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REVIEW

Hepatitis B Virus Elimination Strategies

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Abstract

Purpose of Review The World Health Assembly called to eliminate viral hepatitis as a public health threat in 2016 and proposed elimination goals by 2030. This review examined current national and global progress with hepatitis B virus elimination, and the hurdles and solutions being undertaken to achieve elimination goals.

Recent Findings Few countries are on target to achieve the elimination targets of a 95% reduction in new infections and a 65% reduction in mortality by 2030. Gaps towards elimination remain, such as low infant vaccine coverage in low-income countries and continued under-diagnosis and low rates of treatment globally.

Summary HBV elimination is feasible but will require continued focus on infant and childhood vaccine coverage, improving blood and injection safety, increasing harm reduction measures among persons who use drugs, and providing broader access to low-cost diagnostics and antiviral treatment.

Keywords Global health · Screening · Prevention · Vaccination · Antiviral

Abbreviations

AASLD	American Association for the Study of Liver Diseases
Anti-HBs	Hepatitis B surface antibody
CDC	Center for Disease Control and Prevention
CHB	Chronic hepatitis B
ETV	Entecavir
GHSS	Global Health Sector Strategy
HBIG	Hepatitis B immune globulin
HBsAg	Hepatitis B surface antigen
HBV	Hepatitis B virus
HCC	Hepatocellular carcinoma
IDU	Injection drug use
MSM	Men who have sex with men
PrEP	Pre-exposure prophylaxis
PWUD	Persons who use drugs
STI	Sexually transmitted infection
TAF	Tenofovir alafenamide
TDF	Tenofovir disoproxil fumarate
WHO	World Health Organization

Introduction

Globally, hepatitis B virus (HBV) is a major health problem, with an estimated 257.5 million people infected (3.23% of the population in 2022) and 820,000 deaths in 2019 [1•, 2]. Progress in global vaccine distribution and improved antiviral therapies have reduced the worldwide prevalence and incidence of HBV infection; however, gaps in HBV prevention and treatment remain.

The long-term sequelae of chronic hepatitis B (CHB) infection include cirrhosis and hepatocellular carcinoma (HCC), which are the leading causes of mortality for HBV-infected individuals [3]. In 2019, HBV was the leading cause of liver cancer deaths (39.5%) and the third leading cause of cirrhosis-associated deaths (22.5%) worldwide, with age-standardized mortality rates of 1.2 and 4.03 per 100,000, respectively [4–6]. The burden of disease is highest in the Western Pacific, South-East Asia, and African regions, with 206,000 (37%), 169,000 (30%), and 71,000 (13%) of deaths, respectively in 2019 [6], and these regions have the highest prevalence of liver-related deaths due to cirrhosis and liver cancer [6].

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In response to the substantial global health burden posed by viral hepatitis, the World Health Assembly announced in June 2016 the Global Health Sector Strategy (GHSS) to eliminate viral hepatitis as a public health treat by 2030 [7]. Their targets included the reduction of new HBV infections by 95% and deaths by 65% (or equating to ≤ 4 deaths per 100,000 people per year) by 2030 compared to baseline values in 2015 [8]. For hepatitis B, this would be achieved through increasing childhood vaccine coverage and preventing vertical transmission to reduce childhood HBsAg prevalence to ≤ 0.1% among those ≤ 5 years of age, as well as improving injection and blood safety and access to diagnosis and treatment. In May 2022, the 75th World Health Assembly released new integrated global health sector strategies on viral hepatitis for the years 2022–2030 to help meet these goals, which focused on raising awareness, increasing health equities, preventing transmission, and scaling up screening and treatment services [2].

Globally, there have been strides made in the elimination of HBV. In the United States (U.S.), the number of estimated new HBV infections in 2021 was 13,500, a 5% decrease from 2020 and a 36% decrease from 2019, according to the Centers for Disease Control and Prevention (CDC). The number of deaths has remained relatively stable since 2017, with an age-adjusted death rate of 0.44 cases per 100,000 population in 2021 [8]. Globally, only four countries (Namibia, Montenegro, Ireland, and Dominica) have reached the World Health Assembly's target of reducing deaths by 10% by 2020 with certainty, and no countries in the Western Pacific, South-East Asia, or Eastern Mediterranean regions have met the 2020 target of reducing new cases by 30% [6]. Here, we address the status of HBV elimination, barriers towards progress, and propose strategies to meet the 2030 GHHS targets.

Screening and Diagnosis

Diagnosis Rates

Hepatitis B infection is defined by the presence of HBsAg in blood [9–11], and the GHSS target in diagnosis is 90% by 2030. In 2019, it was estimated that 30.4 million people (10.3% of 257 million persons estimated to be living with hepatitis B) were aware of their infection, which was an increase from 2015 (22.0 million, 9%) [12••] (Table 1). Despite this, 89.7% of HBV infections remain undiagnosed.

In 2021, it was estimated that up to 2.4 million persons in the U.S. have CHB, and 50% were aware of their infection [13, 14•]. There are notable racial and ethnic differences in CHB prevalence rates, with Asians having the highest prevalence at 3.41%, compared to non-Hispanic blacks at 0.69% and non-Asian, non-Black individuals at < 0.2% [15]. Most persons with CHB in the U.S. are foreign-born, and an estimated 80% of these individuals acquired their infection from their country of birth, as demonstrated by foreign-born Asians having a higher prevalence of CHB at 3.85% compared to U.S.-born at 0.79% [14•, 15]. Of 1.47 million foreign-born individuals living with CHB in the U.S., the largest proportions emigrated from Asia (59%, 0.87 million), the Americas (19%, 0.27 million), and Africa (15%, 0.22 million) [14•].

Screening Guidelines

In the U.S., the CDC recommends HBV screening with a triple panel test (HBsAg, anti-HBc total, and anti-HBs) at least once in all adults aged 18 and older, during all pregnancies, in infants born to HBsAg-positive mothers, and anyone with ongoing risk for exposure [16••]. WHO recommends all adults be offered HBsAg testing in settings with a ≥ 2%

Table 1 Status of global and national HBV elimination

Region	Interventions	2015 baseline	Status	2030 targets
Global	Mortality	887,000	820,000 (2019) *8% reduction*	65% reduction
	New infections	6.25 million	1.5 million (2019) *76% reduction*	95% reduction
	HBV vaccination (third dose)	84%	85% (2019)	90%
	HBV vaccination (birth dose)	39%	43% (2019)	90%
	Blood safety	97%	N/A	100%
	Unsafe injections	5%	3.9% (2017)	0%
	Syringe and needles distributed/ PWUD/year	27	200 (2020)	300
	Diagnosis	9%	10% (2019)	90%
	Treatment	8%	22% (2019)	80%
United States	Mortality	1715	1748 (2021)	65% reduction
	New infections	7.6 per 100,000	5.9 per 100,000 *22% reduction*	95% reduction

or ≥ 5% HBsAg seroprevalence in the general population. However, this strategy of screening based on prevalence in country of origin or presence of risk factors may lead to under-screening (and missed opportunities for diagnosis) as it requires the provider to have knowledge of country prevalence rates and/or to ask a detailed risk history. To overcome this limitation and increase the rates of diagnosis, a universal one-time testing and then again if at risk may need to be considered in more countries.

Other Strategies to Improve Screening Rates

China has the highest prevalence of HBV worldwide and had a 19% diagnosis rate in 2016 [1•]. A recent study showed that implementing a five-test universal screen (serum HBsAg, HBsAb, HBeAg, HBeAb, and HBcAb) in people aged 18–70 years old was a cost-effective strategy in China, especially if implemented early, and would help China reach the WHO 2030 elimination targets [17]. In the U.S., the greatest burden of disease is among those born in endemic countries. Studies have shown that community-based and refugee clinic-based HBV testing initiatives can identify considerable numbers of persons with CHB, and resource allocation should be increased for screening and pathways to care in specific geographic areas [18, 19]. Lastly, point-of-care testing was found to be an effective option in remote or underserved areas, with > 90% sensitivity, specificity, positive predictive value, and negative predictive value [20]. This may permit mass community screening events and the opportunity to both diagnose and identify vaccine-eligible individuals in the same day.

A major continued barrier to diagnosis is stigma. In a study from Australia, stigma was shown to be mostly driven by knowledge deficits about HBV and fear of infection and was demonstrated by social exclusion and limited employment opportunities [21]. Stigma can be combated through increased education and awareness on HBV infection, as demonstrated by the successful San Francisco Hep B Free Campaign which changed how HBV was perceived by Asian Americans [22]. Stigma may be reduced by including HBV testing as part of a more comprehensive health evaluation. The WHO recently emphasized the need to provide wide-ranging services for five groups at high risk for new infections: sex workers, people who inject drugs, men who have sex with men (MSM), trans and gender diverse people, and incarcerated persons [23].

Prevention of Transmission

HBV is transmitted through percutaneous or mucosal contact with contaminated blood or body fluids, such as saliva, menstrual, vaginal, and seminal fluids. The risk of chronic infection after exposure is inversely proportional to age. In adults, infection rarely results in chronic hepatitis (< 5%), but perinatal transmission is the main route of HBV transmission in areas where the virus is endemic with chronic infection developing in up to 90% [24]. Thus, global use of the hepatitis B vaccine in infants has considerably reduced the incidence of new chronic HBV infections. Taiwan launched a nationwide hepatitis B vaccination program in 1984, and after 20 years, HBsAg positivity declined by 78–87% in infants, with a 68% decline in mortality from fulminant hepatitis in infants and a 75% decrease in the incidence of HCC in children 6–9 years of age [25]. Similarly in China, HBsAg prevalence declined 52% by 2014 and 97% among children < 5 years of age after implementing a vaccine program in 1992 [26].

WHO recommends that all infants receive the hepatitis B vaccine as soon as possible after birth, preferably within 24 h, followed by 2 or 3 doses of the hepatitis B vaccine at least 4 weeks apart to complete the vaccination series. In the U.S., the CDC recommends the hepatitis B vaccine for all infants, all children or adolescents < 19 years of age who have not been vaccinated, all adults aged 19–59 years, and adults aged > 60 years with risk factors for hepatitis B infection. The new recommendation of one-time screening for all adults has been shown to be cost-effective, by increasing vaccination coverage and thereby preventing 138 cases of cirrhosis, 47 cases of decompensated cirrhosis, 90 cases of HCC, 33 liver transplants, and 163 HBV-related deaths, with a gain of 2185 quality-adjusted life years, per 100,000 adults screened [27, 28••].

Perinatal and Childhood Transmission

Perinatal and childhood transmission can be prevented through the universal immunization of infants and children. Countries that have adopted infant and childhood vaccination have seen a marked reduction in prevalent hepatitis B infections in children. In 2019, 85% of all infants had received the recommended three doses of the hepatitis B vaccine (Table 1), up from 30% in 2000, and the GHSS target of reducing HBsAg prevalence to < 1% among infants and children younger than 5 years by 2020 has been met [29]. However, there are still gaps in coverage in certain parts of the world, with the African region having the lowest percentage (32%) [6]. Challenges remain with the timely administration of the birth dose in rural countries or infants born at home, where there are no birth attendants able to give injections and difficulties with transport, cold chain capacity, and lack of adequately trained healthcare workers.

In addition to the vaccination series, infants born to mothers who are HBsAg-positive should be given hepatitis B immune globulin (HBIG), which can provide short-term protection to neonates after delivery. In a systematic review of

the risk of vertical transmission of HBV in pregnant women with hepatitis B, the estimated transmission rates in the absence of vaccination, with vaccination alone, and with vaccination plus the HBIG birth dose were 75%, 21%, and 6% in women positive for HBeAg, respectively, and 10%, 3%, and 1% in women negative for HBeAg, respectively [30]. High maternal serum viral load is associated with prophylaxis failure in up to 10% despite provision of active and passive immunization [31]. Thus, WHO and AASLD recommend the use of antiviral therapy, specifically tenofovir disoproxil fumarate (TDF), in the third trimester for mothers with HBV viral load > 200,000 IU/mL [9, 32]. Earlier initiation of TDF therapy is recommended among women undergoing invasive procedures, such as amniocentesis [33].

The rate of perinatal transmission is reduced among those who received TDF therapy (5%) compared with those without antiviral therapy (18%) [34, 35••]. Maternal use of TDF is particularly important in scenarios where there may be delay in delivery of HBIG or HBV vaccine, especially in rural or resource-limited settings [36]. While some studies have reported adverse effects of TDF, including decreased bone mineral density and neutropenia in infants with fetal exposure to TDF [37, 38], overall the safety of TDF has been excellent. Tenofovir alafenamide fumarate (TAF), a newer prodrug of tenofovir, has been increasingly used in preventing vertical transmission and was recently endorsed as another safe treatment option for mothers and their infants [39–42].

Barriers to addressing mother-to-child transmission in the Africa region include timely administration of the hepatitis B vaccine in rural areas and availability of affordable testing. Screening may be improved with the integration of a triple rapid diagnostic test for HIV, syphilis, and hepatitis B which was shown to be both efficacious and cost-effective in Cambodia [43]. Administration of hepatitis B virus vaccination at the household level and transport outside the cold chain by trained community health workers can increase coverage, as demonstrated in rural China [44]. Additionally, studies have demonstrated that the HBV monovalent vaccine is relatively heat-stable for a limited time [45, 46], and rapid point-of-care testing can be feasible in a South African clinical setting [47]. These represent important strategies to enhancing infant vaccination rates and support countries in achieving the 2030 goal of global birth dose vaccine coverage to 90% and ≤ 0.1% HBsAg prevalence in children ≤ 5 years old.

Unsafe Injections

Approximately 16 billion injections are administered worldwide each year [48]. In response to the efforts of the Global Injection Safety Network and other injection safety campaigns, the prevalence of unsafe medical injections decreased from 39% in 2000 to 5% in 2010 [49]. However, between 2010 and 2017, 3.5% of all medical injections, or approximately 1 in 29, were potentially unsafe in low- and middle-income countries, with Pakistan, Comoros, and Afghanistan having the highest prevalences of 14.0%, 9.7%, and 9.1%, respectively [50]. In 2015, the WHO called for the worldwide use of safety-engineered syringes and to reduce the number of unnecessary syringes [48]. Multiple studies have shown that safety-engineered syringes are not only effective in reducing viral hepatitis burden, but are also cost-effective [51, 52]. Moreover, there should be further education to change patient and provider perceptions that injection medications are more effective [53] and reduce unnecessary injections by replacing commonly injected medicines with equally effective oral medications.

In many countries including the U.S., persons who use drugs (PWUD) represent an important target group for the prevention of the spread of HBV and other blood-borne pathogens. In the U.S., one in five adults aged 20–59 with a history of injection drug use (IDU) has serologic evidence of previous or ongoing HBV infection, over four times higher than the prevalence in the general population [54]. Globally, from 1990 to 2015, the mortality rate (age-adjusted per 100,000) of IDU-attributable liver cancer increased continually from 0.4 to 0.9, and from the mortality rate of IDU-attributable cirrhosis from 1.5 to 1.9 [55].

Numerous studies have demonstrated the significant impact of needle/syringe exchange programs (NSPs) and opioid agonist therapy as harm reduction strategies among PWUD, with the WHO goal to distribute 300 needles and syringes per PWUD per year by 2030 [23]. A randomized control trial emulation study in the Netherlands showed that complete participation in harm reduction programs led to a 72% decrease in the risk of HBV acquisition compared to no/partial participation [56]. NSPs can further decrease high-risk behaviors such as sharing of needles and injection drug paraphernalia after 6 months, with sustained behavior for over 2 years [57]. NSPs provide an opportunity to improve HBV vaccination rates [58, 59].

Lastly, PWUDs face many structural barriers for receiving HBV care which should be addressed, including decriminalizing drug use and possession for personal use, addressing stigma and discrimination, and increasing access to health services without making cessation of drug use a requirement for eligibility. Additionally, those engaging in chemsex or using stimulants may be at higher risk of other sexually transmitted infections (STIs) and should thus have access to STIs testing, diagnosis, and treatment.

High-Risk Sexual Behaviors

HBV is efficiently transmitted via sexual contact. HBsAg or HBV DNA has been detected in body fluids and mucosal

surfaces including semen, menstrual blood/vaginal discharge, saliva, feces, anal canal, rectal mucosa, and rectal mucosal lesions [60]. Sexual transmission continues to play a major role in incidental HBV in the U.S., accounting for 38.2% of acute HBV infections from 2013 to 2018 [61]. MSM and sex workers are at higher risk of HBV infection [62–64]. Female, transgender, and gender-diverse sex workers are more prone to transmitting HBV to clients as they are often in a poor position to negotiate safe sex because of social, economic, cultural, and legal factors.

The hepatitis B vaccination is recommended for MSM in many countries; however, gaps in vaccination remain. In a large European survey, only 56.4% reported HBV vaccination, with higher vaccination rates in countries that offer free vaccination [65]. In the Netherlands, a targeted vaccination program in outpatient or outreach locations, such as saunas and gay bars, was effective in reducing rates of acute hepatitis B [66]. With the rise of online dating platforms and mobile dating apps, there have been multiple clinical trials investigating the effectiveness of electronic health interventions at reducing HIV and STI transmission, with results showing short-term behavior change [67, 68].

Studies have shown that 54–63% of sex workers do not use condoms consistently and were approximately three times more likely to be infected with HBV, with < 5% vaccinated [62, 63, 69]. Outreach programs and awareness campaigns specifically designed for female sex workers could potentially increase condom use, HBV screening, and immunization uptake as shown in a study from India where community-led organizations of female sex workers increased consistent condom use [70]. In China, free female condoms and vaginal barrier protection appear promising in reducing unprotected sex and controlling STI transmission [71]. With more widespread use of pre-exposure prophylaxis (PrEP) for HIV, tenofovir-based PrEP may further prevent incident HBV infections, as demonstrated in a study among HIV-negative MSM at a high risk, which found that those who received tenofovir-based PrEP had a decreased annual incidence of 0.77% (compared to 3.8%) and 87% reduced risk of acute HBV infection [72].

Incarceration

The prevalence of HBV infection among prisoners is higher than in the general population, reaching a prevalence of almost 25% of the prison populations in West and Central Africa, 10% in Eastern Europe Central Asia, but substantially lower in regions such as North American and Western Europe, where there is higher HBV vaccine coverage [73]. High-risk sexual behaviors, shared contaminated needles for drug injection, and tattooing are the principal routes of hepatitis transmission among prison inmates [74]. Prisons should be seen as opportunities to screen and diagnose HBV, since they bring together persons who more frequently present risk factors for viral hepatitis acquisition. In prisons, access to the health system can be offered to those who usually have little or no access to healthcare and include opportunities to promote prevention, screening, and treatment.

HBV spread can be prevented among the incarcerated by provision of HBV vaccination. Accelerated vaccination schedules, such as those that complete the three-part series within 3 weeks or 2 months, have shown promise for jail settings, particularly for inmates with short-term sentences [75–77]. Additionally, for the treatment of viremic persons who are at risk of transmission to others, directly observed therapy can be implemented and ensure compliance with treatment. Despite these measures, fear of stigma deters key populations from accessing prevention and treatment services in judicial settings [78]. Mathematical models have illustrated the positive epidemiological effects when these harm reduction strategies are implemented on a large scale in prisons [79].

Treatment Gaps and Potential Solutions

Substantial progress has been made in the treatment of CHB, yet achieving high coverage of treatment globally remains a formidable challenge. The WHO goal for 2030 was for 80% of eligible CHB patients to receive treatment, compared to the baseline of 8% in 2015 [3]. However, most countries are not on track to meet this target. Of the 257 million people infected with HBV worldwide in 2016, only 27 million (10.5%) were diagnosed and 4.5 million (16.7%) of those were receiving treatment [80]. In a separate study, it was estimated that the global prevalence of HBsAg in 2016 was 292 million, and of that number, only 4.8 million (5%) of the 94 million eligible for treatment were receiving antiviral therapy [81]. In China, approximately 16.1 million (19%) of those infected with CHB were diagnosed in 2019, with only 2.8 million (10%) of those receiving treatment [82].

The lack of information on the proportion of people with HBV infection who are eligible for treatment hinders the assessment of global treatment coverage. A systematic review found that while numerous studies have described people with CHB, most of them did not present data that could be used to assess eligibility in a consistent manner, as information of the presence of cirrhosis or elevated liver enzymes or level of viral replication are lacking [83]. This uncertainty regarding persons eligible for treatment makes it difficult to determine the true gaps towards reaching the global 2030 goal of 80% of eligible persons on treatment. Country-specific studies are needed to assess the number of people eligible for treatment, and subpopulations with the highest proportion should be targeted for testing and subsequent treatment if positive. In the U.S., about half of patients

Table 2 Treatment eligibility recommendations by society for chronic hepatitis B

	WHO [85]	AASLD [9]	China [91]
Compensated cirrhosis	Treat	Treat	Treat
Decompensated cirrhosis	Treat	Treat	Treat
No cirrhosis	HBV DNA > 20,000 IU/mL *and* Elevated ALT levels *and* Age > 30 years	ALT ≥ 2 × ULN *and* • HBV DNA > 20,000 IU/mL with elevated ALT if HBeAg positive • HBV DNA > 2000 IU/mL with elevated ALT if HBsAg negative If ALT and HBV DNA levels do not meet these thresholds, treat if: • Significant liver inflammation/fibrosis • Family history of HBV-related cirrhosis or HCC • HBV-related extrahepatic manifestations	Detectable HBV DNA *and* Elevated ALT levels Detectable HBV DNA *and* • Age > 30 years • Liver inflammation/fibrosis • Family history of HBV-related cirrhosis or HCC • HBV-related extrahepatic manifestations

with CHB with private insurance did not have a complete laboratory evaluation to ascertain the need for treatment, and over one-third of treatment-eligible patients did not receive antiviral therapy [84]. Another study found that 37% in community primary care, 60% in gastroenterologist care, and 80% in hepatology care had a complete evaluation within the first 6 months of care, and about 40–60% of treatment-eligible patients were started on antiviral therapy [85•].

There are four commonly used drugs for the treatment of CHB globally: peg-interferon, entecavir (ETV), TDF, and TAF. Due to the intensive monitoring/frequent adverse events with peg-interferon, tenofovir (TDF and TAF) and ETV are recommended as the first-line treatment options for CHB by various international organizations, including WHO and AASLD [9, 86]. The current guideline recommendations on CHB treatment eligibility are shown in Table 2.

Historically, treatment rates and patient compliance were hindered by the high cost of antiviral medications; however, this barrier has been improved with recent patent expirations [87]. TDF and ETV have generic formulations and have been shown to be cost-effective in multiple countries [88–90]. The median price of generic tenofovir available on the international market fell by over 85%, from $208 per year of treatment in 2004 to $32 in 2016 [80]. Globally, in 2015, TDF cost $38/person-year and ETV was predicted to cost a minimum of $36/person-year [87]. However, a cost barrier related to HBV monitoring, especially for HBV DNA tests, remains and may result in missed opportunities to intervene with antiviral treatment in a timely manner. A recent study found that the currently recommended annual monitoring frequency was unlikely to be cost-effective in West Africa, and monitoring every 5 years among 15–45-year old would

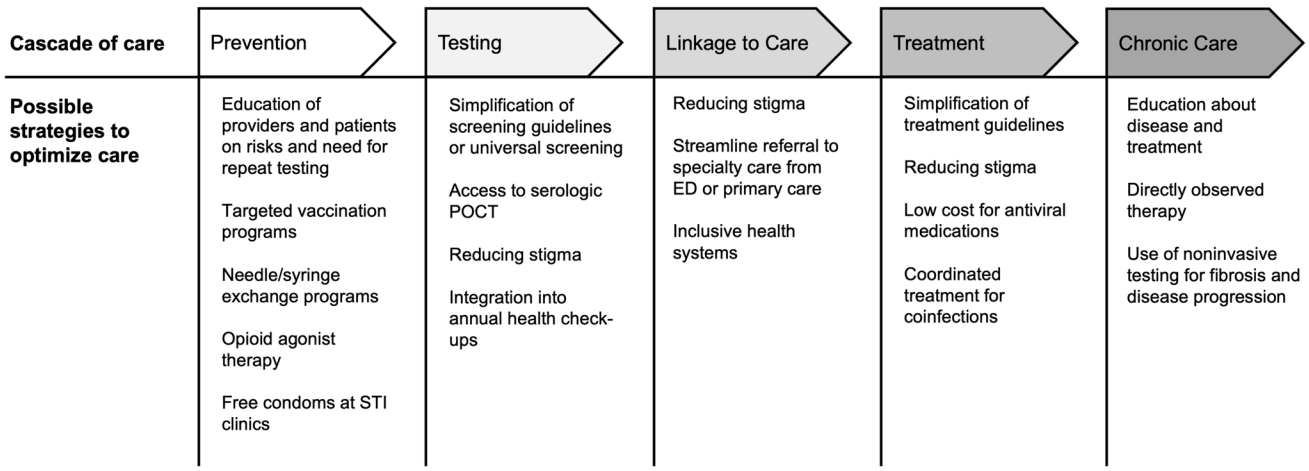

Fig. 1 Cascade of care for the United States and potential solutions. ED, emergency department; POCT, point-of-care testing; STI, sexually transmitted infection

be more cost-effective, averting $404 per disability-adjusted life years while still substantially reducing HBV burden, averting an estimated 3258 HBV-related deaths and 89,000 disability-adjusted life years between 2020 and 2100 compared to the base-case scenario of no screening and treatment [91].

In high-income countries such as the U.S., cost is less of a barrier, but there are other challenges. First, the complexity of treatment algorithms may leave providers uncertain about whether a patient is eligible for treatment and potentially result in undertreatment. A more simplified treatment algorithm may help, and China adopted this approach in late 2022 [92]. Their new guideline recommends treatment for all HBsAg-positive patients with cirrhosis, detectable HBV DNA with elevated ALT levels, or detectable HBV DNA with age > 30 years [92]. WHO is similarly recommending expansion of treatment in any persons with CHB and clinical evidence of cirrhosis or adults with CHB who are age > 30 years with persistently abnormal ALT levels and HBV DNA > 20,000 IU/mL [86]. A U.S. expert consensus meeting designed a simplified treatment algorithm to treat all patients with cirrhosis (with detectable HBV DNA), all patients > 30 years of age and HBV DNA > 2000 IU/mL without cirrhosis, and refer to a specialist if decompensated cirrhosis is suspected or if HIV coinfection exists [93]. The AASLD guidelines are currently being updated. Application of a simplified guideline may increase the overall treatment of CHB with one U.S. study estimating an increase in treatment from 6.7 to 14.1–33.5% using simplified criteria [94]. The impact of broader treatment application on HBV-related morbidity and mortality needs to be studied. Simplified algorithms may result in the treatment of persons with CHB who will not benefit, but this risk is justifiable because current antivirals have an excellent safety record and the harms of missing the timely initiation of therapy are greater. A patient-centric approach is warranted, with consideration of potential clinical benefits (lower risks of transmission to others and lower risk of liver complications) as well as potential burdens (medication adherence) and financial burden (antivirals and monitoring).

Conclusions

Eliminating HBV infection is attainable globally. Major progress has been made, but gaps remain. Each country needs a national strategy to address its unique challenges in achieving the WHO's HBV elimination targets to improve the HBV cascade of care (Fig. 1). In the U.S., recent changes include expanded indications for screening and vaccination, national efforts to increase awareness and reduce stigma, and consideration of expanded treatment opportunities. These provide a sense of optimism for achieving HBV elimination in the U.S. but much still needs to be accomplished in the next 7 years if we are to meet the WHO's 2030 targets!

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Declarations

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- • Of importance
- •• Of major importance

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