Horizontal Transmission of Hepatitis B Virus—Why Discuss When We Can Vaccinate?

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(See the article by Komatsu et al, on pages 478–85.)

Hepatitis B virus (HBV) infection remains an important global health problem despite the availability of a safe and effective vaccine; >350 million people worldwide are chronically infected [1]. Infection with HBV in adults most often results in self-limited, acute hepatitis that confers protective immunity and causes no further disease. In contrast, most children fail to clear the virus, resulting in chronic infection in 90% of children who are infected perinatally. Chronically infected children are generally asymptomatic but are at risk of developing liver cirrhosis and hepatocellular carcinoma [2, 3]. Since 1992, the World Health Organization has recommended global vaccination against HBV, and by the end of 2009, 177 countries had implemented a universal HBV immunization program for newborns, infants, and/or adolescents. Countries with a low level of HBV endemicity, such as Japan and many northern European countries, have adopted a strategy in which vaccination is offered to individuals at high risk of infection [4].

Spread of HBV occurs through contact with blood or other bodily fluids of an infected person. In countries with low endemcity, the spread of HBV is caused predominantly by sharing contaminated equipment during drug injections and through sexual contact.

In this issue of the Journal, Komatsu et al report their findings of high levels of HBV DNA in tear specimens from children with chronic HBV infection and show how inoculation with these specimens led to HBV infection in chimeric mice. Furthermore, they report high levels of HBV DNA in saliva, sweat, and urine samples from children with chronic HBV infection, results that are supported by several studies [5–8]. In countries where only high-risk groups are vaccinated, these findings are of clinical importance when assessing the real and the perceived risk of horizontal transmission of HBV. Children with chronic HBV are more prone than adults to be HBV e antigen positive and to have a high viral load. At the same time, children are more likely to have contact with each other’s body fluids, such as saliva and tears, and therefore have a high risk of horizontal transmission. Horizontal transmission is especially important in children who are at a high risk of acquiring chronic, asymptomatic infection when exposed to HBV. That children often are asymptomatic after infection with HBV lets them enter the large pool of chronic carriers unnoticed.

The report by Komatsu et al provides further evidence of the risk of horizontal transmission, although the precise mechanisms of transmission are unknown. It may possibly be due to contact of non-intact skin or mucous membranes with tears, saliva, or blood-containing secretions. Transmission from sharing personal care items such as toothbrushes may also occur [9].

As Komatsu and colleagues state, physicians from countries with an HBV vaccination strategy targeting at-risk individuals are keen to know whether various body fluids are sources of HBV transmission; in addition, they are concerned whether these strategies are effective in preventing HBV infection. It is believed that the ideal HBV immunization strategy is to implement universal vaccination for children or adolescents [4]. By this strategy, lower carrier rates of HBV surface antigen in children are seen within relatively few years [10], but it is important to state that several immunization strategies are needed in areas of low endemicity until universal vaccination has been in place for 20–40 years.

The issue of cost-effectiveness is important in countries where HBV has a low level of endemicity, but although the strategy focused on at-risk individuals might initially appear to be a cost-
saving approach, the cost of the vaccine is only a small part of the overall cost of immunizing high-risk individuals. Implementation of the high-risk strategy is very resource intensive [11]. Furthermore, people in high-risk groups, such as injection drug users, might have difficulties adhering to an immunization schedule. Increased frequencies of travel make the discussion highly relevant, since unvaccinated individuals are at risk of infection when traveling in settings where HBV is endemic. High rates of immigration also contribute to the importance of this subject, particularly when they involve people who move from countries of high endemicity to countries of low endemicity where universal vaccination has not been implemented. A targeted immunization program is needed for individuals who are at risk for HBV infection because of their occupation, lifestyle, or other factors (eg, close contact with chronically infected individuals). But such programs, when used alone, have never proven effective at reaching all targeted individuals, which suggests the need to revisit the use of targeted vaccination strategies in areas where the endemicity of HBV is low. On the basis of this knowledge, the Netherlands recently changed their strategy and decided to incorporate HBV vaccine in their national immunization program [12].

In spite of the low risk of transmission in countries where the endemicity of HBV is low, concern about the infectivity of children with chronic HBV infection is substantial for families in which a child is a chronic carrier of HBV. Chronic HBV infection is complex, and there is a need to ensure that those affected by chronic HBV infection are not stigmatized [13]. HBV infection disproportionately affects people from low- and middle-income countries. In these countries, high rates of chronic HBV infection are related to high levels of mother-to-child and early childhood transmission, because of a lack of comprehensive immunization programs. Stigmatization and discrimination continue to be unfortunate responses to children with chronic HBV infection, especially in countries where universal vaccination has not been implemented [14].

HBV infection is a vaccine-preventable disease, but although global control is achievable, it has not yet been attained. HBV vaccine is the first effective vaccine against a major human cancer. Twenty years after the availability of HBV vaccine, we are still far from worldwide eradication of the disease. The World Health Organization recommends that HBV vaccine should be included in routine immunization schedules in all countries, and a global policy of universal HBV vaccination is ultimately the only way to eliminate HBV transmission and prevent serious HBV-related liver disease.

### Note

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### References