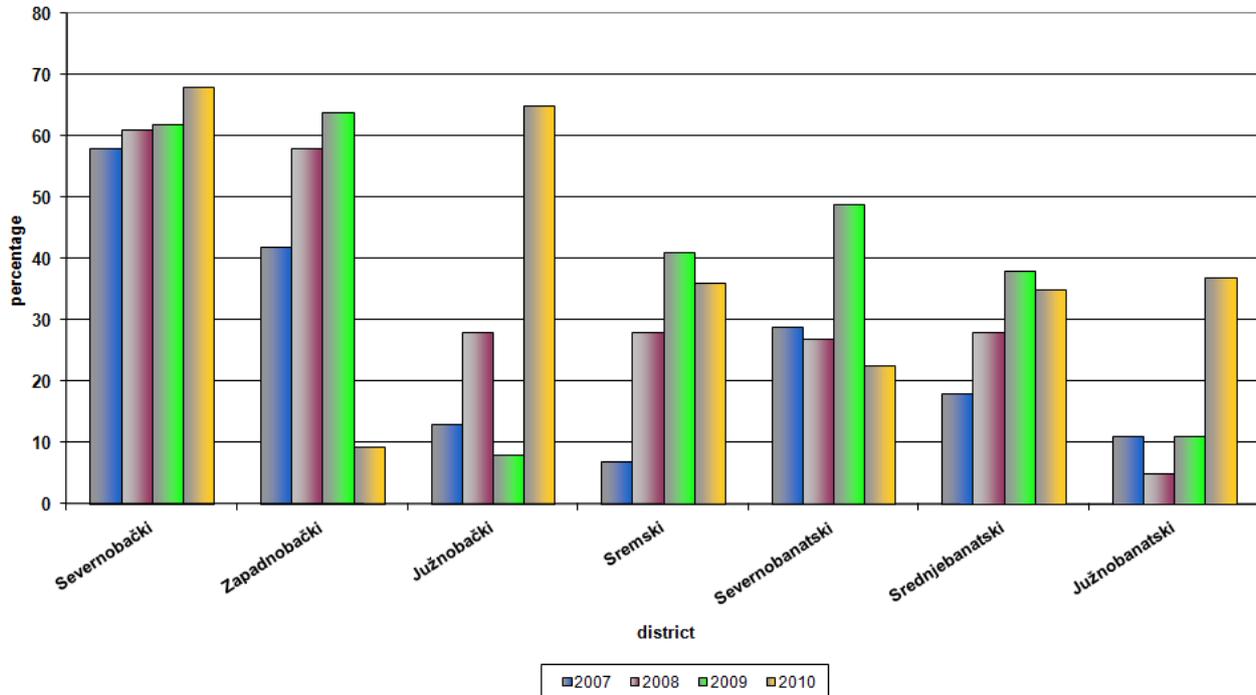
In a 4-year period, 116,874 persons, excluding blood donors, were tested for HBsAg. Out of these, 27,932 (24%) were pregnant women. The frequency of pregnant women tested was 32.5% in 2007, 41% in 2008, 46% in 2009 and 48% in 2010 (Fig. 1). There were differences in testing coverage between the different counties in the province, ranging from 9% in Western Bačka county to 68% in Northern Bačka county, respectively (Fig. 2).

In the Netherlands, every pregnant woman in the 12th week of pregnancy is tested for the presence of hepatitis B. In the case of a positive test, the woman is prescribed treatment with lamivudine in late pregnancy to decrease the chance of transmission to the newborn (Op de Coul, 2011).

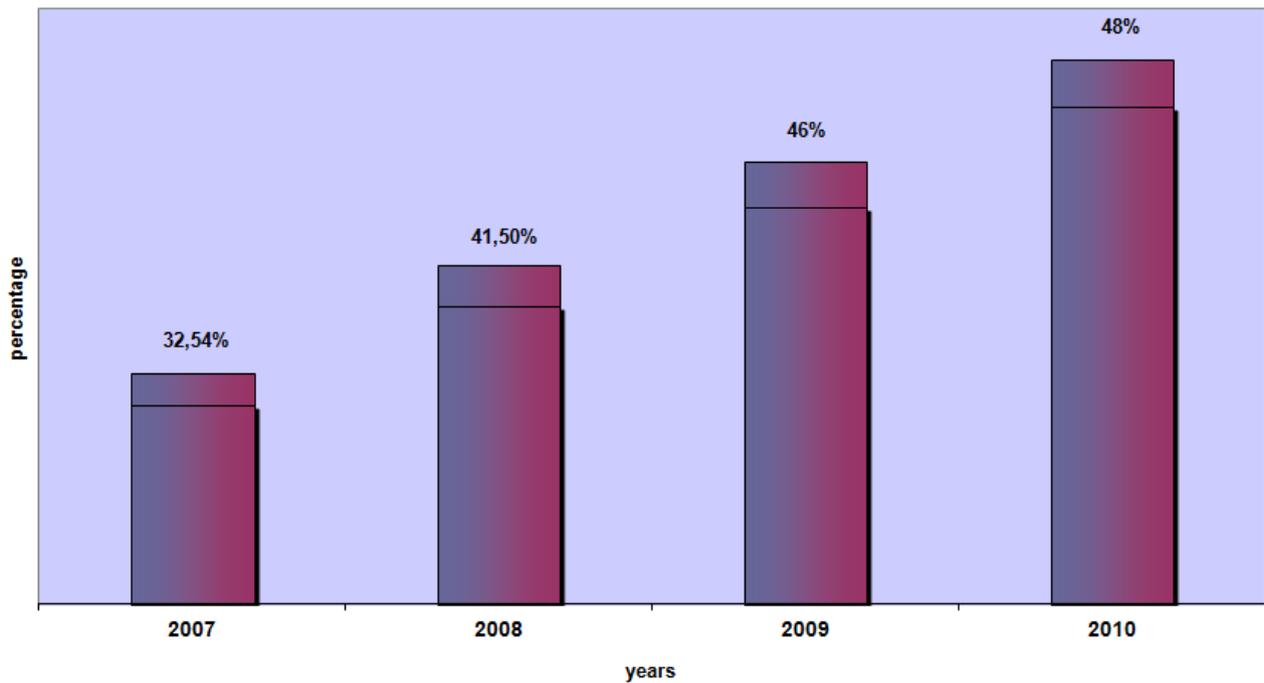
For women infected with hepatitis B, hepatitis C, or HIV, the addition of noninvasive methods of prenatal risk screening, such as nuchal translucency, triple screening, and anatomic ultrasound, may help in reducing the age-related risk to a level below the threshold for genetic amniocentesis (Davies et al., 2003). For women infected with hepatitis B, hepatitis C, or HIV who insist on amniocentesis, every effort should be made to avoid inserting the needle through the placenta. Although cesarean delivery has been proposed as a means of reducing mother-to-child transmission of HBV (Lee et al., 1998), the mode of delivery does not appear to have a significant effect on the interruption of HBV maternal-baby transmission by immunoprophylaxis (Wang et al., 2002). Delivery by cesarean section for the purpose of reducing mother-to-child transmission of HBV is not presently recommended by either the CDC (CDC, 2008) or the ACOG (ACOG, 2007).

A national prevention program for HBV with universal screening of pregnant women and vaccination of infants has been in effect since 1998 in Greece. There are still women who never get tested (Papaevangelou et al., 2006). Because of the high risk of mother-to-child transmission and exposure to blood and body fluids during the birth, universal screening of pregnant women for HBV infection at the first prenatal visit is recommended (Boxall,

Percentage of tested women on HBsAg in county of Vojvodina, 2007-2010



Percentage of tested pregnant women on HBsAg in Vojvodina, 2007-2010



2004). It has been estimated that 5-10 HIV, 50-75 HBV and 10 syphilis cases in newborns have been prevented annually as a result of screening (Op de Coul et al., 2011).

In London, the estimated uptake of antenatal screening in 2007 was 96.4% for hepatitis B. Study showed that the Antenatal Infection Screening Surveillance system described there was an effective method of monitoring policy implementation through the provision of simple, relatively cheap and timely information (Giraudon et al., 2009)

Research in Switzerland showed that chronic HBV infection in infants could be efficiently prevented by early immunization of exposed newborns. Results showed that of 27,131 women tested for HBsAg, 194 (0.73%) were positive with 196 exposed neonates. Of these neonates, 143 (73%) were enrolled and 141 (99%) received simultaneous active and passive HBV immunization within 24 hours of birth. After discharge, the HBV immunization series was completed in 83%. Only 38% of children were tested for anti-HBs afterwards and protective antibody values (>100 U/L) were documented in 27% of the study cohort. No chronically infected child was identified (Heininger et al., 2010).

The coverage of HBsAg testing in pregnant women in Serbia has increased, but it is still unsatisfactory. Differences in the coverage occurring between counties could be explained by the fact that hepatitis B testing was not available in most healthcare institutions so that pregnant women needed to travel to major cities, and also by the lack of promotional activities. A higher level of education was associated with more positive attitudes toward HBV testing. Despite the low incidence rate of hepatitis B in Serbia, the increasing problem with intravenous drug use, sexual route of transmission, and invasive "beauty trends" such as body piercing and tattooing, put individuals at a higher risk for the infection.

Preventing perinatal transmission should be an important element in any national strategy for the prevention of hepatitis B infection.

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