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Modeling the transmission dynamics and control of hepatitis B virus in China. (English)

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Summary: Hepatitis B is a potentially life-threatening liver infection caused by the hepatitis B virus (HBV) and is a major global health problem. HBV is the most common serious viral infection and a leading cause of death in mainland China. Around 130 million people in China are carriers of HBV, almost a third of the people infected with HBV worldwide and about 10% of the general population in the country; among them 30 million are chronically infected. Every year, 300,000 people die from HBV-related diseases in China, accounting for 40–50% of HBV-related deaths worldwide. Despite an effective vaccination program for newborn babies since the 1990s, which has reduced chronic HBV infection in children, the incidence of hepatitis B is still increasing in China. We propose a mathematical model to understand the transmission dynamics and prevalence of HBV infection in China. Based on the data reported by the Ministry of Health of China, the model provides an approximate estimate of the basic reproduction number $R_0 = 2.406$. This indicates that hepatitis B is endemic in China and is approaching its equilibrium with the current immunization program and control measures. Although China made a great progress in increasing coverage among infants with hepatitis B vaccine, it has a long and hard battle to fight in order to significantly reduce the incidence and eventually eradicate the virus.

MSC:

92D30 Epidemiology

92C60 Medical epidemiology

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hepatitis B virus; mathematical modeling; transmission dynamics; basic reproduction number; disease endemic equilibrium

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