JAMA | US Preventive Services Task Force | RECOMMENDATION STATEMENT

Screening for Hepatitis B Virus Infection in Adolescents and Adults
US Preventive Services Task Force Recommendation Statement

US Preventive Services Task Force

IMPORTANCE An estimated 862 000 persons in the US are living with chronic infection with hepatitis B virus (HBV). Persons born in regions with a prevalence of HBV infection of 2% or greater, such as countries in Africa and Asia, the Pacific Islands, and parts of South America, often become infected at birth and account for up to 95% of newly reported chronic infections in the US. Other high-prevalence populations include persons who inject drugs; men who have sex with men; persons with HIV infection; and sex partners, needle-sharing contacts, and household contacts of persons with chronic HBV infection. Up to 60% of HBV-infected persons are unaware of their infection, and many remain asymptomatic until onset of cirrhosis or end-stage liver disease.

OBJECTIVE To update its 2014 recommendation, the USPSTF commissioned a review of new randomized clinical trials and cohort studies published from 2014 to August 2019 that evaluated the benefits and harms of screening and antiviral therapy for preventing intermediate outcomes or health outcomes and the association between improvements in intermediate outcomes and health outcomes. New key questions focused on the yield of alternative HBV screening strategies and the accuracy of tools to identify persons at increased risk.

POPULATION This recommendation statement applies to asymptomatic, nonpregnant adolescents and adults at increased risk for HBV infection, including those who were vaccinated before being screened for HBV infection.

EVIDENCE ASSESSMENT The USPSTF concludes with moderate certainty that screening for HBV infection in adolescents and adults at increased risk for infection has moderate net benefit.

RECOMMENDATION The USPSTF recommends screening for HBV infection in adolescents and adults at increased risk for infection. (B recommendation)

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Group Information: The US Preventive Services Task Force (USPSTF) members are listed at the end of this article.

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Summary of Recommendation

The USPSTF recommends screening for hepatitis B virus (HBV) infection in adolescents and adults at increased risk for infection.	B

See Figure 1 for a more detailed summary of the recommendations for clinicians. See the Practice Considerations section for a description of adolescents and adults at increased risk for infection. USPSTF indicates US Preventive Services Task Force.

Importance

An estimated 862 000 persons in the US are living with chronic infection with hepatitis B virus (HBV).[1] Persons born in regions with a prevalence of HBV infection of 2% or greater, such as countries in Africa and Asia, the Pacific Islands, and parts of South America, often become infected at birth and account for up to 95% of newly reported chronic infections in the US. Other high-prevalence populations include persons who inject drugs; men who have sex with men; persons with HIV infection; and sex partners, needle-sharing contacts, and household contacts of persons with chronic HBV infection.[2]

According to the Centers for Disease Control and Prevention (CDC), an estimated 68% of people with chronic hepatitis B are unaware of their infection,[3] and many remain asymptomatic until onset of cirrhosis or end-stage liver disease.[4,5] This contributes to delays in medical evaluation and treatment and ongoing transmission to sex partners and persons who share objects contaminated with blood or other bodily fluids that contain HBV.[3,6] From 15% to 40% of persons with chronic infection develop cirrhosis, hepatocellular carcinoma, or liver failure, which lead to substantial morbidity and mortality.[4]

Figure 1. Clinician Summary

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What does the USPSTF recommend?	**For adolescents and adults:** Screen adolescents and adults at increased risk for hepatitis B virus (HBV) infection. Grade B
To whom does this recommendation apply?	All asymptomatic, nonpregnant adolescents and adults at increased risk for HBV infection, including those who were vaccinated before being screened for HBV infection.
What's new?	This recommendation is consistent with the 2014 USPSTF recommendation. It is strengthened by new evidence that treatment of HBV infection consistently leads to better health outcomes.
How to implement this recommendation?	**Screen.** Screen adolescents and adults at increased risk using hepatitis B surface antigen (HbsAg) tests followed by a confirmatory test for initially reactive results. Important risk groups for HBV infection with a prevalence of ≥2% that should be screened include • Persons born in countries and regions with a high prevalence of HBV infection (≥2%), such as Asia, Africa, the Pacific Islands, and parts of South America • US-born persons not vaccinated as infants whose parents were born in regions with a very high prevalence of HBV infection (≥8%) • HIV-positive persons • Persons with injection drug use • Men who have sex with men • Household contacts or sexual partners of persons with HBV infection For more information on countries and regions with a high prevalence of HBV infection, visit https://wwwnc.cdc.gov/travel/yellowbook/2020/travel-related-infectious-diseases/hepatitis-b#5182
How often?	Periodically screen persons with continued risk for HBV infection (eg, persons with current injection drug use, men who have sex with men).
What are other relevant USPSTF recommendations?	The USPSTF has made recommendations on screening for HBV infection in pregnant persons, hepatitis C virus infection in adolescents and adults, and HIV infection. These recommendations are available at https:www.uspreventiveservicestaskforce.org
Where to read the full recommendation statement?	Visit the USPSTF website to read the full recommendation statement. This includes more details on the rationale of the recommendation, including benefits and harms; supporting evidence; and recommendations of others.

The USPSTF recognizes that clinical decisions involve more considerations than evidence alone. Clinicians should understand the evidence but individualize decision-making to the specific patient or situation.

USPSTF indicates US Preventive Services Task Force.

USPSTF Assessment of Magnitude of Net Benefit

The USPSTF concludes with moderate certainty that screening for HBV infection in adolescents and adults at increased risk for infection has **moderate** net benefit.

See **Figure 1**, **Table 1**, and the eFigure in the Supplement for more information on the USPSTF recommendation rationale and assessment.

For more details on the methods the USPSTF uses to determine the net benefit, see the USPSTF Procedure Manual.[7]

Practice Considerations

Patient Population Under Consideration

This recommendation applies to asymptomatic, nonpregnant adolescents and adults at increased risk for HBV infection, including those who were vaccinated before being screened for HBV infection. The USPSTF has made a separate recommendation on screening in pregnant women.[8]

Assessment of Risk

The risk for HBV infection varies substantially by country of origin in non–US-born persons living in the US. Persons born in countries with a prevalence of hepatitis B surface antigen (HBsAg) of 2% or greater (**Table 2**, **Figure 2**) account for the majority of cases of new chronic HBV infection in the US; most persons in these countries acquired HBV infection from perinatal transmission.[2] Persons born in the US with parents from regions with higher prevalence are also at increased risk of HBV infection during birth or early childhood, particularly if they do not receive appropriate passive and active immunoprophylaxis (and antiviral therapy for pregnant women with a high viral load) (Figure 2).[11-13] The CDC classifies HBV endemicity levels by prevalence of positive HBsAg (high [8%], moderate [2%-7%], or low [<2%]) (Figure 2). The estimated prevalence of HBV infection in the general US population is 0.3% to 0.5%,[8,9,11,12,14,15] which makes it reasonable to screen adolescents and adults born in countries or regions with an HBsAg prevalence of 2% or greater (regardless of vaccination history in their country of origin) and adolescents and adults born in the US who did not receive the HBV vaccine as infants and whose parents were born in regions with an HBsAg prevalence of 8% or greater (regardless of their biological mother's HBsAg status).

HBV screening should also be offered to other risk groups defined by clinical and behavioral characteristics in which prevalence of positive HBsAg is 2% or greater. Persons from such risk groups include persons who have injected drugs in the past or currently; men who have sex with men; persons with HIV; and sex partners, needle-sharing contacts, and household contacts of persons known to be

Table 1. Summary of USPSTF Rationale

Rationale	Nonpregnant adolescents and adults at increased risk
Detection	Adequate evidence that the identification of HBV infection is accurate based on laboratory-based immunoassays for detecting hepatitis B surface antigen (HBsAg), with reported sensitivity and specificity exceeding 98%.
Benefits of early detection and treatment	• Inadequate direct evidence on benefits of screening on health outcomes due to lack of studies. • Convincing evidence that antiviral treatment of patients with chronic HBV infection is effective at improving intermediate outcomes, including hepatitis B e-antigen (HBeAg) loss and virologic suppression. • Adequate evidence from clinical trials and cohort studies that antiviral treatment of patients with chronic HBV infection improves health outcomes, such as reduced risk of mortality or hepatocellular carcinoma. • Adequate evidence that improvements in intermediate outcomes of chronic HBV infection related to antiviral treatment (such as HBeAg clearance and virologic suppression) are associated with reduced risk of adverse health outcomes (such as cirrhosis and hepatocellular carcinoma).
Harms of early detection and treatment	• Inadequate direct evidence on the harms of screening for HBV infection due to lack of studies. • Adequate evidence to bound the harms of screening as small to none based on the nature of the intervention and the low likelihood of serious harms. (When direct evidence is limited, absent, or restricted to select populations or clinical scenarios, the USPSTF may place conceptual upper or lower bounds on the magnitude of benefit or harms.) • Adequate evidence that the magnitude of harms of treatment is small, based on several trials showing that risks of adverse events, nausea, and diarrhea are not significantly greater in persons receiving treatment than in persons receiving placebo or no treatment, and that some adverse events resolve after discontinuing therapy.
USPSTF assessment	Moderate certainty that screening for HBV infection in nonpregnant adolescents and adults at increased risk for infection has a moderate net benefit, given the accuracy of screening tests and the effectiveness of antiviral treatment.

Abbreviations: HBV, hepatitis B virus; USPSTF, US Preventive Services Task Force.

HBsAg positive[2,3,9,12-14,16,17] (**Table 3**). Some persons with combinations of risk factors who are not members of risk factor groups listed above may also be at increased risk for HBV infection. Clinicians should therefore consider the populations they serve when making screening decisions.

Screening Tests

Screening for hepatitis B should be performed with HBsAg tests approved by the US Food and Drug Administration, followed by a confirmatory test for initially reactive results.[2,18]

A positive HBsAg result indicates chronic or acute infection. Serologic panels performed concurrently with or after HBsAg screening allow for diagnosis and to determine further management. (See the Additional Tools and Resources section for serologic test interpretation.)

Screening Intervals

For patients with negative HBsAg results who have not received the HBV vaccine series, periodic screening may be useful for those who report continued risk for acquiring HBV transmission, such as persons who continue to inject drugs and men who have sex with men. Clinical judgment should be used to determine screening frequency. The USPSTF found no evidence to determine optimal screening intervals.

Treatment

Persons with testing results indicative of acute or chronic HBV infection generally receive education about reducing the risk of transmission to others (eg, during childbirth or with sex and needle-sharing partners and household contacts).[20] Between 20% and 40% of patients with chronic HBV infection will require treatment[4] (see the Additional Tools and Resources section for information on treatment). Several antiviral medications are approved by the US Food and Drug Administration for treatment of chronic HBV infection.[21]

Implementation

Many persons at risk for HBV infection are not screened or vaccinated.[4] For example, approximately 11% to 67% of non–US-born persons and 28% to 52% of men who have sex with men have undergone HBV screening.[4] Low uptake of screening may be related to several barriers, including language, lack of awareness about HBV, limited access to health care, inability to access affordable treatment, stigmatization, concerns about suspension from jobs and other communal activities, and patients' concerns about reporting and follow-up of screening results by public health authorities that may involve notification of close contacts.[4,14,22-24] When offering screening, clinicians should understand the positive and negative implications of reporting (as required by most US jurisdictions[25]), case investigations, and contact notification.[24,26]

Additional Tools and Resources

Several tools may help clinicians implement this screening recommendation. The CDC provides the following tools.

- Resources on hepatitis B for professionals (https://www.cdc.gov/hepatitis/hbv/profresourcesb.htm)
- A fact sheet on interpretation of hepatitis B serologic tests (https://www.cdc.gov/hepatitis/hbv/pdfs/serologicchartv8.pdf)
- Information about HBV prevention, vaccination, transmission, screening, counseling, and treatment (https://www.cdc.gov/hepatitis/HBV/index.htm and https://www.cdc.gov/hepatitis/hbv/hbvfaq.htm)
- Information on adolescent and adult HBV vaccination (https://www.cdc.gov/mmwr/preview/mmwrhtml/rr5416a1.htm?s_cid=rr5416a1_e)

Other Related USPSTF Recommendations

Other related USPSTF recommendations are available at https://www.uspreventiveservicestaskforce.org/uspstf/. These include screening for HBV infection during pregnancy[8]; screening for hepatitis C virus infection in adults aged 18 to 79 years[27]; screening for HIV in adolescents and adults aged 15 to 65 years[28]; and behavioral counseling to prevent sexually transmitted infections.[29]

Update of the Previous Recommendation

In 2014, the USPSTF recommended screening for HBV in persons at high risk for infection (B recommendation).[30] The current draft

Table 2. Estimated Prevalence of Chronic Hepatitis B Virus Infection by Country[a]

Continent/ region	Prevalence				
	High (≥8.0%)	High moderate (5.0%-7.9%)	Low moderate (2.0%-4.9%)	Low (≤1.9%)	No data
Africa	Angola, Benin, Burkina Faso, Burundi, Cameroon, Central African Republic, Congo, Côte d'Ivoire, Djibouti, Equatorial Guinea, Gabon, Gambia, Ghana, Guinea, Liberia, Malawi, Mali, Mauritania, Mozambique, Namibia, Niger, Nigeria, Senegal, Sierra Leone, Somalia, South Sudan, Sudan, Swaziland, Togo, Uganda, Zimbabwe	Cape Verde, Democratic Republic of the Congo, Ethiopia, Kenya, Rwanda, South Africa, Tanzania, Tunisia, Zambia	Algeria, Eritrea, Libya, Madagascar	Egypt, Morocco, Seychelles	Botswana, Chad, Comoros, Guinea-Bissau, Lesotho, Mauritius, São Tomé and Príncipe
Caribbean	Haiti		Dominican Republic, Jamaica	Barbados, Cuba	Antigua and Barbuda, The Bahamas, Dominica, Grenada, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Trinidad and Tobago
Oceana	Kiribati, Nauru, Niue, Papua New Guinea, Solomon Islands, Tonga, Vanuatu	Marshall Islands, Samoa, Tuvalu	Federated States of Micronesia, Fiji, New Zealand, Palau, Tahiti	Australia	Cook Islands
Central Asia	Kyrgyzstan	Bhutan, Kazakhstan, Tajikistan, Uzbekistan	Azerbaijan		Turkmenistan, Armenia
South Asia			Pakistan, Sri Lanka	Afghanistan, India, Nepal	Maldives
Southeast Asia	Laos, Vietnam	Thailand	Bangladesh, Brunei Darussalam, Bulgaria, Cambodia, Myanmar, Philippines, Singapore	Indonesia, Malaysia	Timor-Leste
East Asia	Mongolia	China	South Korea	Japan	North Korea
Middle East	Yemen	Oman	Cyprus, Saudi Arabia, Syria, Turkey	Bahrain, Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Palestine, Qatar, United Arab Emirates	
Eastern Europe		Albania, Moldova, Romania	Belarus, Georgia, Kosovo, Russia	Bosnia and Herzegovina, Croatia, Czech Republic, Hungary, Lithuania, Poland, Ukraine, Serbia, Slovakia, Slovenia	Latvia, Lithuania, Macedonia, Montenegro
Western Europe			Italy	Austria, Belgium, Denmark, France, Germany, Greece, Iceland, Ireland, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom	Andorra, Finland, Luxembourg, Malta, Monaco, San Marino
North (Central) America			Belize	Canada, Costa Rica, Guatemala, Nicaragua, Mexico, Panama, US	El Salvador, Honduras
South America			Colombia, Ecuador, Peru, Suriname	Argentina, Bolivia, Brazil, Chile, Venezuela	Guyana, Paraguay, Uruguay

Abbreviation: HBsAg, hepatitis B surface antigen.

[a] Adapted from Schillie et al[2] and Schweitzer et al.[9] Estimates of prevalence of HBsAg, a marker of chronic hepatitis B virus infection, are based on limited data published from 1965 through 2013 and may not reflect current prevalence in countries that have implemented childhood hepatitis B virus vaccination. In addition, the prevalence of HBsAg may vary within countries by subpopulation and locality.

recommendation is consistent with the 2014 recommendation. It is strengthened by new evidence from trials and cohort studies reporting that antiviral therapy reduces risk of mortality and hepatocellular carcinoma and improves intermediate outcomes that are consistently associated with better health outcomes.

Supporting Evidence

Scope of Review

The USPSTF commissioned a systematic evidence review to update and expand on its prior review on screening for HBV infection in persons at increased risk.[31] In the current review,[11,19] the USPSTF examined evidence from new randomized clinical trials and cohort studies published from 2014 to August 2019 that evaluated the benefits and harms of screening and antiviral therapy for preventing intermediate outcomes or health outcomes and the association between improvements in intermediate outcomes and health outcomes. New key questions focused on the yield of alternative HBV screening strategies and the accuracy of tools to identify persons at increased risk.

Accuracy of Screening Tests and Risk Assessment

The USPSTF previously reviewed the evidence on screening for HBV using serologic testing with HBsAg and found it to be accurate (both

Figure 2. Estimated Prevalence of Hepatitis B Virus Infection

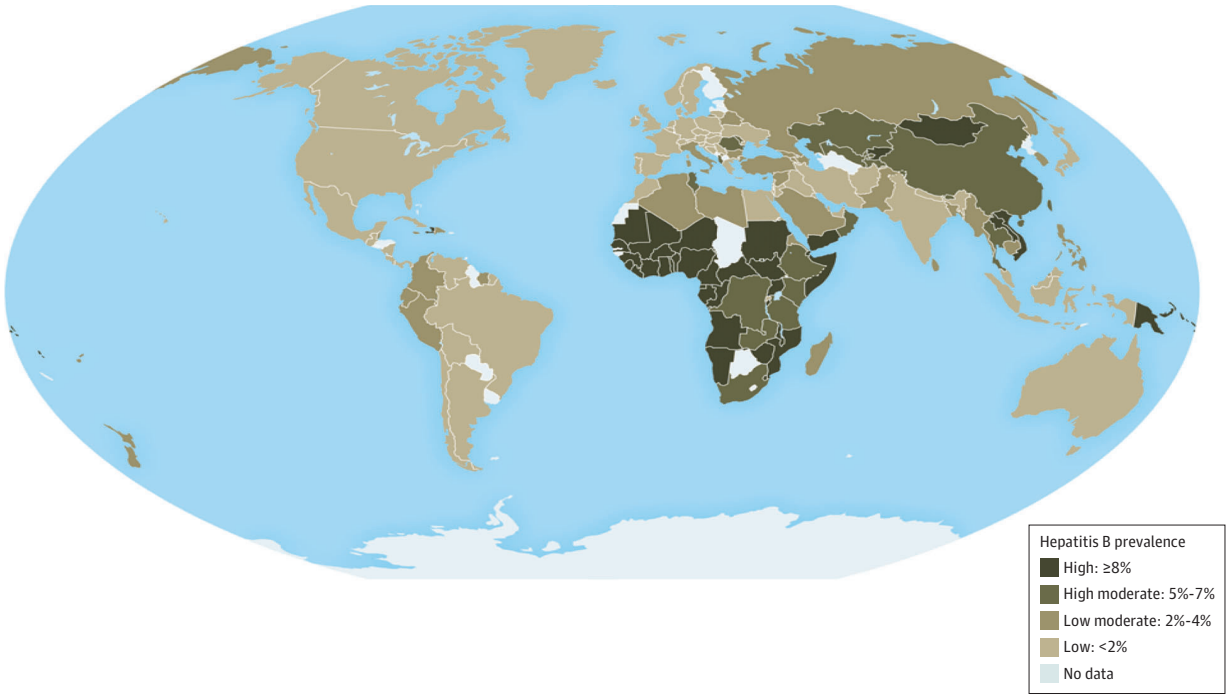

Figure reprinted from Harris[10]; based on prevalence data through 2013 reported in Schweitzer et al.[9]

sensitivity and specificity were >98%).[32] The current review found no studies that assessed the accuracy of tools for identifying persons at increased risk for HBV infection.

Benefits of Early Detection and Treatment

There are currently no randomized clinical trials comparing screening with no screening to provide direct evidence of the benefit of screening.[11,19]

Screening Strategies

Evidence on screening strategies for identifying persons with HBV infection was limited to 3 fair-quality, retrospective studies in private primary care practices in Germany (n = 20 917), a French sexually transmitted infection clinic (n = 6194), and French clinics that served populations with high HBV prevalence (n = 3929). These studies found that screening based on broad criteria (immigration from countries with a high prevalence, other demographic risk factors, or behavioral risk factors) identified nearly all cases of HBV infection, with numbers needed to screen ranging from 32 to 148. Restricting screening to immigrants from high-prevalence (≥2%) countries was more efficient (numbers needed to screen ranging from 19 to 71) and identified 85% to 99% of patients with HBV infection in higher-prevalence clinical settings but missed about two-thirds of HBV infections in German primary care practices. The applicability of these studies to US primary care settings may be limited.[11,19]

Benefits of Treatment on Intermediate Outcomes

Eighteen fair-quality trials (total N = 2972; n = 24-526; follow-up, 1.8-86 months) of antiviral therapy reported intermediate outcomes (eg, virologic suppression, normalization of alanine aminotransferase [ALT] levels, histologic improvement, and HBsAg loss or seroconversion) in persons aged 24 to 46 years. Six studies were conducted in the US or Europe. Trials evaluated first-line therapies (ie, therapies with the highest proven efficacy and safety, including nonpegylated interferon and entecavir) and alternate therapies (lamivudine and adefovir).[11,19]

Pooled analysis showed that antiviral therapy was statistically significantly more effective than placebo or no treatment in achieving histologic improvement, loss of HBsAg, loss of hepatitis B e-antigen (HBeAg), HBeAg seroconversion, virologic suppression,

Table 3. Prevalence of Hepatitis B Virus Infection by Risk Group

Risk group	Proportion with HBV infection, %	Sources
HIV-positive persons[a]	3.3-17.0	Chou et al[11] Schweitzer et al[9] Nelson et al[16] Thio[17] Abara and Schillie[18] Chou et al[19]
Persons who inject drugs	2.7-19.7	Chou et al[11] Kim et al,[12] Schweitzer et al[9] Le et al[15] Chou et al[19]
Household contacts or sexual partners of persons with HBV infection	3.0-20.0	Schillie et al[2] Schweitzer et al[9]
Men who have sex with men	1.1-2.3	Schweitzer et al[9]

Abbreviation: HBV, hepatitis B virus.

[a] Data from the US and Western Europe.

and normalization of ALT levels,[11,19] Although there were some differences in the magnitude of the effect when trials were stratified by geographic region, antiviral therapy was consistently associated with increased likelihood of virologic suppression across regions. Stronger effects were also seen in studies with less than 1 year of follow-up than in studies with longer follow-up.[11,19]

Twelve good- or fair-quality trials (N = 4127; n = 44-715; duration, 3.7-22 months) in adults compared first-line vs alternate regimens, specifically entecavir vs lamivudine (6 studies), entecavir vs telbivudine (2 studies), pegylated interferon vs lamivudine (1 study), or tenofovir disoproxil fumarate (TDF) vs adefovir (3 studies). In 1 trial of pegylated interferon and in pooled analysis of 6 trials of entecavir, both first-line regimens achieved significantly higher virologic suppression or ALT normalization compared with lamivudine.[11,19]

Benefits of Treatment on Health Outcomes

Seven fair-quality randomized trials (N = 1042; n = 42-356; duration, 12-86 months) compared the effects of antiviral therapy vs placebo or no treatment on cirrhosis, hepatocellular carcinoma, or mortality in adults. Three trials were conducted in the US or Europe; the remainder were conducted in Asia or multiple countries with varied HBsAg prevalence. Four trials assessed various interferon alfa regimens; 4 assessed lamivudine. Pooled analysis revealed that treatment was associated with significant reduction in mortality (3 trials; relative risk [RR], 0.15 [95% CI, 0.03-0.69]) and lower risk of incident cirrhosis (2 trials; RR, 0.72 [95% CI, 0.29-1.77]) or hepatocellular carcinoma (4 trials; RR, 0.60 [95% CI, 0.16-2.33]) that were not statistically significant. None of the trials evaluated effects of antiviral therapy in adolescents or how effects varied by age, race/ethnicity, or sex.[11,19]

Seven fair-quality cohort studies (N = 50 912; n = 632-43 190; duration, 2.7-8.9 years) compared antiviral therapy with no antiviral therapy in adults in the US (2 trials) or Asia (5 trials). Most studies adjusted for patient age, sex, and stage of fibrosis; some also adjusted for level of HBV DNA, ALT levels, or medical comorbid conditions. The trials assessed lamivudine (1 trial), entecavir (1 trial), or various regimens (5 trials). All studies found that antiviral therapy was associated with a decreased risk of hepatocellular carcinoma (adjusted hazard ratios [HRs] ranged from 0.24 to 0.64), including 2 US studies with median follow-up of 5.2 years (adjusted HR, 0.39 [95% CI, 0.27-0.56]) or 8.9 years (adjusted HR, 0.24 [95% CI, 0.15-0.39]).[11,19]

Association Between Intermediate Outcomes and Health Outcomes

Nine fair-quality cohort studies (N = 3893; n = 63-1531; duration, 3.2-9.9 years) assessed the association between intermediate outcomes after treatment and health outcomes in adults in the US or Europe (6 trials) or Asia (3 trials) with varied baseline characteristics (eg, HBeAg status, presence of cirrhosis). The trials assessed interferon (6 trials), entecavir (2 trials), or lamivudine (1 trial). HBeAg loss or seroconversion was associated with a lower risk of cirrhosis (1 trial; adjusted HR, 0.41 [95% CI, 0.32-0.88]), hepatocellular carcinoma (1 trial; adjusted HR, 0.13 [95% CI, 0.08-0.57]), or a composite health outcome (1 trial; adjusted HR, 0.06 [95% CI, 0.01-0.61]). Other studies found associations between virologic suppression, ALT normalization, histologic improvement, or composite intermediate outcomes and a lower risk of hepatocellular carcinoma or composite health outcomes, but several associations were not statistically significant.[11,19]

Harms of Early Detection and Treatment

No randomized clinical trials comparing HBV screening with no screening currently exist to provide direct evidence of the harms of screening.[11,19]

Twelve trials (N = 2106) reported on harms of treatment compared with no treatment or placebo. Pooled analyses found no significant differences in the risk of serious adverse events (4 trials; RR, 0.92 [95% CI, 0.45-1.85]), any adverse event (5 trials; RR, 1.01 [95% CI, 0.90-1.11]), renal adverse events (3 trials; RR, 1.27 [95% CI, 0.31-3.55]), or study withdrawal due to adverse events (3 trials; RR, 4.44 [95% CI, 0.95-20.77]). Nine trials (N = 3408) compared harms of first-line antiviral regimens with harms of alternate regimens. Pegylated interferon was associated with an increased risk of any adverse event compared with lamivudine in 1 trial (N = 543; RR, 1.58 [95% CI, 1.41-1.78]). No significant differences in risk of serious adverse events or withdrawal due to adverse events were found in trials that compared entecavir with lamivudine or compared TDF with adefovir. One fair-quality cohort study of Asian patients in the US (n = 1224) that compared risk of incident osteopenia or osteoporosis in patients treated with TDF or entecavir with patients receiving no therapy found no significant differences in these outcomes.[11,19]

Response to Public Comments

A draft version of this recommendation statement was posted for public comment on the USPSTF website from May 5, 2020, through June 1, 2020. Respondents expressed concern that various high-risk populations were not discussed, requested additional information on follow-up testing, and expressed concerns about implementation. In the Additional Tools and Resources section, the USPSTF provides links to additional risk factors, lists tools and resources to help clinicians assess HBV risk, and discusses hepatitis B serologic tests in detail. The USPSTF addresses persons with combinations of risk factors and screening intervals in the Practice Considerations section.

Research Needs and Gaps

The USPSTF identified important gaps related to HBV screening and recommends research on the following.

- Development and validation of clinical decision support tools to help clinicians efficiently and accurately identify adolescents and adults at increased risk for HBV infection.
- Investigating alternative screening strategies defined by a person's country of origin or other health or behavioral factors in the US.
- Development of rapid, point-of-care HBsAg tests for use in the US to facilitate screening and linkage to care for patients at risk for loss to follow-up.
- Additional trials with adequate duration and statistical power to evaluate the association between current first-line therapies (including recently approved tenofovir alafenamide) on long-term health outcomes of cirrhosis, end-stage liver disease, disease-specific and all-cause mortality, and quality of life and risk of HBV transmission.
- In the absence of randomized clinical trials, the development of registries that monitor treatment efficacy could be informative.

Recommendations of Others

Several organizations have issued recommendations about screening nonpregnant adolescents and adults. The CDC, the American College of Physicians, and the American Association for the Study of Liver Diseases recommend screening for HBV infection in asymptomatic, high-risk persons, including all persons born in countries with an HBsAg prevalence of 2% or greater regardless of vaccination history; US-born persons not vaccinated as infants whose parents were born in regions with an HBsAg prevalence of 8% or greater; persons who inject drugs; men who have sex with men; and persons with HIV infection, persons with hepatitis C virus infection, inmates of correctional facilities, and household contacts and sexual partners of HBsAg-positive persons.[2,4,21,33] Both the CDC and the American Association for the Study of Liver Diseases also recommend screening patients with conditions requiring immunosuppressive therapy, predialysis, hemodialysis, peritoneal dialysis, or home dialysis; patients who have elevated ALT levels of unknown etiology; or developmentally disabled persons and staff in residential facilities.[2,4,21] The American Association for the Study of Liver Diseases also recommends screening persons with multiple sexual partners or a history of sexually transmitted infections.[21] The American Academy of Family Physicians[34] endorses the 2014 USPSTF recommendation on HBV screening.

ARTICLE INFORMATION

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Author Contributions: Dr Krist had full access to all of the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis. The USPSTF members contributed equally to the recommendation statement.

Conflict of Interest Disclosures: Authors followed the policy regarding conflicts of interest described at https://www.uspreventiveservicestaskforce.org/Page/Name/conflict-of-interest-disclosures. All members of the USPSTF receive travel reimbursement and an honorarium for participating in USPSTF meetings. Dr Barry reported receiving grants and personal fees from Healthwise.

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Role of the Funder/Sponsor: AHRQ staff assisted in the following: development and review of the research plan, commission of the systematic evidence review from an Evidence-based Practice Center, coordination of expert review and public comment of the draft evidence report and draft recommendation statement, and the writing and preparation of the final recommendation statement and its submission for publication. AHRQ staff had no role in the approval of the final recommendation statement or the decision to submit for publication.

Disclaimer: Recommendations made by the USPSTF are independent of the US government. They should not be construed as an official position of AHRQ or the US Department of Health and Human Services.

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Additional Information: The US Preventive Services Task Force (USPSTF) makes recommendations about the effectiveness of specific preventive care services for patients without obvious related signs or symptoms. It bases its recommendations on the evidence of both the benefits and harms of the service and an assessment of the balance. The USPSTF does not consider the costs of providing a service in this assessment. The USPSTF recognizes that clinical decisions involve more considerations than evidence alone. Clinicians should understand the evidence but individualize decision-making to the specific patient or situation. Similarly, the USPSTF notes that policy and coverage decisions involve considerations in addition to the evidence of clinical benefits and harms.

REFERENCES

1. Patel EU, Thio CL, Boon D, Thomas DL, Tobian AAR. Prevalence of hepatitis B and hepatitis D virus infections in the United States, 2011-2016. *Clin Infect Dis*. 2019;69(4):709-712. doi:10.1093/cid/ciz001

2. Schillie S, Vellozzi C, Reingold A, et al. Prevention of hepatitis B virus infection in the United States: recommendations of the Advisory Committee on Immunization Practices. *MMWR Recomm Rep*. 2018;67(1):1-31. doi:10.15585/mmwr.rr6701a1

3. Hepatitis B basic information. US Department of Health and Human Services. Published August 21, 2020. Accessed November 18, 2020. https://www.hhs.gov/hepatitis/learn-about-viral-hepatitis/hepatitis-b-basics/index.html

4. Abara WE, Qaseem A, Schillie S, McMahon BJ, Harris AM; High Value Care Task Force of the American College of Physicians and the Centers for Disease Control and Prevention. Hepatitis B vaccination, screening, and linkage to care: best practice advice from the American College of Physicians and the Centers for Disease Control and Prevention. *Ann Intern Med*. 2017;167(11):794-804. doi:10.7326/M17-1106

5. McMahon BJ. The natural history of chronic hepatitis B virus infection. *Hepatology*. 2009;49(5)(suppl):S45-S55. doi:10.1002/hep.22898

6. Lin SY, Chang ET, So SK. Why we should routinely screen Asian American adults for hepatitis B: a cross-sectional study of Asians in California. *Hepatology*. 2007;46(4):1034-1040. doi:10.1002/hep.21784

7. Procedure Manual. US Preventive Services Task Force. Published 2015. Accessed October 22, 2020. https://www.uspreventiveservicestaskforce.org/uspstf/procedure-manual

8. US Preventive Services Task Force. Screening for hepatitis B virus infection in pregnant women: US Preventive Services Task Force reaffirmation recommendation statement. *JAMA*. 2019;322(4):349-354. doi:10.1001/jama.2019.9365

9. Schweitzer A, Horn J, Mikolajczyk RT, Krause G, Ott JJ. Estimations of worldwide prevalence of chronic hepatitis B virus infection: a systematic review of data published between 1965 and 2013. *Lancet*. 2015;386(10003):1546-1555. doi:10.1016/S0140-6736(15)61412-X

10. Harris AM. Chapter 4: Travel-Related Infectious Diseases. In: CDC Yellow Book 2020: Health Information for International Travel. Centers for Disease Control and Prevention. Published 2020. Accessed October 22, 2020. https://wwwnc.cdc.gov/travel/yellowbook/2020/travel-related-infectious-diseases/hepatitis-b#5182

11. Chou R, Blazina I, Bougatsos C, et al. *Screening for Hepatitis B Virus Infection in Nonpregnant Adolescents and Adults: A Systematic Review for the U.S. Preventive Services Task Force Recommendation*. Evidence Synthesis No. 194. Agency for Healthcare Research and Quality; 2020. AHRQ publication 20-05262-EF-1.

12. Kim HS, Rotundo L, Yang JD, et al. Racial/ethnic disparities in the prevalence and awareness of hepatitis B virus infection and immunity in the United States. *J Viral Hepat*. 2017;24(11):1052-1066. doi:10.1111/jvh.12735

13. Weinbaum CM, Williams I, Mast EE, et al; Centers for Disease Control and Prevention (CDC). Recommendations for identification and public health management of persons with chronic hepatitis B virus infection. *MMWR Recomm Rep*. 2008;57(RR-8):1-20.

14. Shing JZ, Ly KN, Xing J, Teshale EH, Jiles RB. Prevalence of hepatitis B virus infection among US adults aged 20-59 years with a history of injection drug use: National Health and Nutrition Examination Survey, 2001-2016. *Clin Infect Dis*. 2020;70(12):2619-2627. doi:10.1093/cid/ciz669

15. Le MH, Yeo YH, Cheung R, Henry L, Lok AS, Nguyen MH. Chronic hepatitis B prevalence among foreign-born and U.S.-born adults in the United States, 1999-2016. *Hepatology*. 2020;71(2):431-443. doi:10.1002/hep.30831

16. Nelson P, Mathers B, Cowie B, et al. Global epidemiology of hepatitis B and hepatitis C in people who inject drugs: results of systematic reviews. *Lancet*. 2011;378(9791):571-583. doi:10.1016/S0140-6736(11)61097-0

17. Thio CL. Hepatitis B and human immunodeficiency virus coinfection. *Hepatology*. 2009;49(5)(suppl):S138-S145. doi:10.1002/hep.22883

18. Abara WE, Schillie SF. Chapter 4: Hepatitis B. In: Manual for the Surveillance of Vaccine-Preventable Diseases. Centers for Disease Control and Prevention. Published May 31, 2018. Accessed October 22, 2020. https://www.cdc.gov/vaccines/pubs/surv-manual/chpt04-hepb.html

19. Chou R, Blazina I, Bougatsos C, et al. Screening for hepatitis B virus infection in nonpregnant adolescents and adults: updated evidence report and systematic review for the US Preventive Services Task Force. *JAMA*. Published December 15, 2020. doi:10.1001/jama.2020.19750

20. Workowski KA, Bolan GA; Centers for Disease Control and Prevention. Sexually transmitted diseases treatment guidelines, 2015. *MMWR Recomm Rep*. 2015;64(RR-03):1-137.

21. Terrault NA, Lok ASF, McMahon BJ, et al. Update on prevention, diagnosis, and treatment of chronic hepatitis B: AASLD 2018 hepatitis B guidance. *Hepatology*. 2018;67(4):1560-1599. doi:10.1002/hep.29800

22. Know your rights. Hepatitis B Foundation. Published 2020. Accessed October 22, 2020. https://www.hepb.org/resources-and-support/know-your-rights/

23. Guidelines for viral hepatitis surveillance and case management. Centers for Disease Control and Prevention. Published January 2005. Accessed October 22, 2020. https://www.cdc.gov/hepatitis/statistics/surveillanceguidelines.htm

24. Guidelines on hepatitis B and C testing. World Health Organization. Published February 2017. Accessed October 22, 2020. https://www.who.int/hepatitis/publications/guidelines-hepatitis-c-b-testing/en/

25. Viral hepatitis surveillance—United States. Hepatitis B tables and figures (Table 3.3). Centers for Disease Control and Prevention. Published November 14, 2019. Accessed October 22, 2020. https://www.cdc.gov/hepatitis/statistics/2017surveillance/TablesFigures-HepB.htm#tabs-1-3

26. Spradling PR, Xing J, Rupp LB, et al; Chronic Hepatitis Cohort Study (CHeCS) Investigators. Infrequent clinical assessment of chronic hepatitis B patients in United States general healthcare settings. *Clin Infect Dis*. 2016;63(9):1205-1208. doi:10.1093/cid/ciw516

27. Owens DK, Davidson KW, Krist AH, et al; US Preventive Services Task Force. Screening for hepatitis C virus infection in adolescents and adults: US Preventive Services Task Force recommendation statement. *JAMA*. 2020;323(10):970-975. doi:10.1001/jama.2020.1123

28. Owens DK, Davidson KW, Krist AH, et al; US Preventive Services Task Force. Screening for HIV infection: US Preventive Services Task Force recommendation statement. *JAMA*. 2019;321(23):2326-2336. doi:10.1001/jama.2019.6587

29. LeFevre ML; US Preventive Services Task Force. Behavioral counseling interventions to prevent sexually transmitted infections: U.S. Preventive Services Task Force recommendation statement. *Ann Intern Med*. 2014;161(12):894-901. doi:10.7326/M14-1965

30. LeFevre ML; US Preventive Services Task Force. Screening for hepatitis B virus infection in nonpregnant adolescents and adults: U.S. Preventive Services Task Force recommendation statement. *Ann Intern Med*. 2014;161(1):58-66. doi:10.7326/M14-1018

31. Chou R, Dana T, Bougatsos C, Blazina I, Zakher B, Khangura J. *Screening for Hepatitis B Virus Infection in Nonpregnant Adolescents and Adults: Systematic Review to Update the 2004 U.S. Preventive Services Task Force Recommendation*. Evidence Synthesis No. 110. Agency for Healthcare Research and Quality; 2014. AHRQ publication 12-05172-EF-1.

32. US Preventive Services Task Force. Screening for hepatitis B virus infection in pregnancy: U.S. Preventive Services Task Force reaffirmation recommendation statement. *Ann Intern Med*. 2009;150(12):869-873. doi:10.7326/0003-4819-150-12-200906160-00011

33. Hepatitis B questions and answers for health professionals. Centers for Disease Control and Prevention. Published March 16, 2020. Accessed October 22, 2020. https://www.cdc.gov/hepatitis/hbv/hbvfaq.htm#C17

34. Clinical preventive services: hepatitis B virus chronic infection. American Academy of Family Physicians. Published 2014. Accessed October 22, 2020. https://www.aafp.org/patient-care/clinical-recommendations/all/hepatitis.html