

# Meeting the WHO and US Goals to Eliminate Hepatitis B Infection by 2030: Opportunities and Challenges

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Hepatitis B virus (HBV) infection is a significant cause of morbidity and mortality in the world.<sup>1</sup> The results of a study by the Institute for Health Metrics and Evaluation concluded that viral hepatitis is a leading cause of death and disability worldwide.<sup>2</sup> In the World Health Organization's (WHO) 2017 report,<sup>3</sup> there are an estimated 257 million persons worldwide who are living with chronic HBV infection, of which an estimated 20% will die early of liver failure or hepatocellular carcinoma without management of their infection. More persons worldwide die of chronic viral hepatitis B and C than human immunodeficiency virus (HIV); this is also true in the United States. HBV accounts for 900,000 deaths/year (Fig. 1).<sup>3</sup> Most of these persons reside in the WHO African and Western Pacific regions. The WHO has adapted the goal eliminating HBV globally by 2030 defined as a 65% reduction in mortality and a

90% reduction in incidence compared with the baseline levels obtained in 2015 with interim goals set for 2020. The WHO has targeted five synergistic interventions that include widespread vaccination, and detection and linkage to care of 90% of those with chronic HBV infection. The purpose of this review is to examine those goals and discuss what elements will be needed to successfully reach each of them. The US Government and Centers for Disease Control and Prevention (CDC) have endorsed the goals and developed an implementation strategy. The WHO has asked each member state to develop a plan to reach these goals in their respective countries. Table 1 displays the WHO elimination goals. These goals are divided into two main areas: (1) prevention of new HBV infections through vaccination and blood safety; and (2) identification, linkage to care, and treatment of persons with chronic HBV.

Abbreviations: anti-HBc, antibody to hepatitis B core antigen; anti-HBs, antibody to hepatitis B surface antigen; CDC, Centers for Disease Control and Prevention; HAV, hepatitis A virus; HBsAg, hepatitis B surface antigen; HBV, hepatitis B virus; HCV, hepatitis C virus; HCW, health care worker; HEV, hepatitis E virus; HIV, human immunodeficiency virus; PWID, persons with injecting drugs; WHO, World Health Organization.

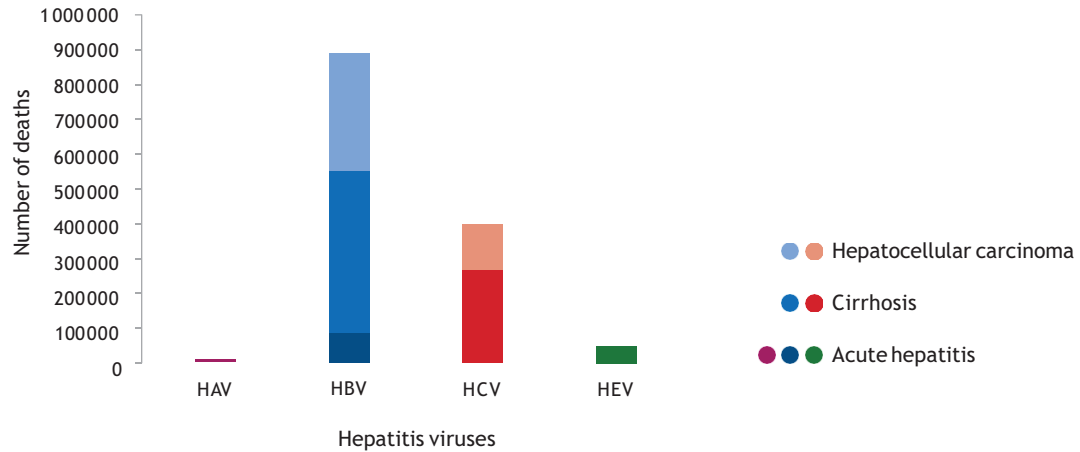
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**FIG 1** Deaths from viral hepatitis, by virus and type of sequelae, 2015: most viral hepatitis deaths are due to the late complications of HBV and HCV infection. HAV: hepatitis A virus; HEV: hepatitis E virus. Reproduced with permission from Global Health Estimates 2015: Deaths by Cause, Age, Sex, by Country and by Region, 2000–2015. Geneva: World Health Organization; 2016.<sup>7</sup>

## PREVENTION

Prevention includes prevention of HBV infections by vaccination and reducing transmission. Goals for vaccination are defined by the proportion of infants who have received a full series by 1 year of age, which is already at 84% worldwide (Fig. 2). Unfortunately, funding for the birth dose for prevention of perinatal transmission was not included in the Global Alliance for Vaccine Initiative program, and global birth dose coverage is currently only 39%, ranging from a low of 10% in the Africa region to a high of 72% to 83% in the Americas and Western Pacific, respectively (Fig. 3). In Africa and other low-income countries, half or more newborns are born outside the hospital, which is a challenge

to administering the birth dose even if the vaccine is available and the cost is covered. In many countries, serology is limited to rapid testing for hepatitis B surface antigen (HBsAg). Although access to the HBV DNA test is limited because of cost and laboratory expertise, the Global HIV Program has recently placed smaller, more cost-effective platforms for molecular testing, such as the Gene X-pert platform, which can be performed on saliva or fingerstick blood samples using less expensive disposable cartridges that give results in a couple of hours. HIV and hepatitis C virus (HCV) RNA cartridges are now licensed, and licensure of the HBV cartridge system is anticipated by 2019.

Reducing transmission includes: (1) blood safety by screening donations with quality assurance, which is

**TABLE 1. WHO GOALS FOR HBV ELIMINATION**

Goals	Indicator	2015 Baseline	2020 Target	2030 Target	Achievable?
Hepatitis B vaccination	3-Dose coverage in infancy	84%	90%	90%	Yes
Prevention perinatal transmission	Birth dose coverage	39%	50%	90%	Likely
Blood safety	Donations screened	97%	95%	100%	Yes
Injection safety	Proportion of unsafe injections	5%	0%	0%	Yes
Harm reduction	Syringes and needle exchange per PWID	27	200	200	Likely
Testing services	% with HBV diagnosed	9%	30%	90%	Will need a massive effort and funding support
Treatment	% diagnosed with HBV on treatment	7%	Not specified	80%	Massive support needed

Abbreviation: PWID, persons with injecting drugs.

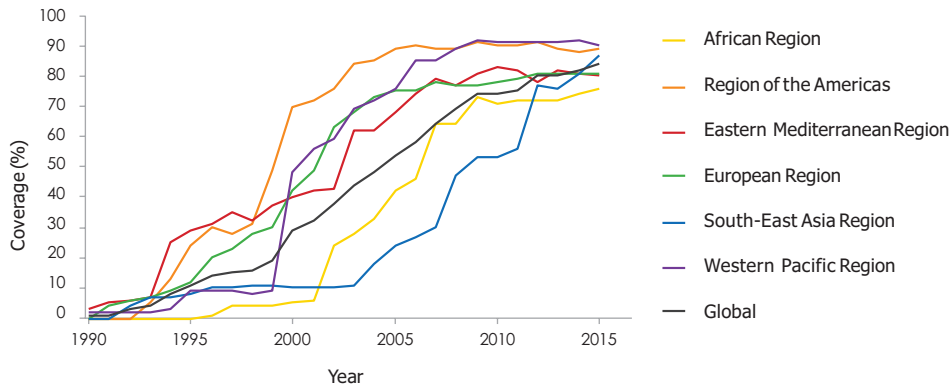


FIG 2 Three-dose hepatitis B vaccine coverage, by WHO region, 2000–2015.

already at 97%; (2) injection safety measured by the proportion of unsafe injections in health care settings, which is currently at less than 5% per year; and (3) harm reduction measured by the syringes and needles distributed to persons who inject drugs per year. This latter goal will require a large scale-up globally of needle exchange programs.

### IDENTIFICATION, LINKAGE TO CARE, AND TREATMENT

Goals for testing and treatment are displayed in Table 1. The WHO estimates that 9% of persons globally with chronic HBV are currently detected (Fig. 4). To reach the goal of 90% diagnosed by 2030 will take a Herculean effort. What would be necessary is the establishment of massive screening programs of large populations in endemic

nations. To meet this goal in the United States, better screening of persons born in endemic countries will have to occur. However, globally, it is feasible to begin this task in incremental steps. Screening is currently taking place in blood donation settings (Intervention 3 in Table 1). Screening could initially be expanded to include household contacts of HBsAg-positive persons and patients with obvious liver disease in hospitals and clinics. The next step might be to “piggyback” screening onto existing HIV screening programs, so that when HIV screening occurs, screening is also done for HBsAg and HCV antibody using rapid low-cost tests. Population-based screening will be a massive undertaking in countries with a more than 2% prevalence rate of HBsAg. In many countries, health care workers (HCWs) are not offered testing or vaccination for HBV. Screening could be done with anti-HBc (antibody to

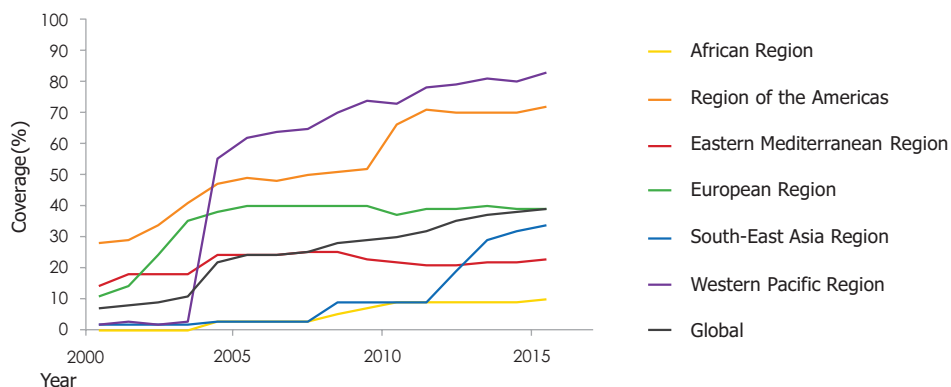


FIG 3 Hepatitis B birth dose coverage, by WHO region, 2000–2015

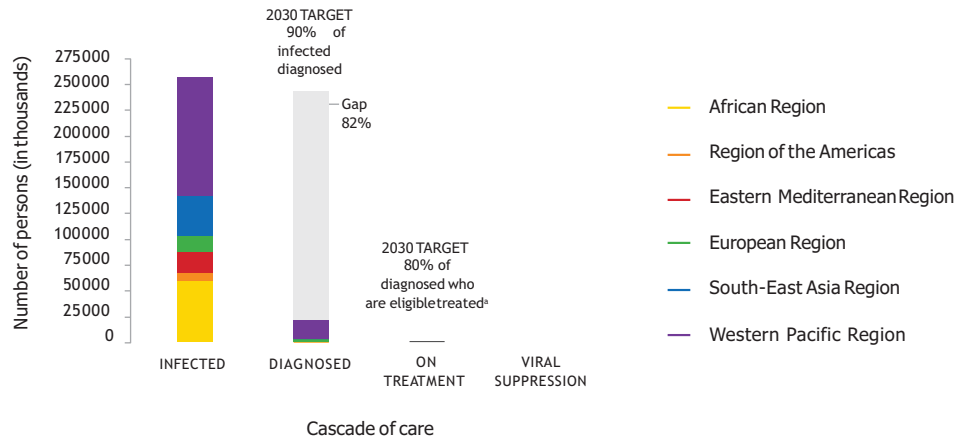


FIG 4 Cascade of care for HBV infection, by WHO region, 2015.

hepatitis B core antigen), anti-HBs (antibody to HBsAg) to identify those who are negative for vaccination, but HCWs should be screened for HBsAg at a minimum before vaccination to identify persons at risk for transmission to patients. HCWs who are HBsAg-positive could then be tested for HBV DNA and offered antiviral therapy if their levels are high, to prevent transmission as is recommended by the CDC.<sup>4</sup>

Regarding treatment goals, it is important to note that the current antiviral medications very effectively lower levels of HBV DNA, quiet liver inflammation, and decrease the risk for liver failure and HCC. Tenofovir is now available for as little as \$48 per year in most countries. However, not everyone will benefit from these medications, because over time most people's immune system accomplishes the same effect. All major guidelines, including American Association for the Study of Liver Diseases and WHO, recommend monitoring of all HBV-infected patients on a regular basis.<sup>5,6</sup> Because successful programs to monitor persons with chronic HIV infections are in place in almost all countries, programs to manage chronic HBV infection and select appropriate persons for treatment could be combined with the existing HIV care and treatment programs.

In conclusion, elimination of HBV will take considerable effort globally, but the tools to do this are available now, and with concerted effort, most of the WHO elimination goals could be met by 2030.

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