Consolidated guidance on hepatitis B and C prevention, testing, treatment, service delivery and monitoring

An implementation handbook for a public health approach

World Health Organization

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Abbreviations and acronyms

ALT	alanine aminotransferase
APRI	aspartate aminotransferase-to-platelet ratio index
ART	antiretroviral therapy
AST	aspartate aminotransferase
COVID-19	coronavirus disease 2019
DBS	dried blood spot (specimen)
GRADE	Grading of Recommendations Assessment, Development and Evaluation
HBeAg	hepatitis B e antigen
HBsAg	hepatitis B surface antigen
HBV	hepatitis B virus
HCC	hepatocellular carcinoma
HCV	hepatitis C virus
HDV	hepatitis D virus
PrEP	pre-exposure prophylaxis
STI	sexually transmitted infection
SVR	sustained virological response
SVR-12	sustained virological response at 12 weeks
SVR-24	sustained virological response at 24 weeks
TB	tuberculosis

Glossary of terms

Adherence
The extent to which a person's behaviour – taking medication, attending scheduled clinic appointments, following a diet and/or changing lifestyle – corresponds with care and treatment plans conjointly agreed between the health-care worker and the person living with hepatitis B or C.

Alpha-fetoprotein
A host cellular protein. People with hepatocellular carcinoma can have high levels.

Anti-HCV antibody
Antibody to hepatitis C virus (HCV) that can be detected in the blood usually within two or three months of HCV infection or exposure. The terms HCV antibody and anti-HCV antibody are equivalent, but these guidelines use HCV antibody throughout.

Aspartate aminotransferase (AST)-to-platelet ratio index (APRI)
A simple index for estimating hepatic fibrosis based on a formula derived from AST and platelet concentrations The formula for calculating the APRI is: APRI = (AST/upper limit of normal) times 100)/platelet count (10^9/L). An online calculator is available at: http://www.hepatitisc.uw.edu/page/clinical-calculators/apri.

Chronic hepatitis B
Defined as persistence of hepatitis B surface antigen for six months or more after acute hepatitis B. Throughout the guidelines, chronic hepatitis B is used to indicate chronic HBV infection.

Chronic hepatitis C
The presence of persistent HCV RNA or HCV core antigen in serum in association with positive serology for HCV antibody.

Cirrhosis
An advanced stage of liver disease characterized by extensive hepatic fibrosis, nodularity of the liver, alteration of liver architecture and disrupted hepatic circulation.

Decentralization
The process of delegating significant authority and resources to lower levels of the health system: provincial, regional, district, subdistrict, primary health care and community.

Decompensated cirrhosis
Clinical complications of cirrhosis become manifest, including jaundice, ascites, spontaneous bacterial peritonitis, oesophageal varices and bleeding, hepatic encephalopathy, sepsis and renal failure.

Differentiated service delivery
An approach that simplifies and adapts viral hepatitis services to better serve the needs of people living with viral hepatitis B or C, to optimize the available resources and to reduce unnecessary burdens on the health system.

Enzyme immunoassay
Laboratory-based serological immunoassays that detect antibodies, antigens or a combination of both.

HCV RNA
HCV viral genomes that can be detected and quantified in serum by nucleic acid testing.

Hepatitis B surface antigen
HBV envelope protein and excess coat particles detectable in the blood in acute and chronic hepatitis B infection.

Hepatitis B e antigen
Viral protein found in the high replicative phase of hepatitis B and usually a marker of high levels of replication with wild-type virus but not essential for viral replication.

Hepatitis D (delta) virus (HDV) RNA
HDV RNA can be detected and quantified in serum or plasma. Testing for the presence of HDV RNA confirms active viraemic infection and differentiates it from past cleared infection.

Hepatocellular carcinoma
Primary cancer of the liver arising from hepatocytes.

Integrated service delivery
Health services that are managed and delivered in a way ensuring that people receive a continuum of health promotion, disease prevention, diagnosis, treatment, disease management, rehabilitation and palliative care services at the different levels and sites of care within the health system and according to their needs, throughout the life-course.

Integration
The co-location and sharing of services and resources across disease areas. In the context of hepatitis B or C, this may include providing testing, prevention, care and treatment services alongside other health services, such as those for HIV, tuberculosis, sexually transmitted infections, antenatal care, contraceptives and other family planning services.

Linkage to care
A process of actions and activities that supports people testing for hepatitis B or C infection to engage with prevention, treatment and care services as appropriate for their hepatitis B and C status.

Nucleic acid testing
A molecular technology, such as polymerase chain reaction or nucleic acid sequence-based amplification, that can detect very small quantities of viral nucleic acid (RNA or DNA), either qualitatively or quantitatively.

Persistently abnormal or normal ALT level
ALT levels fluctuate among people with chronic hepatitis B and require longitudinal monitoring to determine the trend. The upper limits for normal ALT have been defined as below 30 U/L for men and boys and 19 U/L for women and girls, although local laboratory normal ranges should be applied. Persistently normal or abnormal may be defined as two ALT values below or above the upper limit of normal at unspecified intervals during a 6- to 12-month period. For adolescents, treatment of those with HBV DNA >2000 IU/mL and ALT exceeding the upper limit of normal should be based on at least two elevated ALT measurements exceeding the upper limit of normal over a 6- to 12-month period.

Person-centred care
Care that is focused and organized around the health needs and expectations of people and communities rather than on diseases. People-centred health services are an approach to care that consciously adopts the perspectives of individuals, families and communities and sees them as participants and beneficiaries of trusted health systems that respond to their needs and preferences in humane and holistic ways.

Point-of-care testing
Conducted at the site at which clinical care is being provided, with the results being returned to the person being tested or caregiver on the same day as sample collection and test to enable clinical decisions to be made in a timely manner.

Rapid diagnostic test
Immunoassays that detect antibodies or antigens and can give a result in less than 30 minutes. Most rapid diagnostic tests can be performed with capillary whole blood collected by finger-stick sampling.

Serological assays
Assays that detect the presence of either antigens or antibodies, typically in serum or plasma but also in capillary or venous whole blood and dried blood spot samples. These include rapid diagnostic tests and laboratory-based immunoassays, such as enzyme immunoassays, chemiluminescence immunoassays and electrochemiluminescence immunoassays.

Task sharing
The rational redistribution of tasks from higher-level cadres of health-care providers to other cadres, such as trained lay providers.

Transient elastography
A technique to measure liver stiffness (as a surrogate for fibrosis) based on the propagation of a shear wave through the liver.

Viraemic HCV infection
Hepatitis C virus infection associated with the presence of virus in the blood (as measured by HCV RNA) and often referred to as active, ongoing or current infection.

Executive summary

This publication presents the WHO consolidated guidance for the prevention, testing, treatment, service delivery and monitoring of hepatitis B and C. It synthesizes more than 80 evidence-informed recommendations and good practice statements issued between 2015 and 2025. This handbook is the first to combine all the hepatitis B, C and D guidelines into a single reference document and provide practical considerations for implementation using a public health approach. By consolidating and streamlining WHO's guidance, this publication aims to reduce fragmentation, enhance usability and accelerate the scale-up of effective interventions, ultimately contributing to the global effort for eliminating viral hepatitis as a public health problem by 2030.

The guidelines are structured around the full continuum of care and are designed to be adaptable across diverse health system contexts, especially in low- and middle-income countries. They emphasize a public health approach that is evidence-informed, person-centred and scalable and provide practical considerations for implementation. The publication is structured as follows.

The introduction outlines the goals and objectives, referencing relevant WHO materials and guidelines. It explains the basis for strong and conditional recommendations and presents the key guiding principles and methods used in its development. The background chapter follows, situating the publication within the framework of the Global Hepatitis Strategy, which directs the public health response toward viral hepatitis elimination. It also highlights the enabling factors for successful programme implementation, including the role of primary health care systems, strengthening governance and financing, developing the health workforce and ensuring access to essential medicines and diagnostics.

Primary prevention is addressed next, emphasizing strategies such as universal hepatitis B birth-dose vaccination, preventing mother-to-child (vertical) transmission, ensuring blood safety, implementing infection control in health-care settings, and promoting harm reduction for people who inject drugs. The chapter on testing and diagnosis offers recommendations for both targeted and general population testing. It highlights the use of rapid diagnostic tests, point-of-care diagnostics, molecular testing and dried blood spot testing as well as reflex testing to facilitate better linkage to care.

Treatment and care are covered in detail, with updated recommendations for antiviral therapy for hepatitis B and curative direct-acting antiviral regimens for hepatitis C. These updates include simplified eligibility criteria and streamlined monitoring strategies. The chapter on service delivery provides guidance on decentralizing services, integrating hepatitis care with primary health care and other services such as those for HIV and tuberculosis and implementing task-sharing and differentiated service delivery to improve access and efficiency.

Finally, the publication addresses strategic information for the hepatitis response and the use of person-centred data systems for monitoring and evaluation.

The publication includes a detailed summary of all recommendations, key indicators for programme monitoring and a patient management card template. It is intended for use by national programme managers, policy-makers, clinicians, donors and implementing partners involved in hepatitis response planning and service delivery.

Summary of recommendations

Chapter 3: Primary prevention of hepatitis B and C

Domain and approach	
Elimination of mother-to-child transmission of HBV (EMTCT)	Providing universal timely hepatitis B birth dose vaccination a) All infants should receive their first dose of hepatitis B vaccine as soon as possible after birth, preferably within 24 hours. b) The birth dose should be followed by two or three additional doses to complete the primary immunization series for infants. c) Delivery of hepatitis B vaccine within 24 hours of birth should be a performance indicator for all immunization programmes, and reporting and monitoring systems should be strengthened to improve the quality of data on the birth dose. (*Hepatitis B vaccines: WHO position paper*, Strategic Advisory Group of Experts, 2009, updated July 2017)
	Hepatitis B surface antigen testing among pregnant women and adolescent girls All pregnant women should be tested for HIV, syphilis and hepatitis B surface antigen at least once and as early as possible during their pregnancy. *(Strong recommendation, low-certainty evidence, 2019)*
	Antiviral prophylaxis among pregnant women and adolescent girls[1] In settings in which HBV DNA or hepatitis B e antigen (HBeAg) testing is available, prophylaxis with tenofovir disoproxil fumarate (TDF) is recommended for all HBV-positive (hepatitis B surface antigen (HBsAg)–positive) pregnant women with HBV DNA ≥200 000 IU/mL or positive HBeAg – preferably from the second trimester of pregnancy until at least delivery or completion of the infant hepatitis B vaccination series. *(Strong recommendation, moderate-certainty evidence, 2020 (updated 2024))* In settings in which neither HBV DNA nor HBeAg testing is available, prophylaxis with tenofovir disoproxil fumarate is recommended for all HBV-positive (HBsAg-positive) pregnant women – preferably from the second trimester of pregnancy until at least delivery or completion of the infant hepatitis B vaccination series. *(Conditional recommendation, low-certainty evidence, 2024)* *All interventions should be given in addition to at least three doses of hepatitis B vaccination for all infants, including a timely birth dose.*

[1] It is recommended that all pregnant women and girls of reproductive age be assessed first for eligibility for long-term treatment for their own health. However, this assessment should not delay the initiation of prophylaxis. For women and adolescent girls of childbearing age planning additional pregnancies, TDF prophylaxis can also be maintained after delivery and during subsequent pregnancies, according to the woman's choice.

Chapter 3 (continued): Primary prevention of hepatitis B and C

Hepatitis B vaccination[2]	**Childhood vaccination** a) The timely birth dose should be followed by 2–3 additional doses of hepatitis B vaccine, depending on the specific schedule used (usually combined with other vaccines such as diphtheria-tetanus-pertussis (DTP) in national immunization programmes). WHO recommends that all infants complete the full primary vaccination series by six months of age. (*Hepatitis B vaccines: WHO position paper,* Strategic Advisory Group of Experts, July 2017) **Vaccination of adults and adolescents** WHO recommends catch-up hepatitis B vaccination of older children and adolescents who missed childhood vaccination and adults at high risk of hepatitis B if the necessary resources are available. (*Hepatitis B vaccines: WHO position paper,* Strategic Advisory Group of Experts, July 2017)
Harm reduction services for people who inject drugs	**Needle and syringe programmes** All individuals from key populations who inject drugs should have access to sterile injecting equipment through needle and syringe programmes. *(Strong recommendation, low-certainty evidence, 2014)* It is suggested that needle and syringe programmes also provide low dead-space syringes along with information about their preventive advantage over conventional syringes. *(Conditional recommendation, very-low-certainty evidence, 2012)* **Opioid agonist maintenance therapy** All people who are dependent on opioids should be offered opioid agonist maintenance therapy in keeping with WHO guidance, including those in prisons and other closed settings. *(Strong recommendation, low-certainty evidence, 2014, updated 2022)*
Safe health-care injections	WHO recommends that health-care workers use a new sterile needle and syringe with every injection. *(Good practice statement, 2017)* WHO recommends that health-care workers use syringes with a sharps injury protection feature *(conditional recommendation, moderate-certainty evidence, 2016)* and syringes with a reuse prevention feature *(conditional recommendation, very-low-certainty evidence, 2016)* when delivering intramuscular, subcutaneous or intradermal injectable medications.
Blood product safety	a) All whole-blood and apheresis donations should be screened for evidence of infection before blood and blood components are released for clinical or manufacturing use. b) Screening of all blood donations should be mandatory for the following infections and using the following markers: • HIV-1 and HIV-2: screening for either a combination of HIV antigen-antibody or HIV antibodies; • hepatitis B: screening for hepatitis B surface antigen; • hepatitis C: screening for either a combination of HCV antigen/antibody or HCV antibodies; and • syphilis (*Treponema pallidum*): screening for specific treponemal antibodies. *(Policy recommendation, 2009)*

[2] Hepatitis D infection can be prevented by hepatitis B immunization of people not previously infected or exposed to HBV.

Chapter 4: Testing and diagnosis

Hepatitis B	
Who to test (testing approaches)	
Testing among the general population	In settings with a ≥2% hepatitis B surface antigen (HBsAg) seroprevalence in the general population, all adults and adolescents should have routine access to and be offered HBsAg serological testing with linkage to prevention, care and treatment services. General population testing approaches should make use of existing community- or health facility–based testing opportunities or programmes such as those at antenatal, HIV or tuberculosis clinics. *(Conditional recommendation, low-certainty evidence, 2017)*
Routine testing of pregnant women	All pregnant women should be tested for HIV, syphilis and hepatitis B surface antigen (HBsAg) at least once and as early as possible during pregnancy. *(Strong recommendation, low-certainty evidence, 2019)*
Focused testing among most severely affected populations	In all settings (and regardless of whether delivered through the facility- or community-based testing), hepatitis B surface antigen serological testing and linkage to care and treatment services should be offered to the following individuals: • adults and adolescents from populations most severely affected by hepatitis B (who are either part of a population with high HBV seroprevalence or who have a history of exposure and/or high-risk behaviour for hepatitis B); • adults, adolescents and children with clinically suspected chronic viral hepatitis (symptoms, signs and laboratory markers); • sexual partners, children and other family members and close household contacts of those with hepatitis B; and • health-care workers: in all settings, HBsAg serological testing should be offered and hepatitis B vaccination given to all health-care workers who have not been vaccinated previously. *(Strong recommendation, low-certainty evidence, 2017)*
Screening of blood donors	Screening of all blood donations should be mandatory for the following infections: HIV, hepatitis B and C and syphilis. *(Policy recommendation, 2009)*
How to test	
Serological testing: choice of assay	For diagnosing chronic hepatitis B among adults, adolescents and children (older than 12 months of age), a serological assay (either a rapid diagnostic test or laboratory-based immunoassay) that meets minimum quality, safety and performance standards (with regard to both analytical and clinical sensitivity and specificity) is recommended to detect hepatitis B surface antigen. • In settings where existing laboratory testing is already available and accessible, laboratory-based immunoassays are recommended as the preferred assay format. • In settings with limited access to laboratory testing and/or in populations where access to rapid testing would facilitate linkage to care and treatment, use of rapid diagnostic tests is recommended to improve access. *(Strong recommendation, low-certainty evidence. 2017)*
Serological testing strategies	• In settings or populations with a hepatitis B surface antigen (HBsAg) seroprevalence of ≥0.4%, a single serological assay for detecting HBsAg is recommended before further evaluation for HBV DNA and staging of liver disease. • In settings or populations with a low HBsAg seroprevalence of <0.4%, confirmation of HBsAg positivity on the same immunoassay with a neutralization step or a second different rapid diagnostic test for detecting HBsAg may be considered. *(Conditional recommendation, low-certainty evidence, 2017)*

Chapter 4 (continued): Testing and diagnosis

Measuring HBV DNA to guide treatment eligibility and monitor the response	Laboratory-based HBV DNA assays: directly following a positive hepatitis B surface antigen serological test result, the use of HBV DNA nucleic acid testing (quantitative or qualitative) is recommended as the preferred strategy to assess viral load level for treatment eligibility and to monitor treatment response. *(Strong recommendation, moderate-certainty evidence, 2017)* Point-of-care HBV DNA assays: point-of-care HBV DNA nucleic acid test assays may be used as an alternative approach to laboratory-based HBV DNA testing to assess HBV DNA level for treatment eligibility and to monitor treatment response. *(Conditional recommendation, low-certainty evidence, 2017).* See Chapter 5 for measuring HBV DNA to guide treatment eligibility and monitor the response.
Reflex HBV DNA viral load testing	When available, reflex HBV DNA testing for those testing positive for hepatitis B surface antigen (HBsAg) may be used as an additional strategy to promote linkage to care and treatment. This can be achieved through either laboratory-based reflex HBV DNA testing using a sample already held in the laboratory or clinic-based reflex testing in a health-care facility through immediate sample collection following a positive HBsAg rapid diagnostic test. *(Conditional recommendation, low-certainty evidence, 2024)*
Hepatitis D	
Who to test for hepatitis D	
Testing approaches (universal and risk-based testing)	For people with chronic hepatitis B, serological testing for anti-HDV antibodies may be performed for all individuals who are hepatitis B surface antigen (HBsAg) positive as the preferred approach to scale up access to hepatitis D diagnosis and linkage to care. *(Conditional recommendation, very-low-certainty evidence, 2024)* In settings in which a universal anti-HDV antibody testing approach is not feasible because laboratory capacity or other resources are limited, testing for anti-HDV may be given priority in specific populations of HBsAg-positive individuals, including the following: • people born in hepatitis D–endemic countries, regions and areas; • people with advanced liver disease; • people receiving hepatitis B treatment and people with features suggesting hepatitis D (such as low HBV DNA with high ALT levels); and • people considered to have increased risk of hepatitis D, including haemodialysis recipients, people living with hepatitis C or HIV, people who inject drugs, sex workers and men who have sex with men. *(Conditional recommendation, very-low-certainty evidence, 2024)*
How to test for hepatitis D	
Testing strategy and choice of serological and nucleic acid tests	People with chronic hepatitis B (HBsAg positive) may be diagnosed with hepatitis D by using a serological assay to detect total anti-HDV followed by a nucleic acid test to detect HDV RNA and active (viraemic) infection among those who are anti-HDV positive. *(Conditional recommendation, low-certainty evidence, 2024)*
Reflex testing	Reflex testing for anti-HDV antibody testing following a positive HBsAg test result and also for HDV RNA testing (when available) following a positive anti-HDV antibody test result may be used as an additional strategy to promote diagnosis. *(Conditional recommendation, low-certainty evidence, 2024)*

Chapter 4 (continued): Testing and diagnosis

Hepatitis C	
Who to test (testing approaches)	
Testing among the general population	In settings with a ≥2% HCV antibody (anti-HCV) seroprevalence in the general population, all adults and adolescents should have access to and be offered anti-HCV serological testing with linkage to prevention, care and treatment services. General population testing approaches should make use of existing community- or facility-based testing opportunities or programmes such as HIV or tuberculosis clinics, drug treatment services and antenatal clinics. *(Conditional recommendation, low-certainty evidence, 2017, updated 2024)*
Focused testing of most severely affected populations	In all settings (and regardless of whether delivered through facility- or community-based testing), serological testing for HCV antibody (anti-HCV) should be offered with linkage to prevention, care and treatment services to the following individuals: • adults and adolescents from populations most severely affected by hepatitis C: either part of a population with high HCV seroprevalence or have a history of exposure and/or high-risk behaviour for HCV infection); and • adults, adolescents and children with clinically suspected chronic viral hepatitis (symptoms, signs and laboratory markers). *(Strong recommendation, low-certainty evidence, 2017)*
Birth cohort testing	This approach may be applied to specific identified birth cohorts of older people at higher risk of infection and morbidity within populations that have an overall lower general prevalence. *(Conditional recommendation, low-certainty evidence, 2017)*
Screening of blood donors	Screening of all blood donations should be mandatory for the following infections: HIV, hepatitis B and C and syphilis (see further detail in chapter 3). *(Policy recommendation, 2009)*
Self-testing approaches	
HCV self-testing	HCV self-testing should be offered as an additional approach to HCV testing services. *(Strong recommendation, moderate-certainty evidence, 2021).* Remarks: • HCV self-testing needs to be followed by linkage to appropriate post-test services, including confirmation of viraemic infection, treatment, care and referral services, according to national standards. • Adapting HCV self-testing service delivery and support options to the national and local context is desirable, including community preferences. • Communities, including networks of key and vulnerable populations and peer-led organizations, need to be meaningfully and effectively engaged in developing, adapting, implementing and monitoring HCV self-testing programmes.
How to test (testing strategies)	
Serological assays to use	To test for serological evidence of past or present infection among adults, adolescents and children (>18 months of age[3]), an HCV serological assay (antibody or antibody/antigen) using either a rapid diagnostic test or laboratory-based immunoassay that meets minimum safety, quality and performance standards (with regard to both analytical and clinical sensitivity and specificity) is recommended. In settings with limited access to laboratory infrastructure and testing and/or in populations in which access to rapid testing would facilitate linkage to care and treatment, rapid diagnostic tests are recommended. *(Strong recommendation, low- to moderate-certainty evidence, 2017)*

[3] Hepatitis C can be confirmed among children younger than 18 months only by virological assays to detect HCV RNA, because transplacental maternal antibodies remain in the child's bloodstream up until 18 months of age, making test results from serology assays ambiguous.

Chapter 4 (continued): Testing and diagnosis

Serological testing strategies	Among adults and children older than 18 months, a single serological assay for initial detection of serological evidence of past or present infection is recommended before supplementary nucleic acid testing for evidence of viraemic infection. *(Conditional recommendation, low-certainty evidence, 2017)*
HCV RNA testing – detecting HCV viraemic infection	Laboratory-based HCV nucleic acid testing: directly following a positive HCV antibody serological test result, the use of quantitative or qualitative nucleic acid testing for detecting HCV RNA is recommended as the preferred strategy to diagnose viraemic infection. *(Strong recommendation, moderate- to low-certainty evidence, 2017)* HCV core antigen assay: an assay to detect HCV core (p22) antigen, which has comparable clinical sensitivity to laboratory-based HCV RNA nucleic acid testing assays, can be an alternative approach to diagnose HCV viraemic infection. *(Conditional recommendation, moderate-certainty evidence, 2017)* Point-of-care HCV RNA assays*:* The use of HCV point-of-care viral load nucleic acid testing can be an alternative approach to laboratory-based HCV RNA nucleic acid testing to diagnose HCV viraemic infection. *(Conditional recommendation, low- to moderate-certainty evidence, 2022)*
HCV RNA testing – assessment of treatment response	Laboratory-based HCV RNA nucleic acid testing: nucleic acid testing for qualitative or quantitative detection of HCV RNA should be used as test to document cure at 12 or 24 weeks (that is, sustained virological response (SVR12 or SVR24)) after completing antiviral therapy. *(Conditional recommendation, moderate- to low-certainty evidence, 2017)* Point-of-care HCV RNA assays: point-of-care HCV RNA assays with comparable limit of detection to laboratory-based assays can be used as an alternative approach as test of cure. *(Conditional recommendation, low- to moderate-certainty evidence, 2022)*
Reflex HCV viral load testing	Reflex HCV RNA testing may be used for those with a positive HCV antibody test result as an additional key strategy to promote linkage to care and treatment. This can be achieved either through laboratory-based reflex HCV RNA testing using a specimen already held in the laboratory or clinic-based reflex testing in a health facility through immediate specimen collection following a positive HCV antibody rapid diagnostic test. *(Conditional recommendation, low-certainty evidence, 2022)*
Retesting	
Retesting	**Key populations** People with ongoing risk and a history of treatment-induced or spontaneous clearance of hepatitis C may be offered testing every 3–6 months for the presence of HCV viraemia. *(Conditional recommendation, very-low-certainty evidence, 2022).* Remarks: • Testing should be voluntary and not be used to further stigmatize any populations with ongoing risk. • Testing should be offered alongside primary prevention services that are evidence informed and reduce transmission risks and in combination with appropriate treatment access and linkage. • To detect the presence of viraemic infection, quantitative or qualitative nucleic acid testing for detecting HCV RNA or, alternatively, an assay to detect HCV core antigen can be performed.

Chapter 4 (continued): Testing and diagnosis

Interventions to promote uptake of hepatitis testing and linkage to care	
Use of dried blood spot specimens for serology and nucleic acid testing	The use of dried blood spot specimens for hepatitis B surface antigen and HCV antibody serology testing may be considered in settings in which: • there are no facilities or expertise to take venous whole blood specimens; or • rapid diagnostic tests are not available or their use is not feasible; or • there are people with poor venous access (for example, in drug treatment programmes and prisons). *(Conditional recommendation, moderate-certainty (HBV) and low-certainty (HCV) evidence, 2017)* The use of dried blood spot specimens to test for HBV DNA and HCV RNA for diagnosis of HBV and HCV viraemia, respectively, may be considered in settings in which: • there is a lack of access to sites or nearby laboratory facilities for nucleic acid testing, or provision for timely delivery of specimens to a laboratory; or • there are people with poor venous access (for example, in drug treatment programmes and prisons). *(Conditional recommendation, low-certainty (HBV) and moderate-certainty (HCV) evidence, 2017)*
Other interventions to improve uptake of testing and linkage to care	
Uptake of testing and linkage to care	All facility- and community-based hepatitis testing services should adopt and implement strategies to enhance uptake of testing and linkage to care. *(Strong recommendation, moderate-certainty evidence)* In addition to reflex testing above, the following evidence-informed interventions should be considered to promote uptake of hepatitis testing and linkage to care and treatment initiation: • Peer and lay health worker support in community-based settings *(Conditional recommendation, moderate-certainty evidence, 2017)* • Clinician reminders to prompt provider-initiated, facility-based HBV and HCV testing in settings that have electronic records or analogous reminder systems *(Conditional recommendation, very-low-certainty evidence, 2017).* • Provision of hepatitis testing as part of integrated services within mental health/substance use services *(Conditional recommendation, very-low-certainty evidence, 2017).*

Chapter 5: Treatment for hepatitis B and C

Domain	
Baseline assessment	**Recommended non-invasive test according to settings and non-invasive assessment of liver disease stage at baseline and during follow-up**
	Aspartate aminotransferase-to-platelet ratio index (APRI) is recommended as the preferred non-invasive test to assess the presence of significant fibrosis or cirrhosis among adults in resource-limited settings. Transient elastography (FibroScan®) may be a preferable non-invasive test in settings where it is available and cost is not a major constraint. *(Strong recommendation, moderate-certainty evidence, 2015)*
	Evidence of significant fibrosis (≥F2) should be based on an APRI score of >0.5 or transient elastography value of >7.0 kPa. Evidence of cirrhosis (F4) should be based on clinical criteria **or** an APRI score of >1.0 **or** transient elastography (FibroScan®) value of >12.5 kPa). *(Adults: strong recommendation, moderate-certainty evidence; adolescents: strong recommendation, low-certainty evidence, 2022, updated 2024)*
Hepatitis B	
Who to treat (adults and adolescents), 2024	**Who to treat among people with chronic hepatitis B (adults and adolescents)**
	Treatment is recommended for all adults and adolescents (aged ≥12 years) with chronic hepatitis B (including pregnant women and girls and women of reproductive age) with: 1. Evidence of significant fibrosis (≥F2) based on an APRI score of >0.5 or transient elastography value of >7 kPa or evidence of cirrhosis (F4) based on clinical criteria or an APRI score of >1 or transient elastography value of >12.5 kPa, regardless of HBV DNA or ALT levels. *(Adults: strong recommendation, moderate-certainty evidence; adolescents: strong recommendation, low-certainty evidence)* or 2. HBV DNA >2000 IU/mL and an ALT level above the upper limit of normal (30 U/L for men and boys and 19 U/L for women and girls). For adolescents, this should be based on ALT exceeding the upper limit of normal on at least two occasions in a 6- to 12-month period. *(Adults: strong recommendation, high-certainty evidence [HBV DNA>20 000 IU/mL] and low-certainty evidence [HBV DNA 2000–20 000 IU/mL]; adolescents: conditional recommendation, low-certainty evidence)* or 3. The presence of coinfections (such as HIV, hepatitis D or hepatitis C); family history of liver cancer or cirrhosis; immune suppression (such as long-term steroid use or solid organ or stem cell transplant); comorbidities (such as diabetes or metabolic dysfunction–associated steatotic liver disease); or extrahepatic manifestations (such as glomerulonephritis or vasculitis), regardless of the APRI score or HBV DNA or ALT levels. *(Adults: strong recommendation, moderate-certainty evidence: adolescents: conditional recommendation, low-certainty evidence)* or 4. In the absence of access to an HBV DNA assay: persistently abnormal ALT levels alone (defined as two ALT values above the upper limit of normal at unspecified intervals during a 6- to 12-month period), regardless of APRI score. *(Adults and adolescents: conditional recommendation, very-low-certainty evidence, 2024)*

Chapter 5 (continued): Treatment for hepatitis B and C

First-line antiviral therapy	For all adults, adolescents and children (two years or older or older) for whom antiviral therapy is indicated, the nucleos(t)ide analogues that have a high genetic barrier to drug resistance – tenofovir disoproxil fumarate or entecavir – are recommended as preferred regimens. *(Strong recommendation, moderate-certainty evidence, 2015, updated 2024)*
	Tenofovir disoproxil fumarate (TDF) or TDF + lamivudine or TDF + emtricitabine are recommended as alternative regimens (when TDF monotherapy is not available). *(Strong recommendation, moderate-certainty evidence, updated 2024)*
	Entecavir or tenofovir alafenamide (if available) are recommended for people with established osteoporosis and/or impaired kidney function and for children (entecavir for those aged two years or older) or adolescents (tenofovir alafenamide for those aged 12 years or older as an alternative regimen) for whom antiviral therapy is indicated. *(Strong recommendation, moderate-certainty evidence, 2024)*
	Nucleoside analogues with a low genetic barrier to drug resistance (lamivudine, adefovir or telbivudine) can lead to drug resistance and are not recommended. *(Strong recommendation, moderate-certainty evidence, 2015)*
Second-line antiviral therapies for managing treatment failure	Among people with evidence of treatment failure due to confirmed or suspected antiviral resistance (based on history of previous exposure or primary non-response) to lamivudine, entecavir, adefovir or telbivudine, switching to tenofovir disoproxil fumarate is recommended. Tenofovir alafenamide may be considered as an alternative regimen, if available. *(Strong recommendation, low-certainty evidence, 2015)*
Duration of therapy	All people with cirrhosis based on clinical evidence (or aspartate aminotransferase-to-platelet ratio index or transient elastography score) require lifelong treatment with nucleos(t)ide analogues and should not discontinue antiviral therapy because of the risk of reactivation, which can cause an acute hepatitis flare. *(Strong recommendation, moderate-certainty evidence, 2015)*
Preventing vertical transmission of HBV	Antiviral prophylaxis among pregnant women and adolescent girls[4] See prevention in Chapter 3.
Monitoring for safety	Before initiating antiviral therapy for nucleoside analogues, people's baseline risk for renal dysfunction and measurement of baseline renal function may be performed. People receiving long-term tenofovir disoproxil fumarate therapy may be monitored annually for renal function and growth monitored carefully in children. *(Conditional recommendation, very-low-certainty evidence, 2015)*
Monitoring for hepatitis B treatment response and disease progression	For people receiving treatment, the following are recommended to be monitored at least annually: • non-invasive tests (aspartate aminotransferase-to-platelet ratio index (APRI) score or transient elastography) to assess stage of disease and progression of fibrosis or cirrhosis; and • ALT levels (and AST for APRI), hepatitis B surface antigen, HBeAg/anti-HBe[5] and HBV DNA levels (when HBV DNA testing is available). For people receiving treatment, treatment adherence should be monitored regularly and at each visit. *(Strong recommendation, moderate-certainty evidence, 2024)*

[4] It is recommended that all pregnant women and girls of reproductive age be assessed first for eligibility for long-term treatment for their own health. However, this assessment should not delay the initiation of prophylaxis. For women and adolescent girls of childbearing age planning additional pregnancies, TDF prophylaxis can also be maintained after delivery and during subsequent pregnancies, according to the woman's choice.

[5] Monitoring of HBeAg and anti-HBe mainly applies to those who are initially HBeAg positive. However, those who have already achieved HBeAg seroconversion and are HBeAg negative and anti-HBe positive may subsequently serorevert.

Chapter 5 (continued): Treatment for hepatitis B and C

Monitoring for people under special circumstances	More frequent on-treatment monitoring (every 3–6 months for the first year) may be performed for: people with more advanced disease (compensated or decompensated cirrhosis); during the first year of treatment to assess treatment response and adherence; where treatment adherence is a concern; among HIV-coinfected people; and for people with renal impairment. *(Conditional recommendation, very-low-certainty evidence, 2015)*
Monitoring for people not yet receiving treatment	People who do not currently meet the criteria for antiviral therapy (persistently normal serum aminotransferase results and HBV DNA levels below 2000 IU/mL (when HBV DNA testing is available)) or who have expressed a desire to defer treatment may be monitored annually for disease progression and ALT and HBV DNA levels (when HBV DNA testing is available). *(Conditional recommendation, low-certainty evidence, 2015)*
Discontinuation	Antiviral therapy is lifelong. Discontinuation of nucleos(t)ide analogue therapy may be considered exceptionally for: • people without clinical evidence of cirrhosis (or based on a non-invasive test score – aspartate aminotransferase-to-platelet ratio index or transient elastography – suggesting advanced fibrosis); and • who can be followed carefully after discontinuation and long term for reactivation; and • if there is evidence of hepatitis B e antigen (HBeAg) loss and seroconversion to anti-HBe (for people initially HBeAg-positive) and after completion of at least one additional year of treatment; and • in association with persistently normal ALT levels and persistently undetectable HBV DNA levels (if HBV DNA testing is available). If HBV DNA testing is not available: discontinuing nucleos(t)ide analogue therapy may be considered for people who have evidence of persistent hepatitis B serum antigen loss and after completion of at least one additional year of treatment, regardless of previous HBeAg status. *(Conditional recommendation, low-certainty evidence, 2015)*
Retreatment	Relapse is common after stopping therapy with nucleos(t)ide analogues. Retreatment is recommended if there are consistent signs of reactivation: hepatitis B serum antigen or hepatitis B e antigen becomes positive, ALT levels increase or HBV DNA becomes detectable again (if HBV DNA testing is available). *(Strong recommendation, low-certainty evidence, 2015)*
Routine surveillance for hepatocellular carcinoma	Routine surveillance for hepatocellular carcinoma with abdominal ultrasound and alpha-fetoprotein testing every six months is recommended for: • people with cirrhosis, regardless of age or other risk factors; *(Strong recommendation, moderate-certainty evidence, 2015)* • people with a family history of hepatocellular carcinoma; and *(Strong recommendation, moderate-certainty evidence, 2015)* if there is no family history of hepatocellular carcinoma or evidence of cirrhosis, people older than 40 years (a lower age may apply depending on the regional incidence of hepatocellular carcinoma) and with HBV DNA level >20 000 IU/mL (if HBV DNA testing is available). *(Conditional recommendation, low-certainty evidence, 2015)*

Chapter 5 (continued): Treatment for hepatitis B and C

Hepatitis C	
Alcohol intake assessment	An alcohol intake assessment is recommended for all people with hepatitis C followed by the offer of a behavioural alcohol reduction intervention for people with moderate-to-high alcohol intake. *(Strong recommendation, moderate-quality evidence, 2016)*
Who to treat	**Direct-acting antiviral therapy for adults, adolescents and children: who to treat?**
	WHO recommends treatment using pangenotypic direct-acting antiviral regimens for all adults, adolescents and children three years and older with chronic hepatitis C, regardless of the stage of disease: Adults (≥18 years) *(Strong recommendation, moderate-certainty evidence, 2018)* Adolescents (12–17 years) *(Strong recommendation, moderate-certainty evidence, 2022)* Older children (6–11 years) *(Strong recommendation, moderate-certainty evidence, 2022)* Younger children (3–5 years) *(Conditional recommendation, very-low-certainty evidence, 2022)*
	Key populations Pangenotypic direct-acting antiviral therapy for hepatitis C should be offered without delay to people with recently acquired hepatitis C and ongoing risk. *(Strong recommendation, very-low-certainty evidence, 2022)*
Antiviral therapy	**What direct-acting antiviral regimens to use?**
	The following pangenotypic direct-acting antiviral regimens is recommended for adults (18 years and older, 2018), adolescents (12–17 years, 2022), older children (6–11 years, 2022) (all strong recommendations) and younger children (3–5 years) (conditional recommendations): • sofosbuvir + daclatasvir for 12 weeks;[a] *(Adults:, high-certainty evidence; adolescents and older children: high-certainty evidence; younger children: very-low-certainty evidence)* • sofosbuvir + velpatasvir for 12 weeks; and *(Adults: high-certainty evidence; adolescents and older children: low-certainty evidence; younger children: very-low-certainty evidence)* • glecaprevir + pibrentasvir for 8 weeks. *(Adults: high-certainty evidence; adolescents and older children: moderate-certainty evidence; younger children: conditional recommendation, very-low-certainty evidence)*
	[a]For those those without cirrhosis. Treatment should last 24 weeks for those who are treatment experienced or have compensated cirrhosis.

Chapter 6: Simplified service delivery for viral hepatitis

Domain	
Decentralization	WHO recommends delivering HCV testing and treatment at peripheral health or community-based facilities, and ideally at the same site, to increase access to diagnosis, care and treatment. These facilities may include primary care, harm reduction sites, prisons and antiretroviral therapy clinics as well as community-based organizations and outreach services. *(People who inject drugs and prisoners: strong recommendation, moderate-certainty evidence; general population and people living with HIV: strong recommendation, low-certainty evidence, 2022)*
Integration	WHO recommends integrating hepatitis C testing and treatment into existing care services at peripheral health facilities. These services may include primary care, harm reduction (sites for needle and syringe programmes and opioid agonist maintenance therapy), prisons and antiretroviral therapy services. *(People who inject drugs and prisoners: strong recommendation, moderate-certainty evidence; general population and people living with HIV: strong recommendation, low-certainty evidence, 2022)*
Task sharing	WHO recommends delivering hepatitis C testing, care and treatment by trained non-specialist doctors and nurses to expand access to diagnosis, care and treatment. *(Strong recommendation; moderate-certainty evidence, 2022)*

1. Introduction

1.1. Goals and objectives

The consolidated guidance for hepatitis B and C draw on over 80 existing recommendations and good practice statements for prevention, testing, care and treatment across all age groups that have been developed by WHO over the past decade and published in various guidelines publications (Box 1.1).

The goal of consolidating existing guidelines into a single publication is to enhance coherence, reduce fragmentation and improve usability for health-care providers and policy-makers and support countries in achieving the global target of eliminating viral hepatitis as a public health threat by 2030. Although it does not introduce new recommendations or evidence syntheses, it serves as a complementary resource to existing WHO guidelines, emphasizing key practical considerations for implementation across diverse settings and different levels of health-care systems, including primary health care and private sector. The rationale and evidence base supporting each recommendation are available in the source guideline. When implemented collectively, these core actions can significantly reduce the incidence and mortality of viral hepatitis and accelerate progress toward its elimination as a public health threat.

1.2. Related WHO materials and guidelines

To support countries in achieving elimination targets, WHO has developed comprehensive, evidence-informed guidelines covering the full continuum of hepatitis B and C prevention, testing, treatment and long-term care and monitoring from 2015 to 2025. These guidelines follow a public health approach to care, from testing, diagnosis and disease staging to treatment initiation and follow-up. They serve as a blueprint for national programmes, offering standardized methods to reduce the global burden of viral hepatitis. Effective implementation requires adaptation to local context, integration into national protocols and robust monitoring systems across the hepatitis care cascade.

The guidelines were developed in accordance with the procedures established by the WHO Guidelines Review Committee. The clinical recommendations were formulated by regionally representative and multidisciplinary Guidelines Development Groups. Systematic reviews and meta-analysis were undertaken to address key research questions in addition to modelling and cost–effectiveness studies, values and preferences and other relevant surveys. The GRADE (Grading of Recommendations Assessment, Development and Evaluation) approach served as the basis for assessing the certainty of the evidence and formulating recommendations. The recommendations were classified as strong or conditional based on the certainty of evidence, balance of benefits and harm, values and preferences, costs and the feasibility of implementation.

- Strong recommendations are based on high-certainty evidence and benefits clearly outweigh harm.
- Conditional recommendations reflect situations with lower certainty, smaller benefit-to-harm ratios, or where values, costs or feasibility vary by context.

The reasons for making a conditional recommendation include the absence of high-quality evidence, imprecision and/or inconsistency in outcome estimates, uncertainty regarding how individuals value the outcomes and small benefits relative to harm and costs. Factors influencing the adoption of conditional recommendations include cost–effectiveness, feasibility and the balance of benefits and harm in specific conditions or settings and may involve trade-offs.

Some recommendations, such as using hepatitis B vaccine and policies on blood transfusion and products are not graded but are evidence informed, reviewed by appropriate strategic advisory groups and published as policy statements and recommendations.

Box 1.1. Existing publications that form the foundation of this consolidated publication on hepatitis B and C prevention, testing, treatment, service delivery and monitoring.

1. *Guidelines for the prevention, care and treatment for persons with chronic hepatitis B infection (1)*
2. *WHO guidelines on hepatitis B and C testing (2)*
3. *Updated recommendations on treatment of adolescents and children with chronic HCV infection, and HCV simplified service delivery and diagnostics (3)*
4. *Prevention of mother-to-child transmission of hepatitis B virus: guidelines on antiviral prophylaxis in pregnancy: policy brief (4)*
5. *Priorities in planning person-centred hepatitis B and C testing services: operational guide (5)*
6. *Guidelines for the prevention, diagnosis, care and treatment for people with chronic hepatitis B infection (6)*
7. *Consolidated guidelines on person-centred strategic information for viral hepatitis: using data to support country scale-up of hepatitis prevention, diagnosis and treatment services (7)*
8. *Consolidated guidelines on HIV, viral hepatitis and STI prevention, diagnosis, treatment and care for key populations (8)*
9. *WHO guideline on the use of safety-engineered syringes for intramuscular, intradermal and subcutaneous injections in health care settings (9)*
10. *Hepatitis B vaccines: WHO position paper, July 2017 – recommendations (10)*

1.3. Target audience

The consolidated guidelines are aimed at programme managers responsible for planning and implementing hepatitis testing, prevention, care and treatment services and health-care providers involved in implementing and adapting WHO guidelines into national hepatitis programmes, especially those in low- and middle-income countries. It will also be of interest to clinicians and other health service providers, especially those working in primary and district care services that are the first point of contact for patients. Additionally, the recommendations are also important for people of all ages living with hepatitis B or C; programme managers for HIV, tuberculosis (TB), primary health care and related programmes, donors; and nongovernmental organizations.

1.4. Guiding principles

The following principles have informed the development of this document and should guide the implementation of the recommendations.

1.4.1. The public health approach

The guidelines are based on a public health approach to scaling up the testing and antiviral therapy for hepatitis B and C infection along the continuum of hepatitis prevention, care and treatment. The public health approach seeks to ensure the widest possible access to high-quality services at the population level, based on simplified and standardized approaches, and to strike a balance between implementing the best-proven standard of care and what is feasible on a large scale in resource-limited settings. High-income countries with more resources and fewer hepatitis B and C cases favour a more individualized approach to care.

1.4.2. Promoting human rights and equity in access to health care

Access to health care is a fundamental human right – regardless of sex, race, sexual orientation, socioeconomic status, or behavioural practices such as drug use. Promoting human rights and equity in access to hepatitis prevention, treatment, care and support are central to these guidelines. People living with hepatitis B and C often belong to indigenous or rural populations, especially in low- and middle-income countries, marginalized or high-risk groups, including people who inject drugs, men who have sex with men, migrants, and people in prisons and other closed settings. Many also face barriers because of poverty or limited access to health-care services.

Informed consent for hepatitis B and hepatitis C testing and treatment must always be obtained, with strong safeguards to ensure confidentiality. Hepatitis treatment programmes must give priority to access for those with advanced disease, pregnant women and affected populations such as sexual partners, children, family members, household contacts and health-care workers. Services should be delivered in environments that actively reduce stigma and discrimination.

Implementing these guidelines requires active efforts to protect the rights of people seeking hepatitis services. This includes promoting gender equity, preventing stigma and discrimination and addressing structural barriers such as criminalization and violence – including for rural populations, adolescents, key populations, migrants, prisoners and others. WHO emphasizes the importance of workforce training to combat stigma and discrimination and to support individuals affected by violence, ensuring that all populations can access safe and equitable health care.

1.4.3. Person-centred care

This is an approach to care that consciously adopts the perspectives of individuals, families and communities and sees them as participants and beneficiaries of trusted health systems that respond to their needs and preferences in humane and holistic ways. This approach acknowledges the experiences and perspectives of people and health-care providers that may enable or prevent the delivery of people-centred care that is of high quality.

1.4.4. Simplified service delivery to support a public health approach

Simplified service delivery for viral hepatitis services refers to a public health approach aimed at making hepatitis testing, care and treatment more accessible, especially in resource-limited or hard-to-reach settings. This model is designed to overcome barriers such as limited specialist availability, centralized services and complex diagnostic pathways. These include strategies to strengthen linkage from testing to care and treatment; strategies to promote and sustain adherence to long-term antiviral therapy; strategies to promote retention in care and trace and re-engage those disengaged from care; integrating hepatitis testing, care and treatment with other services; decentralized testing and treatment services at primary health facilities or HIV and antiretroviral therapy clinics to promote access to care; task sharing, supported by training and mentoring of health-care workers and peer workers; differentiated care to assess level-of-care needs, with specialist referral as appropriate for those with complex problems; and community engagement and peer support to promote access to services and linkage to the continuum of care.

1.4.5. Adapting implementation to the local context

Implementation of the recommendations and guidance should be informed by local context, including national hepatitis B and C epidemiology, health systems and laboratory capacity, supply systems for drugs and other commodities, availability of financial resources, the organization and capacity of the health system and the anticipated cost–effectiveness of the various interventions.

1.5. Preparation of the publication

This document was developed in accordance with WHO procedures for preparing normative publications, under the leadership of the Department of HIV, Tuberculosis, Hepatitis and Sexually Transmitted Infections. The content builds on a range of existing WHO publications addressing viral hepatitis (Box 1.1) and was informed by initial scoping activities, including consultations with key stakeholders and contributions from a WHO technical working group comprising staff from headquarters and regional offices.

An external expert group was convened to guide and support the development process. The group was selected to ensure balanced representation in terms of gender, geography, disciplines and community perspectives. An initial outline of the publication was shared with the group for feedback on framing, priorities and structure. Their contributions were provided through two online meetings and additional individual inputs.

A near-final draft was reviewed by a diverse panel of expert peer reviewers, representing academia, service delivery, donor agencies and community organizations. Their feedback was considered in alignment with the objectives of the guidance and contributed to its refinement.

In accordance with WHO standards for normative work, all external contributors and peer reviewers submitted declarations of interest forms and confidentiality statements. These were reviewed by the WHO technical team, and no conflicts of interest were identified that warranted exclusion from the process.

Final technical editing and layout were completed in accordance with WHO editorial standards to ensure clarity, accuracy and usability.

1.5.1. How to use this document

The guidelines are presented in a modular format so that readers can refer to and apply the guidelines on prevention, testing and diagnosis, treatment and care as well as service delivery in different ways relevant to their health sector composition and level, including the private sector. It also highlights important practical considerations that support the implementation of the guidelines in a variety of settings. The publication is a derivative of various WHO hepatitis B and C guidelines and is anticipated to complement the respective main guidelines and other normative publications. For simplicity, the background, evidence and decision-making process related to each recommendation are not included in these guidelines; the source publication that includes this information is referenced.

The publication summarizes existing recommendations across the viral hepatitis continuum of care and key practical implementation considerations.

Chapters 1 and 2 describe the global strategy, development of the publication and guiding principles as well as the burden and epidemiological context of the viral hepatitis epidemic and the overall strategy for viral hepatitis elimination as well as the enabling factors for successful programme implementation.

Chapters 3–5 describe the core components of prevention (including preventing the mother-to-child or vertical transmission of HBV), testing and diagnosis and antiviral therapy and care and monitoring for hepatitis B and C.

Chapter 6 describes the simplified service delivery considerations across hepatitis B and C care, including a systems approach that reinforces primary health care and sustainable hepatitis responses. Chapter 7 provides surveillance and monitoring guidance.

This publication includes figures, algorithms, boxes and tables to help readers navigate and apply the content. Links to selected tools and resources can provide additional guidance in each chapter.

1.5.2. Plans for dissemination and updating

These guidelines will be updated in full or in part (modular), based on regular scoping exercises of available evidence and experience from country implementation that will guide and trigger the need for new guidance. As the evidence base or user needs change, consideration will be given to producing technical updates on specific subjects, including treatment of hepatitis C in pregnancy, treatment of hepatitis D, new and innovative diagnostic tests and drug therapy.

The guidelines will be disseminated electronically on the WHO website and made available as a print publication on demand. Dissemination will be supported by publication of policy briefs, web and mobile phone-based apps, including the upcoming artificial intelligence knowledge management platform for HIV, TB, hepatitis and sexually transmitted infections and referencing of WHO clinical recommendations for digital health systems.

2. Background

2.1. Introduction

Over the past decade, global efforts to combat viral hepatitis have led to significant progress in raising awareness, increasing funding and expanding access to prevention, testing and treatment services. Despite these advances, viral hepatitis remains one of the world's leading infectious disease killers, with an estimated 254 million people living with hepatitis B and 50 million with hepatitis C *(11)*. When left untreated, these infections can result in chronic liver disease, cirrhosis, hepatocellular carcinoma, liver failure and death. Improved data from 187 countries show that the estimated number of deaths from viral hepatitis increased from 1.1 million deaths in 2019 to 1.3 million in 2022. Viral hepatitis and TB were the second leading causes of death among communicable diseases after coronavirus disease 2019 (COVID-19). There is increasing recognition of the importance of hepatitis D virus (HDV), which only infects individuals who already have hepatitis B. Globally, hepatitis D affects an estimated 12 million people, or about 5% of those with chronic hepatitis B and is associated with faster disease progression and more severe outcomes *(12)*.

In 2016, the World Health Assembly adopted the Global Health Sector Strategy on Viral Hepatitis, 2016–2021 *(13)*. It set ambitious targets and commitments for eliminating viral hepatitis, defined as a 90% reduction in the incidence of chronic hepatitis infection (95% for hepatitis B and 80% for hepatitis C) alongside a 65% reduction in mortality compared with the 2015 baseline measure.

This commitment has now been established as absolute impact targets[6] to provide standardization across all settings and has been reaffirmed and expanded in the 2022–2030 integrated strategies for HIV, hepatitis and sexually transmitted infections (STIs) *(14)*. The updated framework is structured around five strategic directions:

1. deliver high-quality, evidence-informed, people-centred services;
2. optimize systems, sectors and partnerships for impact;
3. generate and use data to drive action;
4. engage empowered communities and civil society; and
5. foster innovations for greater impact.

These directions emphasize simplified, scalable and person-centred approaches, promote data-driven decision-making and aim to empower communities and promote innovations – aligning with the Sustainable Development Goals (Fig. 2.1).

[6] Achievement of impact targets is demonstrated by (1) HBsAg seroprevalence of ≤0.1% among children five years or younger, *(2)* an annual incidence of new chronic hepatitis C cases of five or fewer per 100 000 people in the general population and two or fewer per 100 among people who inject drugs and *(3)* an annual hepatitis B and hepatitis C combined mortality of six or fewer per 100 000 population.

Fig. 2.1. Strategic directions of the Global health sector strategies on, respectively, HIV, viral hepatitis and sexually transmitted infections for the period 2022–2030 *(14)*

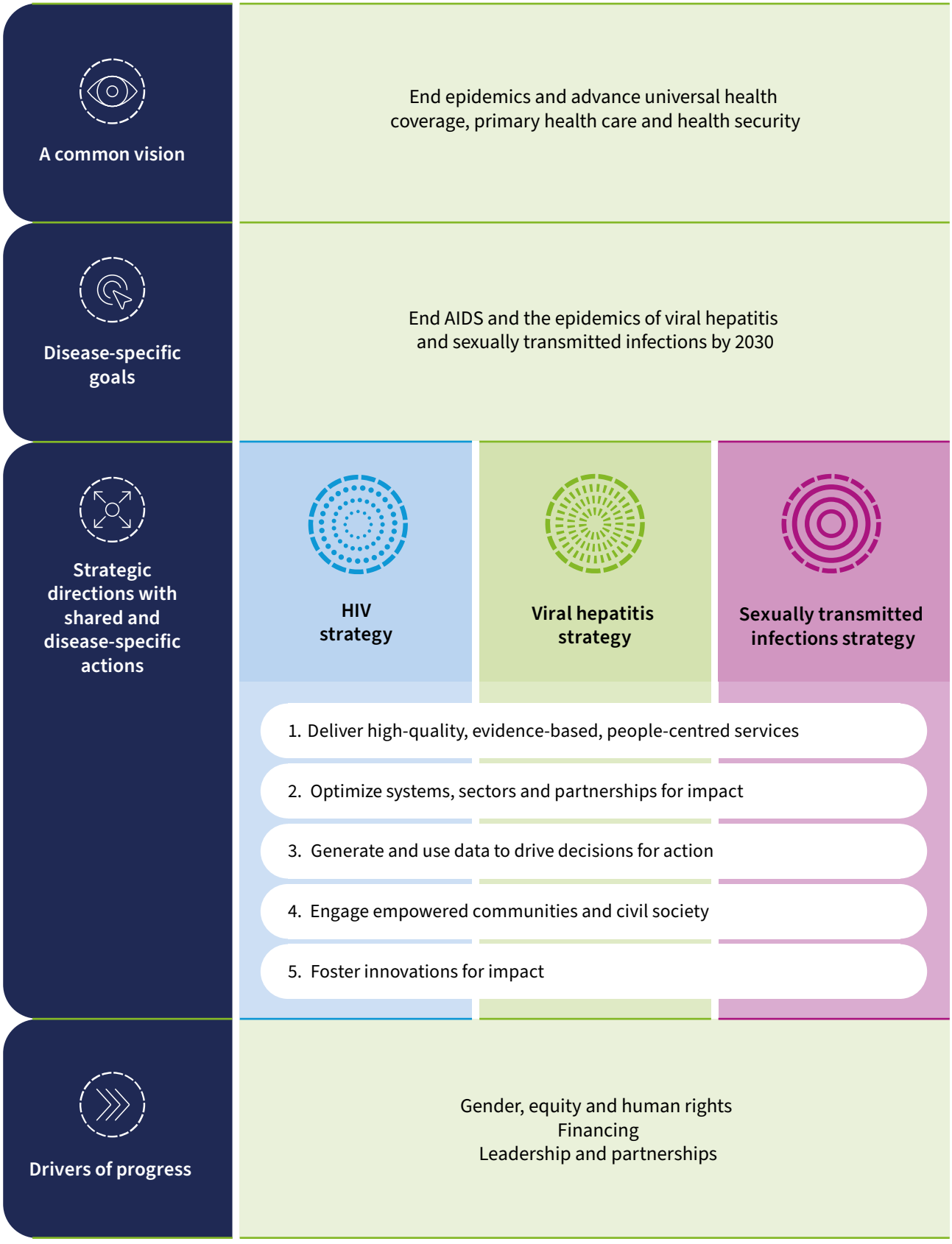


Table 2.1. Key programmatic interventions for viral hepatitis elimination and coverage targets for 2025 and 2030

		Targets		
Interventions	**Indicator**	**2020**	**2025**	**2030**
Hepatitis B vaccinations	Coverage of three doses of hepatitis B vaccine given in infancy	90%	90%	90%
Preventing vertical transmission of hepatitis B[a]	Hepatitis vaccine birth dose coverage	50%	70%	90%
Blood safety	Donations screened with quality assurance	95%	100%	100%
Injection safety	Proportion of safe injections	95%	100%	100%
Harm reduction	Syringes and needles distributed per person who injects drugs per year	200	200	300
Testing services	% of people with hepatitis B diagnosed	30%	60%	90%
	% of people with hepatitis C diagnosed	30%	60%	90%
Treatment	% diagnosed with hepatitis B treated	30%	50%[b]	80%[b]
	% diagnosed with hepatitis C treated	30%	50%[c]	80%[c]

Sources: WHO, including commissioned work, United Nations and United Nations Children's Fund (UNICEF).

[a] Interventions to prevent the vertical transmission of hepatitis B virus (HBV).

[b] Of those eligible for treatment. About 20–30% of the people living with hepatitis B may develop progressive liver disease or hepatocellular carcinoma and are eligible for treatment with nucleoside analogue therapies;

[c] For hepatitis C, all are eligible for treatment according to WHO guidelines.

2.2. Core package of interventions for eliminating viral hepatitis

The Global Health Sector Strategy on viral hepatitis outlines key interventions and their respective targets to achieve elimination by 2030. These include hepatitis B childhood vaccination, preventing the vertical transmission of HBV, blood and injection safety, harm reduction interventions for people who inject drugs and testing and treatment for both hepatitis B and C (Table 2.1, Box 2.1).

To reach the global impact targets, new infections must be reduced from about 2.2 million in 2022 to fewer than 520 000 by 2030, and deaths from hepatitis B and C must be reduced from 1.3 million to less than 500 000 *(14)*. Achieving these ambitious goals will require dramatic scale-up in prevention, testing and treatment services, especially in low- and middle-income countries, where health systems need to be strengthened to deliver broader and more equitable care.

Although absolute reductions in incidence and mortality remain the ultimate criteria for validating the elimination of hepatitis as a public health threat, achieving these thresholds remains challenging – especially in low- and middle-income countries with a high burden of disease.

Box 2.1. Impact and programme targets for eliminating viral hepatitis by 2030

Achievement of impact targets will be demonstrated by:

- hepatitis B surface antigen (HBsAg) seroprevalence of ≤0.1% among children five years and younger;
- an annual incidence of new chronic hepatitis C infections of ≤5 per 100 000 population and ≤2 per 100 among people who inject drugs; and
- an annual hepatitis B and hepatitis C combined mortality of ≤6 per 100 000 population.

Achievement of programmatic targets will be demonstrated by:

- timely[7] hepatitis B vaccine birthdose and HepB3 vaccine coverage ≥90%;
- prevention interventions: 100% safe injections, 100% blood safety and distribution of 300 needles and syringes per person who injects drugs per year;
- diagnosis of ≥90% of the people with chronic hepatitis B and hepatitis C; and
- treatment of ≥80% of the people with diagnosed hepatitis B and hepatitis C.

To acknowledge progress, WHO has established a path-to-elimination framework. Countries are recognized at different tiers – bronze, silver, and gold – based on increasing levels of service coverage in prevention, testing and treatment. The bronze tier aligns with the 2025 Global Health Sector Strategy milestones, and silver and gold reflect more advanced coverage *(15)*.

Prevention targets for hepatitis B and C focus on reducing transmission through safer blood transfusions and injection practices. For hepatitis B, timely birth-dose vaccination, early childhood immunization, maternal testing and TDF prophylaxis are critical to preventing vertical and early childhood transmission. For hepatitis C, harm reduction strategies – such as needle and syringe programmes and opioid agonist treatment in countries with opioid epidemics – are essential to promote programme development with investment and improvements towards full validation *(15)*. In the Global Health Sector Strategy on viral hepatitis, modelling shows that optimizing these prevention strategies, alongside expanded testing and treatment coverage, can enable countries to meet the 2030 elimination target *(14)*.

2.3. Progress and challenges in the global response

The epidemiology of hepatitis B and C is heterogeneous across the world. In some regions, such as the WHO Western Pacific Region and African Region, hepatitis B; in the European Region and the Eastern Mediterranean Region, hepatitis C is more prevalent. In addition, there is marked variability in the hepatitis responses within and across regions and between and within countries as a result of geographical location, socioeconomic status and political will. Nevertheless, the goal of the Global Health Sector Strategy on viral hepatitis is to eliminate viral hepatitis as a global public health threat, and it therefore depends on concerted and coordinated global action to address viral hepatitis, operationalized at the regional and country levels.

According to the 2024 global hepatitis report, annual deaths from viral hepatitis rose from 1.1 million in 2019 to 1.3 million in 2022, amounting to nearly 3500 deaths daily *(11)*. Box 2.2 shows other highlights from the report. Despite the availability of effective diagnostic tools, highly effective treatment for hepatitis B and even curative treatment for hepatitis C, diagnosis rates remain low, universal access to the hepatitis B birth dose vaccine, a critical step in protecting newborns and eliminating vertical transmission and harm reduction, remain low. Most individuals remain unaware of their infection and are at risk of developing severe liver disease.

A new global hepatitis report with updated epidemiological and cascade of care data is expected in 2026.

Box 2.3 shows key strategic and operational shifts required to eliminate chronic hepatitis as a public health problem by 2030. To be effective, countries must adapt strategies to their specific contexts, considering local disease burdens, health system capacity and input from key stakeholders to ensure inclusive, sustainable progress *(16)*.

[7] All infants should receive their first dose of hepatitis B vaccine as soon as possible after birth, preferably within 24 hours.

Box 2.2. Hepatitis B and C: key facts

There are five main types of hepatitis virus, referred to as hepatitis A, B, C, D and E. They all cause liver infection but differ in important ways, including modes of transmission, severity of illness, geographical distribution and prevention methods. These guidelines focus on hepatitis B and C because they lead to chronic disease and constitute the most common cause of liver cirrhosis and hepatitis-related deaths. They also account for 80% of all liver cancer cases and represent the third most common cause of cancer deaths worldwide *(8)*.

From the 2024 global hepatitis report *(11)*

- Chronic viral hepatitis is one of the few communicable diseases for which mortality is increasing.
- About 1.3 million people died from viral hepatitis-related causes in 2022, which is comparable to the number of TB-related deaths in that year (83% were caused by hepatitis B and 17% by hepatitis C).
- There were 1.2 million new hepatitis B infections and almost 1 million new hepatitis C infections in 2022. Most new cases of hepatitis B are the result of vertical transmission and occur predominantly in the WHO African Region, and unsafe injections, including the sharing of contaminated equipment among people who inject drugs, account for the largest number of new hepatitis C infections.
- At the end of 2022, only 13% of the people living with chronic hepatitis B and 36% of the people living with chronic hepatitis C had been diagnosed; 2.6% of the people with hepatitis B and 20% of the people with chronic hepatitis C have received treatment.
- Forty-five per cent of infants received a timely dose of hepatitis B birth dose vaccine in 2022, with the lowest coverage in the WHO African Region, which has the highest burden of new chronic HBV infection.

Box 2.3. Key strategic and operational shifts required to eliminate hepatitis B and hepatitis C as public health threats by 2030

- Promote greater public and political awareness of the importance of viral hepatitis B and C prevention, testing and treatment.
- Allocate increased financial resources to viral hepatitis B and C, which may include external catalytic funding and domestic funding through including viral hepatitis prevention, testing and treatment as part of essential national health benefit packages.
- Scale up universal access to hepatitis B birth-dose vaccines and improved services for testing of pregnant women for preventing the vertical transmission of hepatitis B.
- Ensure continued investment in primary prevention, including improved safety of medical injections and procedures, comprehensive prevention including harm reduction and other evidence-informed measures for people who inject drugs and hepatitis B vaccination for infants and at-risk populations.
- Substantially increase access to hepatitis B and hepatitis C testing to reach people living with chronic hepatitis B and hepatitis C.
- Substantially increase treatment access by building on existing community and health facility–based services.
- Promote simplified service delivery models that include decentralizing hepatitis B and C testing and treatment to lower-level health-care facilities, including primary care; integrating with other services, such as harm reduction and HIV services; and task-sharing with delivery of care and treatment by nonspecialists and nurses.
- Address the barriers faced by populations most severely affected and at risk.
- Strengthen community and civil society engagement and innovative partnerships.
- Advance the research agenda, focusing on developing curative treatment strategies for hepatitis B and a preventive vaccine for hepatitis C.

2.4. Enabling factors for successful programme implementation

The WHO-UNICEF Operational Framework for Primary Health Care serves as a useful framework for opportunities to strengthen programmes and includes political commitment and leadership, governance, service delivery, health workforce, financing, health information and access to medicines *(17)*.

Practical considerations for scaling up the national hepatitis response

Political commitment, leadership and strategic partnerships are foundational for eliminating hepatitis. These elements drive the development of supportive laws, integration into broader health strategies and ensuring high-quality care, surveillance, laboratory systems and cross-sector coordination. They also foster education, advocacy and community engagement, which are essential for mobilizing resources and aligning national priorities, including in the private sector.

Effective governance and policy frameworks: robust governance structures ensure accountability, strategic resource use and coordination across the national and district levels. Through inclusive planning and stakeholder engagement, countries can translate political commitment into actionable strategies. Clear policies and evidence-informed guidelines support consistent implementation, including service integration and a context-specific minimum package of care across all levels of the health system (Box 2.4).

Sustainable financing and smart resource allocation: eliminating hepatitis requires shifting health financing (Box 2.5). Countries must mobilize domestic resources, explore innovative financing mechanisms, leverage external support to close funding gaps and align funding streams from donors and government and further enhance public–private partnerships. Giving priority to hepatitis in national budgets and integrating it into essential health benefit packages supports long-term sustainability.

Investment cases assess gaps and opportunities in the national response and giving priority to interventions that are cost-effective and efficient and produce maximum impact in different resource scenarios. Several tools such as the UHC Service Planning Delivery & Implementation (SPDI) Platform *(18)* and the HBV and HCV calculators *(19, 20)* are available for countries to analyse cost and health impact scenarios for their own national context.

Box 2.4. Enabling policy, legal and regulatory environment

Countries should develop national testing and treatment policy and guidelines that incorporate their selected service delivery approaches, strategies and interventions (such as reflex testing and point-of-care testing) that are adapted to different country contexts and incorporated into national testing guidelines and testing infrastructure.

- Legal and regulatory barriers must be reviewed and reduced to ensure equitable access to health-care services for at-risk populations in all settings, including prisons.
- Implementation should promote and protect human rights, ensuring informed consent and preventing stigma, discrimination and gender inequity.

Box 2.5. The cost of implementing the hepatitis response

The primary cost drivers of scaling up the hepatitis response are the commodities (platforms and reagents, tests and medicines) and training. In the 2024 hepatitis report *(11)*, the main sources of financing for viral hepatitis testing and treatment, both commodities and programmes, were government funding, out-of-pocket payments and bilateral or multilateral support (such as the Global Fund to Fight AIDS, Tuberculosis and Malaria).

Countries highlighted the following barriers to expanding access to viral hepatitis testing and care at affordable prices (survey in 38 WHO focus countries for viral hepatitis, 2023) *(11)*:

- the lack of available funding;
- limited national policies for decentralization;
- the high cost of reagents of certain diagnostic tools;
- limited human resource and testing capacity outside centralized laboratories; and
- lack of local production of diagnostic test kits.

Expanding access to hepatitis services requires tailored, integrated delivery models that address local needs, give priority to primary health care and reach vulnerable populations. Standardized protocols, innovative approaches such as self-care and differentiated service delivery and strengthened laboratory systems – especially at peripheral levels – are key to timely diagnosis and treatment. Equally vital is a skilled, supported health workforce, including community health workers, enabled through training, mentorship, task-sharing and clear coordination across all levels. Legal and policy frameworks must support flexible roles, while continual capacity-building ensures culturally competent, stigma-free care and effective referral of advanced cases.

Ensuring a sustainable supply of affordable, high-quality health commodities is essential to ending the hepatitis epidemic. Several dimensions of access include product selection, quality assurance, regulatory approval, intellectual property, pricing, procurement and supply chain. Successful programme implementation requires strengthening national regulatory systems, promoting research and innovation aligned with public health needs and addressing affordability through licensing, pricing strategies and local manufacturing. Reliable procurement and supply chain systems must support access to diagnostics, medicines and vaccines, while robust logistics and monitoring systems ensure accurate forecasting and distribution. Aligning policies with national and WHO guidelines and fostering strategic collaboration with suppliers are key to building a resilient, responsive supply chain that meets evolving programmatic needs (Box 2.6).

Box 2.6. Product registration and procurement

- Countries reported inefficiency in procurement and supply chain management, limited suppliers, challenges because of small markets and limited government financing. Global data on public procurement showed great variation in the prices countries pay for commodities *(11)*.
- Several international pooled procurement mechanisms such as those operated by UNICEF, the Global Fund and the Pan American Health Organization Strategic Fund are supporting low- and middle-income countries to access cost-effective, quality-assured products in a timely manner.
- Countries can increase access to quality-assured medicines by registering and procuring WHO-prequalified products either nationally or through international procurement mechanisms, especially when they are available in lower-cost generic form.

2.5. Primary health care and the national hepatitis response

Primary health care plays a vital role in scaling hepatitis services by providing accessible care for individuals who do not require specialized treatment while linking them to broader referral networks that include community-based and hospital-level services (Box 2.7). The WHO-UNICEF Operational Framework for Primary Health Care *(17, 21)* outlines how integrated, people-centred care can be achieved through strategic investments and actions, offering a checklist for aligning hepatitis goals with broader efforts to strengthen primary health care (see fig 2.2).

Some key PHC levers to enable successful hepatitis service delivery in primary care include:

- **Models of care:** Hepatitis prevention, testing, and treatment can be delivered effectively through a PHC oriented model of care. Practically, this means explicitly including hepatitis services in primary care in national UHC packages; adequately resourcing primary care delivery platforms; and defining clear pathways to care — from community to primary care clinics to the hospital.
- **Workforce:** There is a need to expand training and support for primary care workers to sustain hepatitis treatment at scale.
- **Essential products:** These must be made available where people first seek care, including through self-care and self-testing, when appropriate.
- **Digital technologies:** Telemedicine and digital health platforms have been shown to support first-contact health workers in delivering high-quality hepatitis care.
- **Quality, research, monitoring and evaluation:** Stronger M&E systems are needed to effectively track progress.

Collaboration between hepatitis and primary health care stakeholders is essential to identify shared priorities and address policy and financing gaps that may hinder progress. When functioning effectively, primary health care ensures continuous and coordinated care across the health system *(17)*.

Tools such as WHO's Service Planning, Delivery and Implementation Platform (SPDI) support countries to adapt hepatitis services to their specific contexts and guide decisions on interventions, resources and costs *(18)*, defining clearly what services will be delivered, where and by whom. Strengthening primary health care systems enhances resilience, enabling countries to maintain service continuity during funding disruptions or crises (Fig. 2.2).

Box 2.7. Primary care and the national hepatitis response

- A PHC-oriented model of care is designed to promote primary care as the first point of contact for most needs; to enhance primary care's coordination role; and to organize health service delivery around the needs and preferences of users, with an emphasis on continuity across the life-course.
- As of 2025, more than 80 countries provide some form of hepatitis interventions within primary health care *(22)*.
- Unique strengths and best practices for primary health care integration using these levers have been described in Ethiopia, Indonesia, Rwanda and several other low- and middle-income countries *(23)*.

Fig. 2.2. The WHO/UNICEF Operational Framework for Primary Health Care

Source: WHO/UNICEF*(17)*.

3. Primary prevention of hepatitis B and C

3.1. Introduction

Hepatitis B virus is primarily transmitted from mother to child around birth and through horizontal household HBV transmission within the first years of life. Hepatitis B is also spread by exposure to infected blood and body fluids and may occur through the sharing or reuse of contaminated needles and syringes or sharp objects in health-care settings, in the community or among people who inject drugs as well as through unprotected sexual contact. Hepatitis C is spread through blood-to-blood contact, most commonly in settings with inadequate infection control and among people who inject drugs; sexual and perinatal transmission are less frequent but still possible.

Primary prevention of hepatitis B relies on vaccination (including the first dose within 24 hours of birth), screening and treating pregnant women, ensuring safe health-care procedures and injections and promoting safer sex practices. For hepatitis C, there is no vaccine, so prevention focuses on improving blood safety and rigorous health-care infection control alongside harm reduction interventions such as needle and syringe programmes and opioid agonist maintenance therapy.

These prevention strategies also have synergistic effects on preventing HIV, STIs and other infectious diseases. By reducing bloodborne transmission risks and promoting safer sexual and injecting practices, hepatitis prevention efforts contribute significantly also to broader HIV prevention goals, including for key populations.

The latest WHO estimates (Annex 1) suggest that hepatitis B and C prevention services, including improvements in hepatitis B immunization and safe injection practices, as well as the initial impact of expanding hepatitis C cure, have reduced the incidence of both hepatitis B and C. Major gaps remain in coverage of timely birth dose of hepatitis B, notably in the WHO African Region, and in coverage of harm reduction services, including needle and syringe and opioid agonist treatment programmes *(13)*.

Strengthening primary prevention for viral hepatitis is crucial for further reducing new infections and for a sustainable response. Reducing new infections will ultimately lead to a reduction in morbidity and mortality from advanced liver disease or liver cancer. To achieve further progress and elimination, national hepatitis programmes have to collaborate across the health-care system and with the respective departments to improve hepatitis B vaccination coverage, harm reduction, blood safety and infection control in health-care systems. In countries with ambitious hepatitis elimination programmes, this has typically led to improvements and stronger regulations in all these programme areas.

The Global Health Sector Strategy for viral hepatitis *(13, 14)* identified five key essential prevention intervention areas to reduce HBV and HCV transmission. To achieve hepatitis elimination, these interventions have to be offered at high coverage levels and with adequate quality.

3.2. Summary of key recommendations

Table 3.1. Summary of key recommendations for prevention of hepatitis B and C

Prevention intervention	Hepatitis B
Preventing vertical transmission	**Providing universal timely hepatitis B birth dose vaccination** *(6, 10, 16)* a) All infants should receive their first dose of hepatitis B vaccine as soon as possible after birth, preferably within 24 hours. b) The birth dose should be followed by two or three additional doses to complete the primary immunization series. c) Delivery of hepatitis B vaccine within 24 hours of birth should be a performance indicator for all immunization programmes, and reporting and monitoring systems should be strengthened to improve the quality of data on the birth dose.
	Testing and antiviral prophylaxis *(6)* **Hepatitis B surface antigen testing among pregnant women and adolescent girls** a) All pregnant women should be tested for HIV, syphilis and hepatitis B surface antigen at least once and as early as possible during their pregnancy. **Antiviral prophylaxis among pregnant women and adolescent girls** a) In settings where HBV DNA or hepatitis B e antigen (HBeAg) testing is available, prophylaxis with tenofovir disoproxil fumarate is recommended for all HBV-positive (hepatitis B surface antigen (HBsAg)-positive) pregnant women with HBV DNA ≥200 000 IU/mL or positive HBeAg – preferably from the second trimester of pregnancy until at least delivery or completion of the infant hepatitis B vaccination series. b) In settings in which neither HBV DNA nor HBeAg testing is available, prophylaxis with tenofovir disoproxil fumarate is recommended for all HBV-positive (HBsAg-positive) pregnant women – preferably from the second trimester of pregnancy until at least delivery or completion of the infant hepatitis B vaccination series. *All interventions should be given in addition to at least three doses of hepatitis B vaccination for all infants, including a timely birth dose.*
Hepatitis B vaccination	**Childhood vaccination** *(10)* a) The timely birth dose should be followed by 2–3 additional doses of hepatitis B vaccine, depending on the specific schedule used (usually combined with other vaccines such as diphtheria-tetanus-pertussis (DTP) in national immunization programmes). WHO recommends that all infants complete the full primary vaccination series by six months of age. **Vaccination of adults and adolescents**[8] WHO recommends hepatitis B vaccination of people at high risk of hepatitis B in older age groups and catch-up vaccination of unvaccinated cohorts if the necessary resources are available (see the WHO position paper on hepatitis B vaccines for details *(10)*).

[8] The WHO Global Health Sector Strategy on viral hepatitis sets only targets for childhood vaccination coverage since this has the biggest impact on preventing chronic hepatitis B and contributing to elimination; vaccination of adults and adolescents may be important in terms of good clinical practice – especially for those with increased risk for infections but less essential to eliminate hepatitis B as a global public health threat.

Table 3.1 (continued). Summary of key recommendations for prevention of hepatitis B and C

Prevention intervention	Hepatitis B	Hepatitis C
Harm reduction services for people who inject drugs	**Needle and syringe programmes** *(8)* All individuals from key populations who inject drugs should have access to sterile injecting equipment through needle and syringe programmes. It is suggested that needle and syringe programmes also provide low dead-space syringes along with information about their preventive advantage over conventional syringes.	
	Opioid agonist maintenance therapy *(8, 24, 25)* All people who are dependent on opioids should be offered opioid agonist maintenance therapy in keeping with WHO guidance, including those in prison and other closed settings.	
Safe health-care injections *(9, 26)*	WHO recommends that health-care workers use a new sterile needle and syringe with every injection. WHO recommends that health-care workers use syringes with a sharps injury protection feature and syringes with a reuse prevention feature when delivering intramuscular, subcutaneous or intradermal injectable medications.	
Blood product safety *(27)*	a) All whole-blood and apheresis donations should be screened for evidence of infection before blood and blood components are released for clinical or manufacturing use. b) Screening of all blood donations should be mandatory for the following infections and using the following markers: • HIV-1 and HIV-2: screening for either a combination of HIV antigen-antibody or HIV antibodies; • hepatitis B: screening for hepatitis B surface antigen; • hepatitis C: screening for either a combination of HCV antigen/antibody or HCV antibodies; and • syphilis (*Treponema pallidum*): screening for specific treponemal antibodies.	

3.3. Practical considerations for prevention interventions

The following sections highlight key implementation considerations for the relevant prevention intervention areas and provide links to more comprehensive guidance from WHO and partners.

3.3.1. Preventing the vertical transmission of HBV

The following are specific considerations for implementing hepatitis B vaccine birth dose *(10)*.

- All infants – including low-birthweight and premature infants – should receive their first dose of hepatitis B vaccine as soon as possible after birth, ideally within 24 hours.
- If administration within 24 hours is not feasible, a late birth dose can still be effective in preventing horizontal transmission and therefore remains beneficial. Although effectiveness declines progressively in the days after birth, a late birth dose can still be effective in preventing horizontal transmission and therefore remains beneficial. Such infants should receive the birth dose during the first contact with health-care providers at any time up to the time of the next dose of the primary schedule.
- Hepatitis B immunoglobulin (HBIG) in conjunction with hepatitis B vaccination has been shown to be of additional benefit for HB PMTCT in newborn infants whose mothers are HBsAg-positive, particularly if they are also HBeAg positive or when they have high HBV viral load *(29, 32)*.
- Use of HBIG for HB PMTCT has been in practice in many high-income countries. The use of HBIG may not be feasible in many settings, especially in LMIC, owing to concerns related to supply, storage, safety and costs. (See 3.3.2 for HB PMTCT without the need for HBIG)
- Coordination between immunization services and maternal health services is important to provide and administer the vaccine immediately after birth ideally at (or as a next best option, near) the place of delivery.
- Transporting vaccine to remote areas may be constrained by the limits of cold-chain storage. In settings where administration of a birth dose is restricted by access to cold storage, storage of monovalent hepatitis B vaccine outside the traditional cold chain (2–8°C) for a limited time under controlled conditions may be considered; this may improve birth-dose coverage and access, including in rural and remote settings. If an out-of-cold-chain policy for a monovalent hepatitis B vaccine product is adopted, which is an off-label use of the vaccine, it is strongly recommended that the WHO recommendations for out-of-cold-chain and controlled-temperature-chain use of vaccines be followed (Box 3.1).
- Home deliveries, often in isolated or rural areas, may represent a common obstacle to administering a birth dose because of lack of access to vaccine, access to trained health personnel or both. When infants are born outside health-care facilities, consider options such as home visits to provide timely vaccination and/or integration of birth dose with other early postnatal care, alongside other interventions to increase access to skilled attendance at birth.
- Health promotion initiatives include prevention, treatment and care messages and addressing misinformation – such as concerns about vaccinating low-birthweight or premature infants. These efforts should also aim to dispel fears of adverse reactions, reduce worries about vaccine wastage, alleviate concerns over out-of-pocket costs and consider strategies to navigate cultural or religious objection.

Box 3.1. Further guidance and resources

More detailed guidance on implementing timely birth dose:

- *Preventing perinatal hepatitis B virus transmission: a guide for introducing and strengthening hepatitis B birth dose vaccination (28)*; and
- *Practices to improve coverage of the hepatitis B birth dose vaccine (29)*.

Further guidance on out of cold chain and controlled temperature chain (CTC) for vaccines:

- WHO guidance documents on controlled temperature chain implementation [website] *(30)*;
- *Immunization Practices Advisory Committee (IPAC) statement: out of cold chain (OCC) and controlled temperature chain use of vaccines (31)*; and
- *Meeting of the WHO Strategic Advisory Group of Experts on immunization, October 2016 – conclusions and recommendations (32)*.

3.3.2. Specific considerations for testing pregnant women for chronic hepatitis B and antiviral prophylaxis *(6, 33)*.

Fig. 3.1 shows the algorithm for diagnosis, antiviral prophylaxis and care for preventing mother-to-child (vertical) transmission and assessing treatment eligibility for maternal health.

In addition to universal timely birth dose vaccination for preventing vertical transmission, WHO recommends testing all pregnant women for HIV, syphilis and HBsAg and to provide antiviral prophylaxis and long-term treatment to everyone who is eligible based on nationally identified criteria.

- Each country should develop and approve updated national policy and guidance that specifically defines these criteria to adopt the different options from WHO guidance. This should be done in view of the health systems and workforce capacity and resources.
- All HBsAg-positive pregnant women should be assessed for eligibility for antiviral prophylaxis to prevent vertical transmission and for long-term treatment for their own health. This assessment should not delay the initiation of antiviral prophylaxis.
- Where HBV DNA testing is available, antiviral prophylaxis should be used for pregnant women with HBV DNA levels ≥200 000 IU/mL in accordance with WHO recommendations. In settings where HBV DNA testing is not available, adopting universal antiviral prophylaxis for all HBsAg-positive women may be considered a time-limited intervention to address ongoing vertical transmission while access to HBV DNA assays is improved and expanded to enable more targeted use of antiviral prophylaxis.
- Baseline testing of HBV DNA for HBsAg-positive pregnant women enables a more complete assessment of hepatitis B treatment eligibility for women for their own health.
- For women and adolescent girls of childbearing age planning additional pregnancies, TDF prophylaxis may be continued after delivery, if preferred by the women.
- For women receiving prophylaxis or treatment (for maternal health), referral and linkage to appropriate care, psychosocial support and adherence counselling are required. Discontinuation of long-term therapy may be associated with potential risk of reactivation flare and should be carefully monitored.
- HBV screening and TDF prophylaxis should be integrated into routine antenatal care and coordinated with immunization services to streamline service delivery. Moreover, community empowerment and education are helpful in educating pregnant women about the importance of HBV screening and adherence to prophylaxis to enhance uptake and compliance (Box 3.2).
- Pregnant women need to be tested under circumstances that prevent stigma and discrimination. Integral parts of these services are providing pre-test information and post-test counselling and education on measures to reduce the risk of transmitting HBV to the infant (including the need for hepatitis B birth dose within 24 hours of delivery), encouraging partner education, testing and vaccination and ensuring linkage to care of HBsAg-positive women.
- With the 2024 WHO recommendation on HBV testing and maternal prophylaxis, WHO recognized the emerging scientific and operational evidence that antiviral prophylaxis during pregnancy combined with timely birth dose and infant vaccination series can also effectively prevent HBV transmission without the need for HBIG *(6)*.
- WHO continues to monitor the implementation of the maternal antiviral prophylaxis and will consider formal recommendations on HBIG-free HB PMTCT after further review of the evidence.

Among those who are HBsAg negative at antenatal care testing, adult catch-up vaccination and other prevention strategies should be considered. Hepatitis B vaccine is safe in pregnancy.

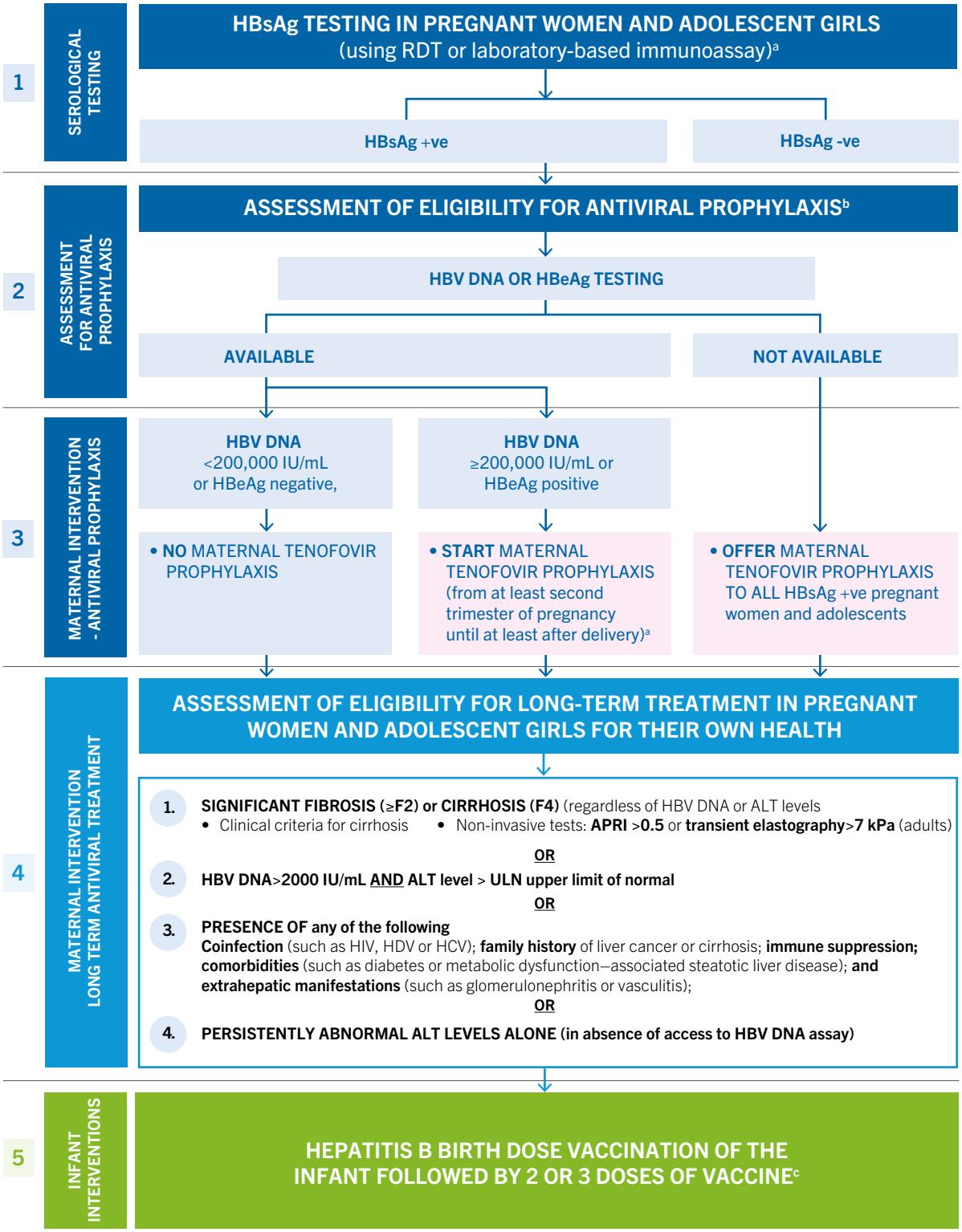
Establish specific systems to monitor the implementation of universal prophylaxis and assess its impact on vertical transmission rates, facilitating programme evaluation and improvement.

Box 3.2. Further guidance and resources

More detailed information on implementing HBV testing and antiviral prophylaxis in the framework of triple elimination is available in:

- *Country guidance for planning triple elimination of mother-to-child transmission of HIV, syphilis and hepatitis B virus programmes (33)*

Fig. 3.1. Summary algorithm for diagnosis, antiviral prophylaxis and care for preventing mother-to-child (vertical) transmission of HBV and assessing treatment eligibility for maternal health



[a] At least once and as early as possible in the pregnancy. HBsAg testing should be undertaken as part of triple testing for HIV, syphilis and HBsAg toward triple elimination initiative.

[b] It is advised that all pregnant women and adolescent girls should be assessed first for eligibility for long-term treatment for their own health. However, this assessment should not delay the initiation of antiviral prophylaxis.

[c] Hepatitis B timely (within 24 hours) birth dose vaccination of the infant followed by 2 or 3 doses of hepatitis B vaccine should be given regardless of HBsAg status of the pregnant mother. HBIG (if available) is also offered mainly in high income settings for infants born to HBsAg positive mothers, especially with high HBV DNA.

Box 3.3. Further guidance and resources

More detailed information on implementing hepatitis B vaccination for health-care workers is available here:

- WHO recommendations on immunization of health-care workers *(34)*; and
- *Implementation guide for vaccination of health workers (35).*

3.3.2. Hepatitis B vaccination

Hepatocellular carcinoma and other hepatitis B–related liver diseases are global public health problems, and WHO strongly recommends that hepatitis B vaccines be included in all national immunization programmes *(10)*. Up to 90% of infants exposed to HBV at birth and 30% of children exposed to HBV at the age of 1–5 years progress to chronic hepatitis B versus less than 5% of the people exposed to HBV in adulthood. A comprehensive approach to eliminating HBV transmission must address the prevention of infections acquired perinatally and during childhood and preventing adolescents and adults from acquiring infections.

The following are practical considerations for childhood vaccination.

All national programmes should include a monovalent hepatitis B vaccine birth dose. The birth dose should be followed by 2–3 additional doses to complete the primary series. Both of the following options are considered appropriate:

- a three-dose schedule of hepatitis B vaccine, with the first dose (monovalent) being given at birth and the second and third (monovalent or as part of a combined vaccine) given at the same time as the first and third doses of DTP-containing vaccine; or
- four doses, with a monovalent birth dose followed by three (monovalent or combined vaccine) doses, usually given with other routine infant vaccines; the additional dose does not cause any harm.

The interval between doses should be at least four weeks. There is no evidence to support a booster dose of hepatitis B vaccine after completion of the primary vaccination series in routine immunization programmes.

The following are practical considerations for older children, adolescents and adults.

- Time-limited catch-up strategies targeting unvaccinated older age groups can hasten the development of population-based immunity and more rapidly decrease the incidence of acute hepatitis B and subsequent complications caused by chronic hepatitis B. Possible target groups for catch-up vaccination include age-specific cohorts (such as unvaccinated children, young adolescents before initiation of sexual activity and people with risk factors for acquiring hepatitis B (Health-care workers, men who have sex with men, people who inject drugs, people in closed settings, sex workers, people with chronic renal failure (since they may need haemodialysis), transplant recipients and those living with people with hepatitis B.
- The need for catch-up vaccination in older age groups, including adolescents and adults, is determined by the baseline epidemiology of hepatitis B in the country and, in particular, the relative importance of reducing acute hepatitis B–related disease. In highly endemic settings, catch-up vaccination of older children, adolescents and adults is less important and is best considered after an infant immunization programme has been established and high coverage of hepatitis B vaccination among infants and young children has been achieved.
- In exceptional circumstances (such as travelling, if rapid protection is needed), a rapid hepatitis B vaccination regimen can be given at 0, 7 and 21 days followed by a fourth dose 12 months after the first dose. People who inject drugs may be offered the rapid hepatitis B vaccination regimen, to improve completion rates *(22)*.
- Hepatitis B is a well-recognized occupational risk for health-care workers (including trainees) and others (such as housekeeping staff and emergency workers) exposed to infected blood and body fluids or blood-contaminated environments. Because of their contact with patients or infective material, health-care workers are at considerably greater risk of hepatitis B than the general population and a priority for hepatitis B vaccination (Box 3.4).

Pre-vaccination serological testing is not common in routine practice but can identify people previously infected with or vaccinated against hepatitis B. Serological testing can thus avoid unnecessary vaccination for individuals already immune, especially in settings where cost–effectiveness is important.Routine post-vaccination testing for immunity is not necessary, but it is recommended for high-risk individuals whose subsequent clinical management depends on knowledge of their immune status.

Box 3.4. Further guidance and resources

More detailed guidance on implementing needle and syringe programmes is available from:

- *Operational guide for implementing needle and syringe programmes (36).*

More detailed guidance on treatment of opioid dependence and prevention of overdose is available from:

- *Guidelines for the psychosocially assisted pharmacological treatment of opioid dependence (25)*;
- *Community management of opioid overdose (37)*;
- *Guidelines for identification and management of substance use and substance use disorders in pregnancy (38)*; and
- *Opioid agonist maintenance treatment as an essential health service: implementation guidance on mitigating disruption of services for treatment of opioid dependence technical brief (39).*

3.3.3. Harm reduction services for people who inject drugs

Evidence-informed harm reduction and health-care services for people who inject and use drugs in the framework of viral hepatitis elimination include needle and syringe programmes and opioid agonist maintenance therapy.

The following are practical considerations for needle and syringe programming *(8)*.

- Providing sterile injecting equipment is an evidence-informed intervention that significantly reduces the transmission of HIV, viral hepatitis and bacterial infections. It does not lead to an increase in drug use. Needle and syringe programmes are a cost-effective, essential health-care service, and their implementation aligns with human rights principles and the right to health.
- Needle and syringe programmes play a critical role in establishing contact with marginalized, stigmatized and often criminalized communities of people who inject drugs and provides the opportunity for linkage with other services.
- Efforts must focus on improving availability, reach, uptake, coverage and quality to ensure that needle and syringe programmes are effective. Programmatic obstacles such as geographical constraints, limited service hours, supply restrictions, low-quality or poorly adapted materials and personnel attitudes can limit reach and coverage.
- Needle and syringe programmes are most effective when embedded within a broader package of harm reduction, health-care and social services. These include opioid agonist maintenance therapy, overdose prevention and management through community distribution of naloxone, HIV and hepatitis C testing and treatment, mental health services and social support.
- Active community engagement is fundamental to the success of needle and syringe programmes. It is vital to give priority to the voices, needs, and perspectives of the people the services aim to support. Meaningful community participation helps to understand and address local injection practices, specific risk factors and unique needs and contributes to tailor and improve services.
- Needle and syringe programmes must be agile and responsive to shifting drug use patterns, evolving drug markets, and emerging public health challenges. For example, stimulant use requires different harm reduction approaches than opioid use.
- Punitive laws and drug policies undermine health outcomes and exacerbate exclusion and marginalization. WHO supports an evidence-informed, human rights–centred approach. The continued criminalization of syringe possession or drug use discourages service uptake and fuels health inequity. Decriminalizing drug use and offering alternatives to conviction or punishment can foster an enabling environment in which harm reduction services can operate effectively and improve public health outcomes.

The following are practical considerations for opioid agonist maintenance therapy *(25)*.

- Providing regulated, medically supervised opioid agonist maintenance therapy is a safe and effective strategy to reduce non-medical opioid use and support long-term recovery among people with opioid dependence.
- WHO recommends opioid agonist maintenance therapy as the intervention to be offered to most people with opioid dependence given its proven effectiveness. A national strategy on the treatment of opioid dependence should include a clear outline of government policy to ensure adequate coverage, quality and safety of treatment.
- WHO emphasizes that opioid agonist maintenance therapy should be delivered as a long-term, individualized treatment approach. Treatment plans must be open-ended and continued for as long as clinically indicated. Moreover, treatment should be provided confidentially and without compulsion or coercion.

Opioid agonist maintenance therapy must be maintained without interruption, since involuntary or unplanned disruptions may have life-threatening consequences and must be avoided. It is an essential health service that should be fully integrated into national health systems and given priority in the same way as other life-saving health-care services to protect those who depend on it.

WHO recommends a range of treatment options for opioid dependence. These include opioid agonist maintenance treatment with medicines such as methadone and buprenorphine, treatment with opioid antagonists such as naltrexone and psychosocial support. Successful opioid agonist maintenance therapy programmes integrate treatment with psychosocial support, addressing the multifaceted needs of individuals with opioid dependence.

Treatment services should have a system of clinical governance, with a chain of clinical accountability within the health-care system, to ensure that the minimal standards for providing opioid dependence treatment are met. Documented processes should be established to ensure the safe and legal procurement, storage, dispensing and dosing of medicines, especially methadone and buprenorphine.

For people who demonstrate clinical stability – characterized by consistent adherence, stable social situation and low risk of diversion for illegitimate purposes – consideration for take-home doses may be appropriate. The decision to provide take-home doses should be individualized, weighing the benefits of increased autonomy against the potential risks.

Voluntary engagement in treatment is crucial for its success. People should be provided with information about their treatment options and allowed to make informed decisions. This approach respects individual autonomy and is associated with better treatment outcomes.

The short-acting opioid antagonist naloxone should also be available for emergency management of opioid overdose and part of every opioid agonist maintenance therapy and needle and syringe programme and provided to those likely to witness opioid overdose and instructed in how to administer it (Box 3.5).

Box 3.5. Further guidance and resources

More detailed information on implementing blood product safety is available at:

- *Action framework to advance universal access to safe, effective and quality-assured blood products: 2020–2023 (40)*;
- *Global status report on blood safety and availability 2021 (41)*; and
- *WHO list of prequalified in vitro diagnostic products 2023 (42).*

Box 3.6. Further guidance and resources

The following provide more detailed information on implementing safe injection practices in health-care settings:

- WHO guidance, tools, training materials and advocacy materials on infection prevention and control *(43)*;
- *Make smart injection choices: safe injection practices for health care providers (26)*; and
- *Global action plan and monitoring framework on infection prevention and control, 2024–2030 (44, 45)*.

3.3.4. Improving blood safety

The following are key practical implementation considerations for this programme area.

- Unnecessary transfusions can be reduced through active patient blood management and appropriate clinical use of blood and blood products.
- Donor recruitment and screening should rely on voluntary, non-remunerated blood donation and the need for universal screening of donated blood for transfusion-transmissible infections.
- Develop and implement an appropriate national blood screening policy and strategy; implement clear standard operating procedures for blood collection, handling and testing.
- Ensure a continuous supply of high-quality screening assays with appropriate sensitivity and specificity for blood screening.
- Implement appropriate quality systems to ensure the reliability and consistency of screening outcomes.
- Enforce compliance through licensing, accreditation and regulatory oversight of blood establishments, blood screening laboratory structures and other facilities where blood is collected or tested.
- Protect donor and patient confidentiality and establish clear informed consent processes and protocols for notifying donors of positive test results; establish systems that enable linkage to further care.
- Ensure traceability from donor to recipient to manage recalls or look-back procedures and establish haemovigilance and monitoring the outcomes of transfusion in recipients (Box 3.6).

3.3.5. Infection prevention and control in health-care settings

The following are key practical implementation considerations for infection prevention and control in health-care settings *(9, 40, 41)*.

- Enforce policies and guidelines that require health-care providers to use a new sterile needle and syringe with every injection and single-use equipment in all health-care settings and ensure alignment with national infection prevention and control.
- Include injection products suitable for use in a range of common applications (such as needles, syringes, safety-engineered devices, autodisable syringes, sharps-injury protection syringes; reuse prevention syringes and sharps containers) in national essential medical supplies lists and develop contracts with reliable suppliers to prevent stock-outs.
- Strengthen sharps waste management systems, including providing an adequate supply of safety boxes (such as sharps containers) and access to incineration or safe disposal. Establish protocols for collecting, transporting and destroying used equipment.
- Provide training to health and care providers on the WHO seven steps for safe injections and how to use safety-engineered devices.
- Provide education (such as information and communication products) to both patients and health-care workers on the risks related to overprescription of therapeutic injections or use of unsafe injections and their potential to transmit bloodborne infections.
- Monitor adherence to guidance (such as safe injection practices at the facility level) and correct unsafe practices through regular, supportive supervision.
- Implement surveillance systems to track compliance with injection safety protocols and monitor adverse events and infection rates (such as needle-stick injuries and hepatitis B and C incidence) as quality indicators.

4. Testing and diagnosis

4.1. Introduction

This chapter summarizes the WHO recommendations on hepatitis B, D and C testing and diagnosis, interventions to enhance testing and linkage to care and key practical considerations.

The Global Health Sector Strategies for HIV, viral hepatitis and sexually transmitted infections outline a set of global targets on testing and treatment of chronic hepatitis B and hepatis C infection and describe a set of priority actions for countries to achieve these targets *(14)*. The strategies are designed to contribute to eliminating viral hepatitis and linked to attaining the public health disease elimination targets of the 2030 Sustainable Development Goals target 3.3.

Most people with hepatitis B and C remain undiagnosed and untreated. By the end of 2022, only 13% of the estimated 254 million people living with hepatitis B had been diagnosed, and less than 3% had received antiviral therapy *(11)*. Of the estimated 50 million people living with hepatitis C, 36% had been diagnosed and 20% had received curative treatment between 2015 and 2022 *(11)*. Hepatitis D is being increasingly recognized as an important coinfection among people with hepatitis B and is associated with an accelerated progression to liver cirrhosis or liver cancer *(46–48)*. In 2024, WHO made recommendations on who to test and how to test for hepatitis D (Box 4.4) *(6)*.

Testing is a critical component of national responses and the first step in accessing hepatitis B and C prevention, care and treatment services (Box 4.1). The primary goals of testing services for hepatitis B and C *(2)* are:

- to identify and link individuals with hepatitis B to lifelong antiviral therapy and those with hepatitis C to curative antiviral therapy in efforts to reduce morbidity and mortality; and
- to accelerate uptake and engagement in prevention services, including hepatitis B vaccination, harm reduction services and other preventive interventions, among individuals at risk of hepatitis B or hepatitis C.

Box 4.1. Guiding principles of viral hepatitis testing *(2)*

- The WHO five Cs are principles that apply to all models of hepatitis testing and in all settings: consent, confidentiality, counselling, correct test results and connection (linkage to prevention, treatment and care services) *(2, 49)*. This means that hepatitis testing for diagnosis must always be voluntary, and consent for testing must be informed by pre-test information. Testing should be linked to prevention, treatment, care and support services to maximize both individual and public health benefits. Mandatory, compulsory or coercive hepatitis testing is never appropriate, whether that coercion comes from a health-care provider, an employer, authorities (such as immigration services) or a partner or family member. All testing sites should ensure client confidentiality.
- Accurate testing (2): People have the right to accurate and high-quality testing to ensure that the people requiring treatment are identified and initiated, and those who are negative or not in need of treatment are not inappropriately treated. This requires: (1) regulator-approved, high-quality test kits; (2) trained and competent personnel; and (3) quality-assured testing environment with proper process control, equipment management, accurate records, standard operating procedures and external quality assessments.
- Counselling and linkage to care: Individuals should receive pre- and post-test counselling, with clear pathways for treatment and monitoring liver complications. They should also be counselled on preventing transmission to household contacts and sexual partners and, for people who inject drugs, injecting partners, through preventive interventions including hepatitis B vaccination and harm reduction.

The testing approaches for chronic viral hepatitis (hepatitis B, D and C) describe the different populations (who to test) and the different settings (where to test (Tables 4.1 -4.5)) *(2)*.

These approaches include:

- general population testing;
- age-based or birth-cohort testing;
- focused testing of populations most severely affected by hepatitis B or C (that is, those who are either part of a population with higher seroprevalence or who have a history of exposure to or high-risk behaviour for hepatitis B or C) *(2, 6)*;
- routine HBsAg testing of all pregnant women as part of integrated triple testing for syphilis, hepatitis B and HIV in antenatal clinic services *(6)*; and
- hepatitis D testing approaches among people living with chronic hepatitis B (universal or focused).

Countries need to develop a strategic mix of testing approaches based on the local context, including the epidemiological context, resources and health system capabilities, integration opportunities and community engagement *(5)*. This also involves creating demand and developing differentiated testing and treatment delivery models *(5)*.

Viral hepatitis testing can be delivered through health facilities, community-based settings and may include self-testing *(2, 5, 50)*.

- Facility-based testing includes primary health care centres, inpatient wards, emergency department and outpatient clinics, including specialist clinics such as HIV, STI and TB clinics, antenatal and prenatal clinics, drug treatment and harm reduction services, mental health services and noncommunicable disease screening services (for example, diabetes or hypertension). Facility-based testing also may include testing in prisons and other closed settings and in pharmacies.
- Community-based testing: Testing can be delivered through outreach (mobile) services in general and for key populations; home-based testing (or door-to-door outreach); testing in workplaces, places of worship, parks, bars and drop-in centres; in schools and other educational establishments; and through campaigns (for example, screening for HIV or malaria, alongside campaigns on noncommunicable diseases such as diabetes and hypertension and age-specific cancer screening) and other community-based services for certain mobile, migrant or indigenous population groups. Health-care workers or trained peer and lay providers can conduct community-based testing.
- Self-testing for hepatitis C is an additional approach for HCV testing but currently not available for hepatitis B or D *(50)*. Self-testing is empowering and acceptable and increases access to testing for people who have not tested before or who could benefit from regular opportunities to test, including people who inject drugs, men who have sex with men, sex workers and those in the general population *(50, 51)*. Self-testing can be offered through health-care providers, community and peer workers, online platforms and secondary distribution by partners and social contacts (Boxes 4.2 and 4.3).

Box 4.2. Linkage to care *(5)*

- Hepatitis B and C testing must always be followed by linking clients to a comprehensive package of prevention services (both those testing negative or positive) and linking those testing positive on serology to viral load testing and evaluating treatment eligibility and initiating treatment and care. All hepatitis testing, whether facility or community based or self-testing, should adopt strategies to enhance uptake of testing and linkage to care (see Box 4.3).
- A combination of testing strategies (for example, an onsite rapid diagnostic test followed by point-of-care molecular viral load testing) is needed to improve linkage to prevention, care and treatment and especially to minimize loss to follow-up, including for populations that may face barriers to services, such as key populations, migrants and displaced people and rural communities.

4.2. Summary of recommendations

Table 4.1. Summary of WHO recommendations and guidance on who to test for hepatitis B and C infection *(2, 27)*

	Hepatitis B	Hepatitis C
Testing among the general population		
General population testing in intermediate- or high-seroprevalence settings (≥2%)[a]	In settings with a ≥2% HBsAg seroprevalence in the general population, all adults and adolescents should have routine access to and be offered HBsAg serological testing with linkage to prevention, care and treatment services.	In settings with a ≥2% HCV antibody (anti-HCV) seroprevalence in the general population, all adults and adolescents should have routine access to and be offered anti-HCV serological testing with linkage to prevention, care and treatment services.
	General population testing approaches should make use of existing community- or facility-based testing opportunities or programmes such as HIV or TB clinics, drug treatment services and antenatal clinics.	
Birth-cohort testing for specific age groups known to have higher HCV prevalence than the general population		This approach may be applied to specific identified birth cohorts of older people at higher risk of infection and morbidity within populations that have an overall lower general prevalence.
Routine testing among specific populations		
Pregnant women	All pregnant women should be tested for HIV, syphilis and hepatitis B surface antigen (HBsAg) at least once and as early as possible during pregnancy.	Although there is no specific recommendation for HCV testing for pregnant women, it may be considered in settings of ≥2%[a] HCV antibody seroprevalence as part of general population testing or focused testing in most affected populations.[c]
Blood donors	Screening of all blood donors for HBsAg and HCV antibodies should be mandatory with linkage to care, counselling and treatment for those who test positive *(27)*.	
Focused testing in most affected populations		
	In all settings (and regardless of whether delivered through the facility- or community-based testing), serological testing for HBsAg or HCV antibody (anti-HCV) should be offered with linkage to prevention, care and treatment services to the following individuals: • adults and adolescents from populations most severely affected by hepatitis C (either part of a population with high HCV seroprevalence or have a history of exposure and/or high-risk behaviour for HCV infection[9]); and • adults, adolescents and children with clinically suspected chronic viral hepatitis (symptoms, signs and laboratory markers).	

[9] Box 4.5 lists these populations.

Table 4.1 (continued). Summary of WHO recommendations and guidance on who to test for hepatitis B and C infection *(2, 27)*

	Hepatitis B	Hepatitis C
Focused testing in most affected populations		
Sexual partners, children and other family members and close household contacts	Sexual partners, children and other family members and close household contacts of those with hepatitis B	
	Infants born to mothers with the presence of HBsAg should be tested for HBsAg between 6 and 12 months of age to screen for evidence of hepatitis B.[f]	Although not a specific recommendation, Children of mothers with chronic hepatitis C (especially if HIV coinfected) may be offered anti-HCV serological testing.[g] (they are part of a population with a history of exposure).
Health-care workers	In all settings, HBsAg serological testing should be offered and hepatitis B vaccination given to all health-care workers who have not been vaccinated previously.	
Key and at-risk populations		
		People at ongoing risk and a history of treatment-induced or spontaneous clearance of HCV infection may be offered testing every 3–6 months for the presence of HCV viraemia.

[a] Choice of a threshold of ≥2% seroprevalence was based on several published thresholds of intermediate (≥2%) and high (≥5%) seroprevalence *(3)* demonstrating the cost–effectiveness of routine general population testing. The prevalence thresholds for general population testing may be adapted based on a country's epidemiology and the cost–effectiveness of testing approaches.

[b] Because of historical exposure to unscreened or inadequately screened blood products and/or poor health-care injection safety.

[c] Currently, there is no formal WHO recommendation for HCV treatment during pregnancy, since clinical trials to evaluate the safety of hepatitis C treatment during pregnancy are ongoing. Detecting hepatitis C during pregnancy may nevertheless enable counselling of the mother and increased protection of the child during birth as well as testing and follow-up of the newborn after birth. The mother can be treated after childbirth and be free of hepatitis C for additional pregnancies.

[d] Features that may indicate underlying chronic hepatitis B or C include clinical evidence of existing liver disease, such as cirrhosis or hepatocellular carcinoma, or where there is unexplained liver disease, including abnormal liver function tests or liver ultrasound.

[e] In all settings, HBsAg serological testing, with hepatitis B vaccination of those who are HBsAg negative and not previously vaccinated, should be offered, through community- or facility-based testing, to all children with parents or siblings diagnosed with hepatitis B or with clinically suspected hepatitis.

[f] Testing of exposed infants is problematic within the first six months of life since HBsAg and hepatitis B DNA may be inconsistently detectable in infected infants. In all age groups, acute hepatitis B can be confirmed by the presence of HBsAg and immunoglobulin M anti-hepatitis B core antibody.

[g] Hepatitis C can be confirmed among children younger than 18 months only by virological assays to detect HCV RNA because transplacental maternal antibodies remain in the child's bloodstream up until 18 months of age, making test results from serological assays ambiguous. Note: WHO recommends hepatitis C treatment using pangenotypic direct-acting antiviral regimens for all children aged three years and older with chronic hepatitis C infection, regardless of the stage of disease.

Table 4.2. WHO hepatitis B and C testing recommendations (how to test)

How to test	*General note: all assays should meet minimum quality, safety and performance standards (regarding both analytical and clinical sensitivity and specificity)*	
	Hepatitis B	**Hepatitis C**
Serological and testing strategy: choice of assay	**Choice of assay** For diagnosing chronic hepatitis B among adults, adolescents and children (older than 12 months of age), a serological assay (either a rapid diagnostic test or a laboratory-based immunoassay) that meets minimum quality, safety and performance standards (with regard to both analytical and clinical sensitivity and specificity) is recommended to detect HBsAg. • In settings where laboratory testing is already available and accessible, laboratory-based immunoassays are recommended as the preferred assay format. • In settings with limited access to laboratory testing and/or in populations where access to rapid testing would facilitate linkage to care and treatment, use of rapid diagnostic tests is recommended to improve access. **Serological testing strategies** • In settings or populations with an HBsAg seroprevalence of ≥0.4%, a single serological assay for detecting HBsAg is recommended before further evaluation for HBV DNA and staging of liver disease. • In settings or populations with a HBsAg seroprevalence of <0.4%, confirmation of HBsAg positivity on the same immunoassay with a neutralization step or a second, different rapid diagnostic test for detecting HBsAg may be considered.	**Choice of assay and serological testing strategy** • For adults, adolescents and children (>18 months of age): A single HCV serological assay (antibody or antibody/antigen) using either a rapid diagnostic test or laboratory-based immunoassay for initial detection of serological evidence of past or present infection before nucleic acid testing for evidence of viraemia. • In settings with limited access to laboratory infrastructure and testing and/or in populations in which access to rapid testing would facilitate linkage to care and treatment, rapid diagnostic tests are recommended.

Table 4.2 (continued) WHO hepatitis B and C testing recommendations (how to test)

How to test	*General note: all assays should meet minimum quality, safety and performance standards (regarding both analytical and clinical sensitivity and specificity)*	
	Hepatitis B	**Hepatitis C**
Molecular testing for HBV DNA and HCV RNA	Measuring HBV DNA[a] to guide treatment eligibility and monitor response • Laboratory-based HBV DNA assays: directly following a positive HBsAg serological test result, the use of HBV DNA nucleic acid testing (quantitative or qualitative) is recommended as the preferred strategy to assess viral load level for treatment eligibility and to monitor treatment response. • Point-of-care HBV DNA assays: point-of-care HBV DNA nucleic acid test assays may be used as an alternative approach to laboratory-based HBV DNA testing to assess HBV DNA level for treatment eligibility and to monitor treatment response.	Confirmation of HCV viraemia • Directly following a reactive HCV antibody serological test result, laboratory-based quantitative or qualitative nucleic acid test for detecting HCV RNA is recommended as the preferred strategy. • An assay to detect HCV core antigen, with comparable clinical sensitivity to laboratory-based HCV RNA qualitative nucleic acid test, can be an alternative approach. • Point-of-care HCV RNA viral load assay can be an alternative approach to laboratory-based HCV RNA qualitative nucleic acid test. Assessment of hepatitis C treatment response 1. Laboratory-based qualitative or quantitative nucleic acid test for detecting HCV RNA should be used as test of cure at 12 or 24 weeks after completion of antiviral therapy (that is, SVR12 or SVR24). 2. Point-of-care HCV RNA nucleic acid test with a limit of detection comparable to those of laboratory-based assays can be used as an alternative approach as test of cure.
Reflex testing	When available, reflex HBV DNA testing for those testing positive for HBsAg may be used as an additional strategy to promote linkage to care and treatment. This can be achieved either through laboratory-based reflex HBV DNA testing using a sample already held in the laboratory or through clinic-based reflex testing in a health-care facility with immediate sample collection following a positive HBsAg rapid diagnostic test.	Reflex HCV RNA viral load testing for those with a positive HCV antibody test result as an additional key strategy to promote linkage to care and treatment. This can be achieved either through laboratory-based reflex HCV RNA testing using a specimen already held in the laboratory or through clinic-based reflex testing in a health facility with immediate specimen collection following a positive HCV antibody rapid diagnostic test.
Dried blood spot (DBS)	The use of DBS specimens for HBsAg and HCV antibody serology testing may be considered in settings in which: • there are no facilities or expertise to take venous whole-blood specimens; or • rapid diagnostic tests are not available or their use is not feasible; or • there are people with poor venous access (for example, in drug treatment programmes or prisons). The use of DBS specimens to test for HBV DNA and HCV RNA for diagnosis of HBV and HCV viraemia, respectively, may be considered in settings when: • there is a lack of access to sites or nearby laboratory facilities for nucleic acid testing or provision for timely delivery of specimens to a laboratory; or • there are people with poor venous access (for example, in drug treatment programmes and prisons).	

[a]HBV DNA units: serum HBV DNA levels should be expressed in IU/mL to ensure comparability. Values given as copies/mL can be converted to IU/mL by dividing by a factor of 5 to approximate the conversion used in the most commonly used assays (10 000 copies/mL = 2000 IU/mL; 100 000 copies/mL = 20 000 IU/mL; 1 million copies/mL = 200 000 IU/mL).

Table 4.3. Recommendations on HCV self-testing and other interventions to promote testing uptake and diagnosis and linkage to care *(3,6,50)*

Hepatitis C self testing and other interventions to enhance linkage to care

HCV self-testing should be offered as an additional approach to HCV testing services.

(Strong recommendation, moderate-certainty evidence, 2021).

Remarks:

- HCV self-testing needs to be followed by linkage to appropriate post-test services, including confirmation of viraemic infection, treatment, care and referral services, according to national standards.
- Adapting HCV self-testing service delivery and support options to the national and local context is desirable, including community preferences.
- Communities, including networks of key and vulnerable populations and peer-led organizations, need to be meaningfully and effectively engaged in developing, adapting, implementing and monitoring HCV self-testing programmes.

Other interventions

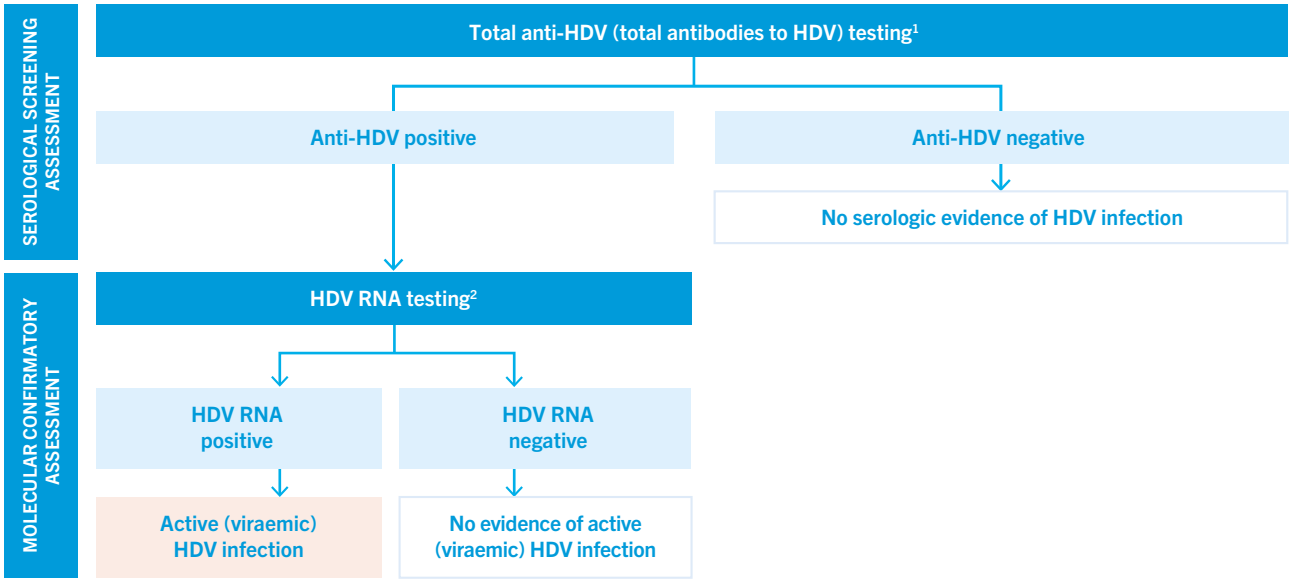
- All facility- and community-based hepatitis testing services should adopt and implement strategies to enhance uptake of testing and linkage to care.
- Clinician reminders can prompt provider-initiated, facility-based HCV serological testing in settings that have electronic records or analogous reminder systems.
- Peer and lay health workers can provide support in community-based settings. Use peer and lay health workers to support community-based or -led testing efforts *(3, 6)*.
- Use HCV self-testing as a testing approach in addition to HCV testing services.

Table 4.4. WHO recommendations for hepatitis D on who to test and how to test

Who to test	
Universal HDV testing approach	For people with chronic hepatitis B, serological testing for anti-HDV antibodies may be performed for all individuals who are HBsAg positive as the preferred approach to scale up access to hepatitis D diagnosis and linkage to care.
Focused (risk-based) HDV testing approach	In settings in which a universal anti-HDV antibody testing approach is not feasible because laboratory capacity or other resources are limited, testing for anti-HDV may be given priority in specific populations of HBsAg-positive individuals, including the following: • people born in hepatitis D-endemic countries, regions and areas; • people with advanced liver disease; • people receiving hepatitis B treatment and people with features suggesting hepatitis D (such as low HBV DNA with high ALT levels); and • people considered to have increased risk of hepatitis D, including haemodialysis recipients, people living with hepatitis C or HIV, people who inject drugs, sex workers and men who have sex with men.
How to test	
Serological testing and confirmation of HDV viraemia	People with chronic hepatitis B (HBsAg positive) may be diagnosed with hepatitis D by using a serological assay to detect total anti-HDV, followed by a nucleic acid test to detect HDV RNA[a] and active (viraemic) infection among those who are anti-HDV-positive.
Reflex testing	Reflex testing for anti-HDV antibody testing following a positive HBsAg test result, and also for HDV RNA testing (when available) following a positive anti-HDV antibody test result may be used as an additional strategy to promote diagnosis.

[a] Consider genotypic variability (especially for African subgenotype 1 and African genotypes 5 to 8) that might affect detection and counsel individuals accordingly. Use standardized, quantitative HDV RNA nucleic acid tests in IU/mL from reference laboratories to accurately diagnose and monitor active infections.

Fig. 4.1. Testing strategy for diagnosing HDV infection among individuals who are HBsAg positive



Abbreviations: HDV: hepatitis D virus; RNA: ribonucleic acid

[1] Reflex testing for anti-HDV may be considered for specimens testing hepatitis B surface antigen positive, where feasible.

[2] Reflex testing for HDV RNA may be considered for specimens identified as positive anti-HDV, where feasible.

Box 4.3. Some affected populations that may benefit from focused screening for hepatitis B and C

They are either part of a population with high HBV seroprevalence:

- mobile or migrant adult and adolescent populations from high or intermediate endemic countries; and
- certain indigenous populations.

They have a history of exposure to or high-risk behaviour for HBV or HCV infection:

- people who inject drugs;
- people in prison and other closed settings;
- sex workers;
- men who have sex with men;
- people living with HIV;
- partners, family members and children of people with hepatitis B;
- children of mothers with chronic hepatitis C, especially if they are living with HIV;
- people exposed outside the health-care system through invasive procedures with transmission risk via contaminated equipment: for example, unsafe tattooing, body piercing, circumcision or other unsafe cultural practices such as scarification; and
- people exposed in health-care settings: for example, people with thalassaemia, haemophilia, haemodialysis, a history of multiple blood transfusions or recurrent intensive care, surgical procedures or other health-care exposure risks.

4.3. Practical considerations for hepatitis B, C and D testing services

To optimize the scale up of hepatitis testing, countries will need to tailor a strategic mix of testing approaches based on local epidemiology, health-care infrastructure, available resources, opportunities for integrating testing services and community engagement *(2, 5, 6, 51)*. Priorities in planning person-centred hepatitis B and C testing services: operational guide *(5)* provides a strategic framework to guide countries in planning person-centred testing approaches and strategies. Policies and guidance on hepatitis B (including hepatitis D) and C testing approaches and strategies should be established, either stand-alone or integrated with other communicable diseases.

4.3.1. Hepatitis testing approaches (who to test)

- Although there are no specific hepatitis B birth cohort testing recommendations, many countries with a high burden of viral hepatitis are increasingly developing evidence-informed cohorts for targeted HBV testing in adults, especially those born before country adoption of childhood hepatitis B vaccination.
- Consideration should be given to offering viral hepatitis testing to all adults, children and adolescents attending HIV services, STI clinics and TB clinics or admitted to hospitals in high-prevalence regions (Box 4.4, 4.5).
- Infants born to mothers with the presence of HBsAg should be tested for HBsAg between six and 12 months of age to screen for evidence of hepatitis B *(6)*. Testing of exposed infants is problematic within the first six months of life since HBsAg and hepatitis B DNA may be inconsistently detectable among infected infants (Box 4.6).
- In all age groups, acute hepatitis B can be confirmed by the presence of HBsAg and immunoglobulin M antihepatitis B core antibody.

Box 4.4. HIV PrEP and testing for hepatitis B and C

Individuals at substantial risk of HIV infection may also be at a higher risk for HBV and HCV infection. PrEP services provide an important opportunity to screen for HBV and HCV infection and provide linkages to care.

- Testing PrEP users for HBV surface antigen (HBsAg) once, at or within one to three months of PrEP initiation, is strongly encouraged where feasible, particularly in highly endemic countries.
- HCV antibody testing is strongly encouraged at or within one to three months of PrEP initiation and every 12 months thereafter where PrEP services are provided to populations at high risk of HCV infection.
- Lack of HBV and HCV testing should not be a barrier to PrEP initiation or use. PrEP can be initiated before HBV and HCV test results are available.

Box 4.5. Testing approaches to improve hepatitis case-finding among infants and children

- Give priority to testing children of all mothers with hepatitis B or C (especially if the mother is coinfected with HIV) through home- or facility-based testing.
- Consider offering viral hepatitis testing to all children and adolescents attending HIV services, STI clinics and TB clinics or admitted to hospitals in high-prevalence regions.
- Offer viral hepatitis testing or retesting to mothers or infants in maternal and child health services, immunization clinics or clinics focusing on children younger than five years.
- Focus HCV testing on children who have had medical interventions or received blood products in countries with a higher prevalence of hepatitis C, where screening of blood is suboptimal or where medical equipment is inadequately sterilized.
- Offer testing to all children and adolescents presenting with signs and symptoms that suggest acute viral hepatitis, including anorexia, nausea, jaundice, right-upper-quadrant discomfort and abnormal liver function tests.

4.3.2. Hepatitis testing strategies (how to test)

Use high-quality, quality-assured and regulator-approved rapid diagnostic tests or enzyme immunoassays that offer minimal false positivity and reliable performance. The choice between rapid diagnostic tests and enzyme immunoassays should be based on local capacity and resources. Rapid diagnostic tests are valuable for point-of-care testing, especially in remote areas, because of their ease of use and quick turnaround.

- Access to affordable, high-quality serological and molecular assays that meet safety and performance standards is essential for reliable diagnosis.
- Test for hepatitis B before starting direct-acting antiviral therapy for hepatitis C because of the risk of reactivation of HBV in settings and populations with higher prevalence of hepatitis B or C coinfection.
- Testing or retesting for anti-HDV antibodies should be considered when clinically indicated, such as in cases of aminotransferase flares or acute decompensation of chronic liver disease and for those remaining at risk of infection *(53)*.

4.3.3. Molecular testing: laboratory-based versus point-of-care assays for HBV DNA and HCV RNA testing

- Laboratory-based quantitative HBV DNA and HCV RNA nucleic acid testing is generally the standard of care for diagnosing and monitoring these infections. However, their high cost and laboratory requirements limit their availability in resource-limited settings and limit decentralization. Now, commercially available assays that can detect HBV DNA and HCV RNA at or near the point of care and are potentially less costly are emerging as alternatives.
- The decision between laboratory-based and point-of-care HBV DNA and HCV RNA nucleic acid testing depends on such factors as cost, ease of use, site infrastructure and staff skills. Point-of-care testing can be especially beneficial in remote areas, prisons, harm reduction sites and populations at high risk of loss to follow-up. Centralized systems with efficient sample transport and rapid result delivery can also be highly effective.
- Priority locations for point-of-care platforms include where testing and treatment are integrated – such as one-stop clinics for hepatitis C in harm reduction sites for people who inject drugs and prisons – maximizing impact and convenience. Priority sites for hepatitis B point-of-care platforms are remote areas lacking laboratory infrastructure or sample transport, such as antenatal clinics with high hepatitis B prevalence needing access to HBV DNA to assess eligibility for antiviral prophylaxis. For low volumes (under 20 samples daily), a 4-, 8- or 16-cartridge machine with two or three runs per day should suffice.
- Multi-disease testing platforms (HIV, TB, COVID-19 and hepatitis B and C) can expand access, improve system efficiency and reduce costs. Countries with existing platforms should consider integrating HBV DNA and HCV RNA testing and optimizing diagnostic networks across disease programmes.
- Higher volumes and pooled procurement can reduce costs, and increased competition may further lower prices. Device and operational costs should be considered, especially in resource-limited settings.
- Other operational aspects: point-of-care testing requires decentralized systems with quality control, trained personnel and reliable maintenance. Basic infrastructure includes a centrifuge, a device, a laptop and stable power supply. Regular quality checks, personnel training and annual calibration are essential for accuracy and device longevity.

4.3.4. Reflex serological and molecular testing for HBV, HDV and HCV

- Laboratory-based reflex testing involves one blood draw with initial serological testing, and if positive, the same specimen is automatically used for nucleic acid testing. Clinic-based reflex testing requires two blood draws in a single visit: an initial fingerstick rapid diagnostic test, and if positive, a second sample for nucleic acid testing – either at a laboratory or onsite with point-of-care technology. Currently, reflex testing for HDV is only done in the laboratory because of the lack of rapid diagnostic tests for HDV serology.
- The decision between laboratory-based or clinic-based point-of-care testing depends on policies, infrastructure, resources, sample transport and service locations. A mix of both strategies may be optimal for different populations or regions (Boxes 4.6 and 4.7).
- Countries should incorporate routine reflex HCV RNA nucleic acid testing into their guidelines.
- Laboratories should have trained personnel and updated protocols, including electronic order forms to facilitate reflex testing.

Box 4.6. Considerations for laboratory-based versus clinic-based reflex testing

- A laboratory-based reflex testing suits high-volume settings with robust specimen transport.
- A clinic-based reflex sample collection and virological testing may be preferred for key populations, such as people who inject drugs or men who have sex with men, and in primary care with widespread rapid diagnostic test use.

Box 4.7. Further guidance and resources

The section on monitoring of treatment in Chapter 5 provides further details about the laboratory tests required for monitoring and long-term care. The following resources can be useful.

- *WHO guidelines on hepatitis B and C testing (2)*
- *Updated recommendations on treatment of adolescents and children with chronic HCV infection, and HCV simplified service delivery and diagnostics (3)*
- *Guidelines for the prevention, diagnosis, care and treatment for people with chronic hepatitis B infection (6)*
- *Priorities in planning person-centred hepatitis B and C testing services: operational guide (5)*
- *Recommendations and guidance on hepatitis C virus self-testing (50)*
- *Consolidated guidelines on HIV, viral hepatitis and STI prevention, diagnosis, treatment and care for key populations (8)*
- *Self-testing implementation toolkit for HIV, viral hepatitis and sexually transmitted infections (54)*
- *Differentiated and simplified pre-exposure prophylaxis for HIV prevention: update to WHO implementation guidance: technical brief (52)*
- *Screening donated blood for transfusion-transmissible infections: recommendations (27)*
- Toolkit for planning, implementing and monitoring integrated network-based testing [website] *(55)*

4.3.5. Use of DBS specimens for hepatitis B and C serological and virological testing

The choice of using DBS for hepatitis B and C testing depends on health-care infrastructure and context. Options include DBS serology plus nucleic acid testing for remote or hard-to-reach populations, rapid diagnostic test serology plus DBS nucleic acid testing in clinics or enzyme immunoassay serology with plasma nucleic acid testing in urban settings. When high-quality rapid diagnostic tests are available, DBS can give priority to nucleic acid testing; if not, DBS can expand access to both serology and nucleic acid testing, especially in mass testing at clinics and prisons or for multiplex screening when multiplex rapid diagnostic tests are unavailable or costly.

Successful DBS testing requires experienced, centralized laboratories capable of handling and quality assurance. Lay workers need training to perform finger-prick DBS, with systems in place for timely result communication.

The mobility and instability of vulnerable populations may lead to low return rates for results and linkage to care.

See also WHO guidelines on hepatitis B and C testing *(2)* for how to set up laboratory services for hepatitis testing and selection of an assay and how to assure the quality of hepatitis B and hepatitis C.

5. Treatment for hepatitis B and C

5.1. Introduction

Viral hepatitis remains one of the world's leading infectious disease killers, and the estimated number of deaths from viral hepatitis increased from 1.1 million deaths in 2019 to 1.3 million in 2022 with hepatitis B causing 83% of the deaths and hepatitis C 17% *(11)*. Hepatitis D, which only affects individuals with hepatitis B, is associated with a two- to six-fold higher risk of liver cancer compared with hepatitis B alone. Deaths from chronic hepatitis B and C will continue to rise without an increased coverage of effective testing, treatment and care interventions. Antiviral therapy for chronic hepatitis B and C is key to prevent transmission and death from long-term complications of cirrhosis and hepatocellular carcinoma. Effective treatment options for hepatitis D continue to evolve.

For people with chronic hepatitis B, long-term treatment with nucleoside analogues (such as tenofovir or entecavir or combinations including TDF + lamivudine or TDF + emtricitabine) is essential to suppress viral replication, delay cirrhosis, reduce HCC risk and improve survival. Without treatment, 20–30% may develop cirrhosis. WHO's 2024 guidelines *(6)* recommend treatment for individuals with significant fibrosis, presence of coinfections and comorbidities as well as elevated HBV DNA. When DNA testing is not available, persistently elevated ALT levels can guide treatment decisions. First-line agents with a high genetic barrier to drug resistance have made HBV drug resistance uncommon. However, as access to hepatitis B treatment scales globally, monitoring treatment quality and outcomes, including HBV drug resistance surveillance, is critical. Research is ongoing to develop therapies that achieve a functional cure, by targeting all replicative forms, including covalently closed circular DNA.

Hepatitis C is now considered curable. Direct-acting antiviral drugs achieve SVR12 for more than 95% of individuals, effectively eliminating the virus from the body. Reaching SVR12 is clinically significant, since it reduces the risk of developing liver cancer by 85% and lowers overall mortality by 70% to 75% *(3)*.

The advent of short-course, oral direct-acting antiviral regimens has transformed the landscape of hepatitis C treatment, especially for adults who carry the highest burden of disease-related complications.

Hepatitis C infection is relatively rare among children, and when it does occur, it is most commonly acquired through mother-to-child transmission during birth. Current evidence indicates that about 66% of children infected this way will spontaneously clear the virus by the age of five years *(56)*. However, for those who do not clear the infection, hepatitis C can negatively affect their overall health and quality of life, especially during adolescence. This underscores the importance of early diagnosis and timely treatment for older children and adolescents to prevent long-term health effects.

This chapter summarizes the main WHO recommendations to assess eligibility for treatment, choose the best treatment regimen and monitor and evaluate treatment response and disease progression. It includes considerations for treatment implementation and public health surveillance. It also includes algorithms for assessment, treatment and monitoring of people with hepatitis B and C along the continuum of testing and diagnosis, initial assessment, antiviral therapy as well as monitoring (Tables 5.1–5.6, Boxes 5.1-5.5 and Fig. 5.1 and 5.2).

5.2. Summary of key recommendations

Table 5.1. Initial assessment of people with chronic infection with chronic viral hepatitis infection *(1,3,60)*,

	Hepatitis B	Hepatitis C
Recommended non-invasive test according to settings	Aspartate aminotransferase-to-platelet ratio index (APRI) is recommended as the preferred non-invasive test to assess the presence of significant fibrosis or cirrhosis among adults in resource-limited settings. Transient elastography (FibroScan®) may be a preferable non-invasive test in settings where it is available and cost is not a major constraint.	
Non-invasive assessment of liver disease stage at baseline and during follow-up	Evidence of significant fibrosis (≥F2) should be based on an APRI score of >0.5 or transient elastography value of >7.0 kPa. Evidence of cirrhosis (F4) should be based on clinical criteria **or** an APRI score of >1.0 **or** transient elastography (FibroScan®) value of >12.5 kPa.	
Specific assessment	Before initiating antiviral therapy with nucleoside analogues, people's baseline risk for renal dysfunction and measurement of baseline renal function may be performed. People receiving long-term tenofovir disoproxil fumarate therapy may be monitored annually for renal function and growth monitored carefully in children.	
Alcohol	An alcohol intake assessment is recommended for all people with hepatitis C followed by the offer of a behavioural alcohol reduction intervention for people with moderate-to-high alcohol intake. Note: this is also relevant for people with hepatitis B.	

Table 5.2 Eligibility criteria for hepatitis B treatment

Who to treat among people with chronic hepatitis B *(6)*
Treatment is recommended for all adults and adolescents aged ≥12 years with chronic hepatitis B (including pregnant women and girls and women of reproductive age) with: 1. Evidence of significant fibrosis (≥F2) based on an APRI score of >0.5 or transient elastography value of >7 kPa or evidence of cirrhosis (F4) based on clinical criteria or an APRI score of >1 or transient elastography value of 12.5 kPa, regardless of HBV DNA or ALT levels. or 2. HBV DNA >2000 IU/mL and an ALT level above the upper limit of normal (30 U/L for men and boys and 19 U/L f or women and girls). For adolescents, this should be based on ALT exceeding the upper limit of normal on at least two occasions in a 6- to 12-month period. or 3. The presence of coinfections (such as HIV, hepatitis D or hepatitis C); family history of liver cancer or cirrhosis; immune suppression (such as long-term steroid use or solid organ or stem cell transplant); comorbidities (such as diabetes or metabolic dysfunction–associated steatotic liver disease); or extrahepatic[10] manifestations (such as glomerulonephritis or vasculitis), regardless of the APRI score or HBV DNA or ALT levels. or 4. In the absence of access to an HBV DNA assay: persistently abnormal ALT levels alone (defined as two ALT values above the upper limit of normal at unspecified intervals during a 6- to 12-month period), regardless of APRI score.

[10] About 20% of people with chronic hepatitis B develop major extrahepatic manifestations, including polyarteritis nodosa, non-rheumatoid arthritis, non-Hodgkin lymphoma, cryoglobulinaemic vasculitis and glomerulonephritis, which can influence their quality of life and mortality.

Table 5.3. Eligibility criteria for hepatitis C treatment *(3,6)*

Who to treat among people with hepatitis C
• WHO recommends treatment using pangenotypic direct-acting antiviral regimens for all adults, adolescents and children three years and older with chronic hepatitis C, regardless of the stage of disease: – adults (≥18 years): strong recommendation; moderate-certainty evidence; – adolescents (12–17 years): strong recommendation; moderate- to low-certainty evidence; – older children (6–11 years): strong recommendation; moderate- to very-low-certainty evidence; and – younger children (3–5 years): conditional recommendation; very-low-certainty evidence. • Key populations: pangenotypic direct-acting antiviral therapy for hepatitis C should be offered without delay to people with recently acquired hepatitis C and ongoing risk.

Table 5.4. Recommended treatment for people with hepatitis B and C *(3,4,6)*

	Hepatitis B	Hepatitis C
Antiviral therapy	For all adults, adolescents and children (12 years or older) for whom antiviral therapy is indicated, the nucleos(t)ide analogues that have a high genetic barrier to drug resistance – tenofovir disoproxil fumarate or entecavir – are recommended as preferred regimens. Nucleoside analogues with a low genetic barrier to resistance (lamivudine, adefovir or telbivudine) can lead to drug resistance and are not recommended. 1. Preferred regimen: • TDF or entecavir. 2. Alternative regimen when TDF monotherapy is not available (dual therapy): • TDF + lamivudine or • TDF + emtricitabine.	The following pangenotypic DAA regimens are recommended in adults (18 years and above), adolescents (12–17 years), older children (6–11 years) *(all strong recommendations)* and younger children (3–5 years) *(conditional recommendation)*: • sofosbuvir (SOF)/daclatasvir (DCV) for 12 weeks:[a] • sofosbuvir (SOF)/ velpatasvir (VEL) for 12 weeks: • glecaprevir(G)/ pibrentasvir (P) for 8 weeks: ***Remarks*** *Certainty of evidence:* • *SOF/DCV: high (adults), high (adolescents and older children); very low (younger children) certainty of evidence:* • *SOF/VEL: high (adults), low (adolescents and older children); very low (younger children)* • *GP: high (adults), moderate (adolescents and older children); very low (younger children).* [a] For those without cirrhosis. Treatment should last 24 weeks for those who are treatment experienced or have compensated cirrhosis.
Special circumstances	Entecavir or tenofovir alafenamide (if available) are recommended for people with established osteoporosis and/or impaired kidney function and for children (entecavir for those aged two years or older) or adolescents (tenofovir alafenamide for those aged 12 years or older as an alternative regimen) for whom antiviral therapy is indicated.	

Table 5.4 (continued). Recommended treatment for people with hepatitis B and C

	Hepatitis B	Hepatitis C
Pregnant women	In settings in which HBV DNA or HBeAg testing is available, prophylaxis with TDF is recommended for all HBV-positive (HBsAg-positive) pregnant women with HBV DNA ≥200 000 IU/mL or positive HBeAg – preferably from the second trimester of pregnancy until at least delivery or completion of the infant hepatitis B vaccination series. In settings in which neither HBV DNA nor HBeAg testing is available, prophylaxis with TDF is recommended for all HBV-positive (HBsAg-positive) pregnant women – preferably from the second trimester of pregnancy until at least delivery or completion of the infant hepatitis B vaccination series. Note: Women of childbearing age who are planning additional pregnancies can also maintain TDF prophylaxis after delivery and during subsequent pregnancies according to womens' preference. All interventions should be given in addition to at least three doses of hepatitis B vaccination for all infants, including a timely hepatitis B birthdose.	
Retreatment and second-line antiviral therapy	Relapse is common after stopping therapy with nucleos(t)ide analogues. Retreatment is recommended if there are consistent signs of reactivation: HBsAg or HBeAg becomes positive, ALT levels increase or HBV DNA becomes detectable again (if HBV DNA testing is available). Among people with evidence of treatment failure due to confirmed or suspected antiviral resistance (based on history of previous exposure or primary non-response) to lamivudine, entecavir, adefovir or telbivudine, switching to TDF is recommended. Tenofovir alafenamide may be considered as an alternative regimen, if available.	Note for HCV See comments in Box 5.6. Investigation of a failure to achieve SVR with direct-acting therapy includes re-examination of adherence and of potential drug–drug interactions.

Box 5.1. Duration of DAA therapy

Age groups	Pangenotypic DAA regimens			Non-pangenotypic DAA regimen (in settings with minimal GT3 infection)[4]
	Sofosbuvir/ daclatasvir[1]	Sofosbuvir/ velpatasvir[2]	Glecaprevir/ pibrentasvir[3]	Sofosbuvir/ ledipasvir[4]
Adults (18 years and above)	12 weeks	12 weeks	8 weeks	12 weeks
Adolescents (12-17 years)	12 weeks	12 weeks	8 weeks	12 weeks
Older children (6-11 years)	12 weeks	12 weeks	8 weeks	12 weeks
Younger children (3-5 years)	12 weeks	12 weeks	8 weeks	12 weeks

[1] In those without cirrhosis. Treatment for 24 weeks is recommended in those who are treatment experienced or with compensated cirrhosis.
[2] May be considered in settings where genotype 3 is known to be highly prevalent (>10%).
[3] People who failed prior therapy with interferon, ribavirin, and/or sofosbuvir with HCV genotype 1, 2, 4–6 with cirrhosis should be treated for 12 weeks, and with HCV genotype 3 with or without cirrhosis should be treated for 16 weeks.
[4] For use in those with genotype 1, 4, 5, or 6 infection.

Box 5.2. Summary of preferred and alternative first-line antiviral regimens for HBV

Population	Preferred first-line regimen	Alternative first-line regimen	Special circumstances
Adults	TDF ETV	TDF + 3TC TDF + FTC (where TDF monotherapy is not available)	ETV TAF (for people with established osteoporosis and/or impaired kidney function)
Adolescents (12-17 years)	TDF ETV	TDF + 3TC TDF + FTC (where TDF monotherapy is not available) TAF	
Children (2- 11 years)	TDF[a] ETV		

TDF: tenofovir disoproxil fumarate: ETV: entecavir: 3TC: lamivudine: FTC: emtricitabine: TAF: tenofovir alafenamide fumarate.

Table 5.5. Treatment monitoring and HCC surveillance

Monitoring	Hepatitis B	Hepatitis C
Treatment response	For people receiving treatment, the following are recommended to be monitored at least annually: • non-invasive tests (APRI score or transient elastography) to assess stage of disease and progression of fibrosis or cirrhosis; and • ALT levels (and AST for APRI), HBsAg, HBeAg/anti-HBe[a] and HBV DNA levels (when HBV DNA testing is available). For people receiving treatment, treatment adherence should be monitored regularly and at each visit.	• Nucleic acid testing for qualitative or quantitative detection of HCV RNA should be used as test of cure (SVR12 or SVR24) after completion of antiviral therapy. • Point-of-care HCV RNA nucleic acid testing with comparable limit of detection to laboratory-based assays can be used as an alternative approach as a test of cure.
Monitoring in special circumstances	More frequent on-treatment monitoring (every 3–6 months for the first year) may be performed for: people with more advanced disease (compensated or decompensated cirrhosis); during the first year of treatment to assess treatment response and adherence; where treatment adherence is a concern; among HIV-coinfected people; and for people with renal impairment.	
HCC surveillance	Routine surveillance for HCC with abdominal ultrasound and alpha-fetoprotein testing every six months is recommended for: • people with cirrhosis, regardless of age or other risk factors; • people with a family history of HCC; and • if there is no family history of HCC or evidence of cirrhosis, people older than 40 years (a lower age may apply depending on the regional incidence of HCC and with HBV DNA level >20 000 IU/mL (if HBV DNA testing is available).	Note See 5.3.4 for guidance on monitoring for people with hepatitis C who have achieved SVR but with underlying cirrhosis.

[a]Monitoring of HBeAg and anti-HBe mainly applies to those who are initially HBeAg positive. However, those who have already achieved HBeAg seroconversion and are HBeAg negative and anti-HBe positive may subsequently serorevert

Table 5.6. Recommendations for lifelong nucelos(t)ide analogue therapy and discontinuing treatment for people with chronic hepatitis B

Lifelong antiviral therapy
All people with cirrhosis based on clinical evidence (or APRI or transient elastography score) require lifelong treatment with nucleos(t)ide analogues and should not discontinue antiviral therapy because of the risk of reactivation, which can cause an acute hepatitis flare.
Discontinuation
Antiviral therapy is lifelong. Discontinuation of nucleos(t)ide analogue therapy may be considered exceptionally for: • people without clinical evidence of cirrhosis (or based on a non-invasive test score – APRI or transient elastography – suggesting advanced fibrosis); **and** • who can be followed carefully after discontinuation and in the long term for reactivation; **and** • if there is evidence of HBeAg loss and seroconversion to anti-HBe (for people initially HBeAg-positive) and after completion of at least one additional year of treatment; **and** • in association with persistently normal ALT levels and persistently undetectable HBV DNA levels (if HBV DNA testing is available). If HBV DNA testing is not available: discontinuing nucleos(t)ide analogue therapy may be considered for people who have evidence of persistent HBsAg loss and after completion of at least one additional year of treatment, regardless of previous HBeAg status.

Box 5.3. Recommendation for monitoring for people not yet receiving treatment

People who do not currently meet the criteria for antiviral therapy (e.g. persistently normal serum aminotransferase results and HBV DNA levels below 2000 IU/mL (when HBV DNA testing is available) or who have expressed a desire to defer treatment may be monitored annually for disease progression and ALT and HBV DNA levels (when HBV DNA testing is available).

5.3. Practical considerations for antiviral therapy for chronic hepatitis B and C

5.3.1. Initial assessment of people with chronic hepatitis B and C

- A person- and family-centred counselling approach should be adopted, ensuring that the uncertainties around benefits and harm and the financial implications of long-term treatment are fully explained and understood, so that caregivers and the people with hepatitis, alongside their health-care provider, can make an informed choice about starting a potentially lifelong hepatitis B treatment or not.
- In preparation for starting treatment, people with chronic hepatitis B should be counselled about indications for treatment, including likely benefits and side-effects, the need for and willingness to commit to long-term treatment and follow-up monitoring both on and off therapy, the importance of full adherence for treatment to be both effective and reduce the risk of drug resistance (and that abruptly ending treatment may cause hepatic flare and acute decompensation) and cost implications.
- Assessment of baseline risk for renal dysfunction and measurement of baseline renal function should be considered before initiating nucleot(s)ide therapy and during therapy, especially if a tenofovir-based regimen is used. TDF and entecavir require dose adjustment and should be used with caution among people with renal impairment and renal transplant recipients.
- Comorbidities should be assessed: coinfection with HIV, other types of hepatitis including hepatitis D, impaired glucose tolerance, dyslipidaemia, metabolic dysfunction–associated steatotic liver disease, alcoholic liver disease and drug- or toxin-induced injury. All people with cirrhosis should be screened for the presence of HCC. Family history of HCC and medication history should also be reviewed and potential drug–drug interactions should be part of the initial assessment.
- Although only one of the four criteria for treatment eligibility requires access to HBV DNA level, having at least one HBV DNA test is strongly encouraged to provide full assessment before treatment. This is especially important for pregnant women, but is not a barrier to initiating TDF prophylaxis (see Chapter 3). HBV DNA level will also be ideally required for monitoring treatment response
- Women of childbearing age who are offered HBV testing in pregnancy should be counselled on TDF prophylaxis to prevent mother-to-child transmission or initiate maternal therapy as required. When HCV testing in pregnancy is provided, she should be informed about the lack of available data on the safety and efficacy of direct-acting antiviral drugs during pregnancy.

5.3.2. Eligibility for antiviral therapy

- The WHO 2024 guidelines *(6)* substantially expanded treatment eligibility criteria for adults and adolescents, so that they now capture at least 50% of all people with chronic hepatitis B versus about 8–20% previously. Only one of the four treatment criteria requires access to hepatitis B virus DNA viral load testing and quantification.
- Implementing expanded treatment eligibility poses major challenges, especially in low- and middle-income countries, and will require more awareness and community education, expanded access to testing, HBV DNA and HCV RNA assays and non-invasive tests, trained health-care personnel and appropriate monitoring tools and lifelong antiviral therapy (for hepatitis B).
- Systems must be developed and capacity enhanced to deliver widespread testing and treatment, especially in areas with high prevalence. Using HIV infrastructure (laboratory and pharmacy capacity, personnel, procurement and supply chain) provides an opportunity to expand care and treatment to people with hepatitis B mono-infection and coinfection in many low-and middle-income countries. The existence of well-established adolescent-friendly services for offering prevention, testing and treatment services for HIV clients presents an opportunity for integrating similar hepatitis B services.
- Simplified treatment eligibility criteria that apply to both adolescents and adults should be easier to implement in low- and middle-income countries, in which non-specialist physicians will likely be the main health-care workers treating people with chronic hepatitis infection.
- If implementing a “treat all” recommendation for hepatitis C is not affordable in the short term, national programmes may consider allocating resources

preferentially to individuals at higher risk of hepatic and extrahepatic morbidity and mortality.

- Hepatitis C treatment recommendations for younger children (3–5 years old) are conditional and associated with very-low-certainty evidence. Additionally, current evidence suggests that in the context of vertical HCV transmission, the probability of spontaneous clearance of the virus by age five years was about 66% *(56)*. Thus, careful consideration and consultation of paediatric expertise may be required for treatment decisions.
- Treatment of people who inject drugs needs to be integrated or linked with harm reduction services to ensure quality of care and prevent reinfection.
- All people with compensated or decompensated cirrhosis should receive indefinite antiviral therapy with TDF or entecavir, even if the HBV DNA level is low or undetectable, to improve clinical outcomes and to prevent flares and reactivation. People with decompensated cirrhosis would ideally be treated in centres with the expertise to manage complications and where access to liver transplantation is available.

Box 5.4. Balance of benefits and harm for treating adolescents and children with chronic hepatitis B

- The balance of benefits and harm for expanding treatment to include adolescents (12–17 years) with CHB was considered in the context of a limited number of generally short duration clinical trials involving adolescents and children and the fact that significant evidence gaps remain.
- Treatment recommendations are conditional for adolescents (12–17 years old) with CHB based on low- or very-low-certainty evidence, except for those with significant fibrosis and cirrhosis – for which there is a strong recommendation
- Antiviral therapy will continue to be indicated on a case-by-case basis for only a very few children younger than 12 years, and for this reason no formal recommendations were made.

Box 5.5. Future recommendations for HDV treatment

- WHO recognizes that the hepatitis D treatment landscape is rapidly evolving. Until recently, pegylated interferon-alfa2b had been the only treatment option for chronic hepatitis D but had poor treatment outcomes, a significant side-effect profile and many contraindications.
- WHO continues to monitor the ongoing hepatitis D treatment trials and will consider formal recommendations on treatment when further evidence becomes available.

5.3.3. Management considerations for specific populations

5.3.3.1. HIV and hepatitis B coinfection

HIV coinfection profoundly affects almost every aspect of the natural history of HBV infection and includes more rapid progression to cirrhosis and HCC, higher liver-related mortality, less spontaneous clearance, higher levels of HBV replication and rate of reactivation, higher rates of occult HBV (HBV DNA positivity in the absence of HBsAg-positivity) and reduced treatment response compared with people without HIV coinfection. Treating HIV and HBV coinfection with ARV drug regimens that include TDF or TAF active against hepatitis B have substantially improved outcomes.

5.3.3.2. HIV and hepatitis C coinfection

People coinfected with HIV and hepatitis C generally have more rapid disease progression than monoinfected people *(57)*. Even among people for whom ART leads to successful control of HIV infection (undetectable HIV viral load), the risk of hepatic decompensation among coinfected people is higher than among people with hepatitis C monoinfection. For these reasons, since 2014, the WHO guidelines listed people coinfected with HIV and hepatitis C among those to be given priority for hepatitis C treatment.

Hepatitis C treatment outcomes with direct-acting antiviral drugs are comparable for people coinfected with HIV and hepatitis C to those with hepatitis C monoinfection. Because direct-acting antiviral drugs

are safe and effective for people with HIV and hepatitis C, there is no longer any need to consider them as a special or difficult-to-treat population. However, there are important drug–drug interactions with pangenotypic hepatitis C regimens and ART. Therefore, checking for drug–drug interactions between HIV and hepatitis C medications needs to be emphasized.

5.3.3.3. Hepatitis C and B coinfection

Although uncommon, hepatitis B and C coinfection may be higher in hepatitis B–endemic countries in Asia, sub-Saharan Africa and South America, especially among people who inject drugs.

Treatment for both HBV and HCV infections is generally required. Treating HBsAg positive persons with a nucleos(t)ide anologue during and after direct-acting antiviral therapy is advisable because of the moderate risk of HBV reactivation. People with advanced disease may be considered for monitoring at regular intervals for HBV reactivation during hepatitis C treatment. The risk of reactivation among people who are anti-hepatitis B core antibody positive but HBsAg negative is very low.

5.3.3.4. Hepatitis D and B coinfection

Chronic HDV infection among people with established chronic hepatitis B is considered to be the most aggressive form of viral hepatitis because of its accelerated progression to liver cirrhosis or liver cancer compared with CHB monoinfection. Longitudinal studies also show increased disease progression, with male sex, older age, concomitant HIV infection or HCV infection, persistent HDV viraemia, HBV replication, diabetes and obesity. Until recently, PEG-IFNα had been used off licence for the past three decades as the only treatment option for HDV infection alongside treatment of CHB with nucleos(t)ide analogues, although its use was limited by poor treatment outcomes, side- effects and contraindications. The HDV treatment landscape is now rapidly evolving, with novel agents showing favourable results in clinical trials.

5.3.3.5. Coinfection with TB

Groups with increased risk of hepatitis B are also at risk of infection with TB largely because they live in regions of the world that are endemic for both infections. This can pose a particular challenge for clinical management and warrants additional clinical vigilance. People who inject drugs and prisoners have a high risk of acquiring HIV and hepatitis B and C and increased risk of coinfection with TB and should be considered for screening for all infections.

People with hepatitis C who are treated for TB have a higher risk of drug-induced hepatotoxicity than people with TB monoinfection, although the risk of severe hepatotoxicity is rare. Monitoring liver function tests detects hepatotoxicity early.

Concurrent treatment of hepatitis C and multidrug-resistant TB is particularly complicated because of many drug–drug interactions between direct-acting antiviral drugs and second-line antimicrobial drugs. Specialist referral may be needed to reduce the additive side-effects, pill burden and drug–drug interactions. Co-administering multidrug-resistant TB and hepatitis C treatments versus delaying hepatitis C treatment while treating multidrug-resistant TB alone may yield several benefits. These benefits include higher multidrug-resistant TB treatment success rates, fewer cases of multidrug-resistant TB treatment failure, reduced instances of patients lost to follow-up and a slight decrease in mortality rates. The decision to administer both treatment regimens should be informed by knowledge of potential drug-drug interactions and patient preferences. Importantly, the unavailability of hepatitis C treatment should not impede the initiation of multidrug-resistant TB treatment *(58)*.

5.3.3.6. Extrahepatic manifestations

About 20% of people with chronic hepatitis B develop major extrahepatic manifestations, including polyarteritis nodosa, non-rheumatoid arthritis, non-Hodgkin lymphoma, cryoglobulinaemic vasculitis and glomerulonephritis, which can influence their quality of life and mortality *(6)*. Effective antiviral therapy for the primary liver disease can improve extrahepatic signs or symptoms.

5.3.3.7. Acute hepatitis B or C

Antiviral therapy is not necessary for uncomplicated symptomatic acute hepatitis B, since >95% of immunocompetent adults will spontaneously clear hepatitis B *(6)*. People with fulminant or severe acute hepatitis may benefit from nucleos(t)ide analogue therapy with entecavir or TDF, to improve survival and reduce the risk of chronic hepatitis B *(6)*. The duration of treatment has not been established, but continuing antiviral therapy for at least three months after seroconversion to anti-HBs or at least 12 months after anti-HBe seroconversion without HBsAg loss is generally advised.

Acute hepatitis C is usually asymptomatic and does not usually lead to a life-threatening disease. About 30% (15–45%) of people with acute hepatitis C spontaneously clear the virus within six months of infection without any treatment. WHO strongly recommends therapy with pangenotypic direct-acting antiviral drugs for all adults and adolescents with viraemic infection.

5.3.3.8. Health-care workers with chronic hepatitis B

Those who are HBsAg positive and viraemic and undertake exposure-prone procedures (with direct contact between the body fluids of health-care workers, especially blood, and the tissues or mucous membranes of the person with hepatitis B), such as procedures performed by surgeons, gynaecologists, nurses, phlebotomists, personal care attendants and dentists, should be considered for antiviral therapy to reduce direct transmission, and levels of HBV DNA should ideally be undetectable or at least <2000 IU/mL before resuming exposure-prone procedures.

5.3.3.9. Children

Non-specialist paediatricians can treat children and adolescents with hepatitis C. However, although children and adolescents with hepatitis C and experience with direct-acting antiviral drugs and those with cirrhosis are rarely encountered in clinical practice, such cases may be most appropriately managed under the supervision of a paediatric specialist. Few data cover this.

5.3.4. Treatment monitoring and HCC surveillance

- Chronic hepatitis B services need to adopt strategies to optimize linkage to care after diagnosis, initiation of antiviral therapy if eligible, adherence to antiviral therapy and retention in care. Long-term antiviral therapy for chronic hepatitis B is effective in reversing liver fibrosis and preventing hepatocellular carcinoma.
- Regardless of the criteria used for treatment initiation, everyone initiating treatment should be monitored at least annually for HBV DNA (when available), ALT and APRI score and HCC surveillance, with ongoing adherence support and retention in care.
- Assessment and follow-up for progression of disease and evidence of HCC are an essential part of the care of people with cirrhosis related to hepatitis B and C. People with cirrhosis (including those with hepatitis C who have achieved SVR) may be considered for HCC screening with six-monthly ultrasound examinations and/or alpha-fetoprotein estimation and endoscopy every 1–2 years to exclude oesophageal varices.
- Surveillance for HCC needs to be integrated into existing monitoring systems for disease progression and treatment response for those receiving antiviral therapy. Additional training in the use and expert interpretation of ultrasound imaging for small HCC will also be required.
- People receiving tenofovir alafenamide should be monitored for weight gain and lipid rises as well as the metabolic syndrome.
- Age and advanced liver disease are additional contributing factors that can help to identify those at greatest risk of osteoporotic fracture.
- People receiving long-term TDF therapy may be monitored annually for renal function and children monitored carefully for growth.
- Objective monitoring of adherence to antiviral therapy is essential for effective long-term management of chronic hepatitis B. Each clinic visit is an opportunity for assessing and supporting treatment adherence and may require a combination of approaches depending on the local context.
- Monitoring also needs to address the needs of specific populations with chronic hepatitis B, including people coinfected with HIV, hepatitis D or hepatitis C, those with advanced or decompensated liver disease as well as extrahepatic manifestations and children and adolescents, pregnant women and people who inject drugs.
- Failure to suppress viral loads may occur in treatment for chronic hepatitis B and/or C (see Box 5.6).

5.3.5. Monitoring for people not yet receiving treatment

The chronic hepatitis B care cascade has considerable attrition, with low rates of retention especially for people not receiving antiviral therapy *(59)*.

People who do not currently meet the criteria for antiviral therapy or who have expressed a desire to defer treatment may be monitored annually (Table 5.2, Box 5.3). To address specific individual concerns, regarding infectivity, transmission, the risk of oncogenicity and progressive liver fibrosis, a patient-centred approach with discussion between individuals and their health-care provider will be key in helping them make informed decisions about whether to begin treatment or not.

Box 5.6. Failure to suppress viral loads in hepatitis B or C

- Measuring HBV DNA and HCV RNA levels and testing for drug resistance are fundamental to confirming treatment failure and genotypic resistance, but low- and middle-income countries have extremely limited access to these.
- For hepatitis C, the triple direct-acting antiviral regimen sofosbuvir + velpatasvir + voxilaprevir was highly effective for people who did not reach an SVR with regimens containing direct-acting antiviral drugs. SVR rates ranged from 93% to 99%, with the lowest rate for people with genotype 3 infection and cirrhosis. Sofosbuvir + velpatasvir + voxilaprevir cannot be used for people with Child-Pugh class B or C cirrhosis or renal failure. They require more intensive clinical support and referral.
- In low- and middle-income countries, ascertaining the development of HBV resistance is largely based on clinical suspicion and, in some instances, an increase in serum aminotransferases. However, elevation in ALT tends to occur later after the rise in HBV DNA and has been shown to be a relatively poor predictive marker of resistance.
- Treatment adherence should be reinforced for everyone with confirmed or suspected antiviral resistance.

Fig. 5.1. Summary algorithm for the diagnosis, treatment and monitoring of chronic hepatitis B infection among adults and adolescents[a]

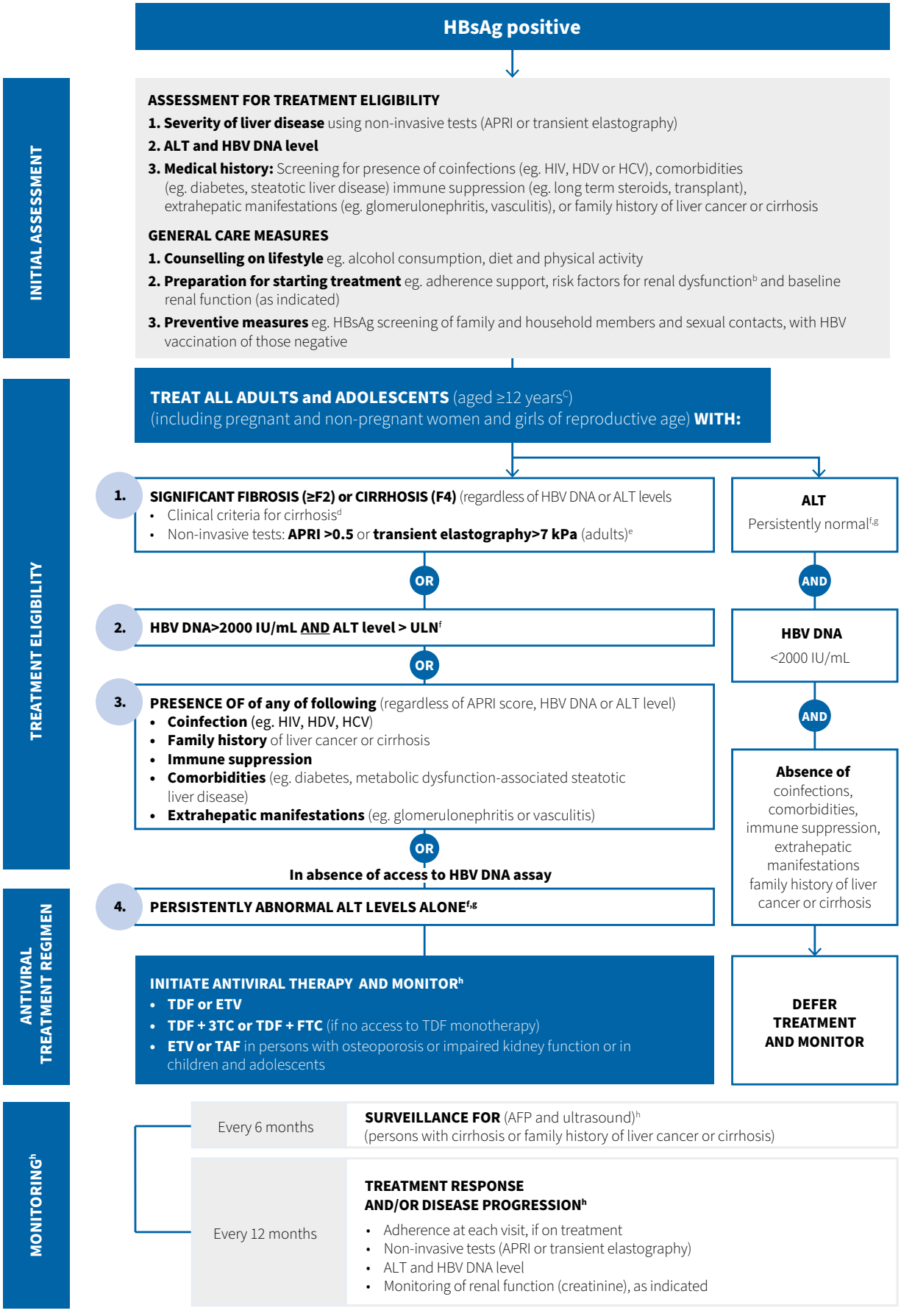


Fig. 5.1 (continued). Summary algorithm for the diagnosis, treatment and monitoring of chronic hepatitis B infection among adults and adolescents

Abbreviations: ALT: alanine aminotransferase; APRI: aspartate aminotransferase-to-platelet ratio index; AFP: alpha fetoprotein; HCC: hepatocelluar carcinoma; HDV: hepatitis D virus; ETV: entecavir; TDF: tenofovir disoproxil fumarate; 3TC: lamivudine; FTC: emtricitabine; TAF: tenofovir alafenamide fumarate.

[a] Defined as the presence of HBsAg for adults living in countries with high prevalence and, for adolescents and children, persistence of HBsAg for six months or more.

[b] Before initiation of antiviral therapy, assessment of risk factors for renal dysfunction (decompensated cirrhosis, CrCl <50 mL/min), poorly controlled hypertension, proteinuria, uncontrolled diabetes, active glomerulonephritis, solid organ transplantation, older age, body-mass index <18.5 kg/m2 (or body weight <50 kg), concomitant use of nephrotoxic drugs or a boosted protease inhibitor for HIV). Additional assessment of renal function as indicated. This may include serum creatinine level, estimated glomerular filtration rate, urine dipsticks for proteinuria and glycosuria.

[c] Age groups: these guidelines use the same definitions of age groups as those adopted in most trials and for regulatory approval. An adult is a person 18 years of age or older; an adolescent is age 12–17 years; and a child is age 2–11 years.

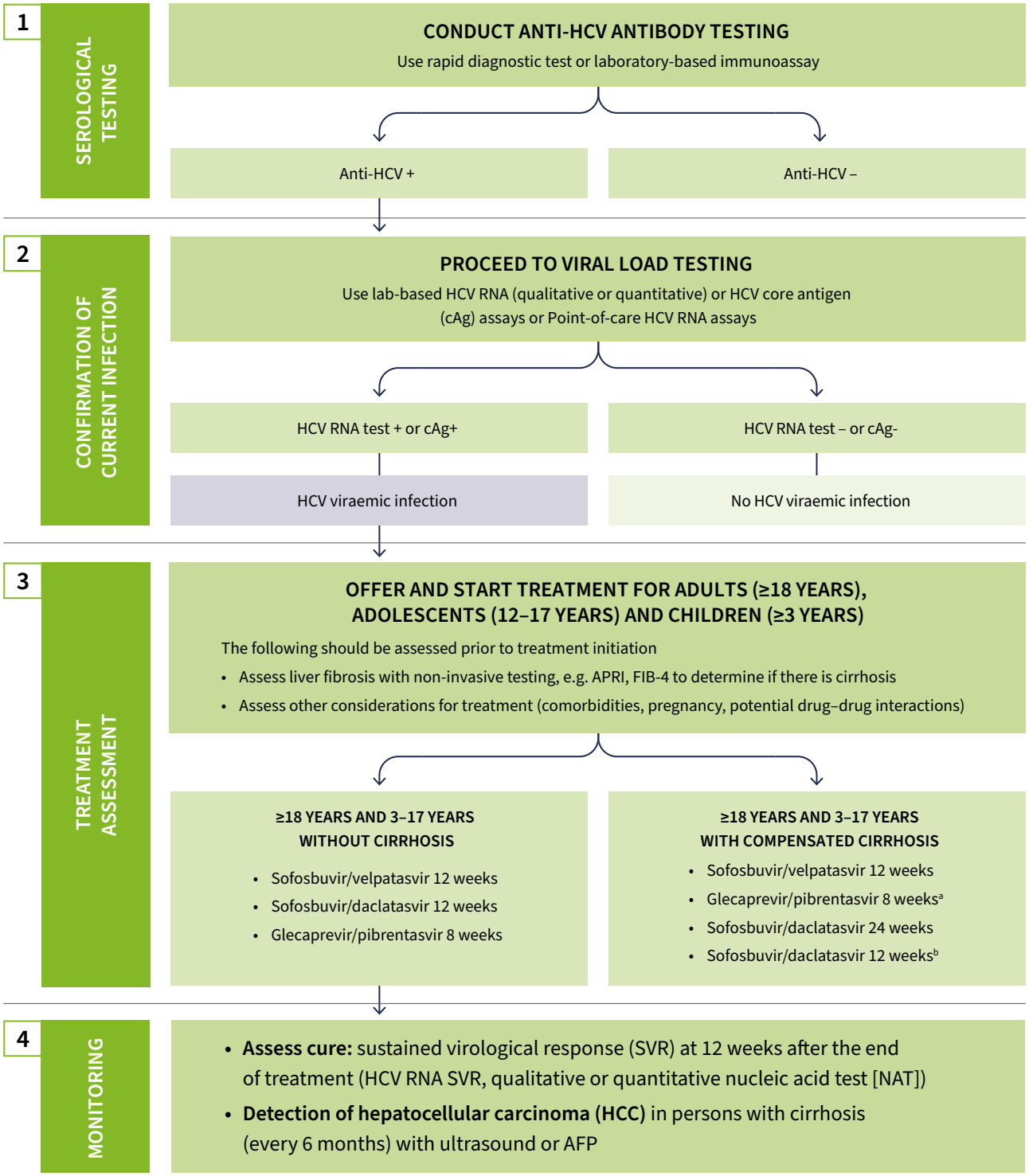
[d] Clinical features of decompensated cirrhosis: portal hypertension (ascites, variceal haemorrhage and hepatic encephalopathy), coagulopathy or liver insufficiency (jaundice). Other clinical features of advanced liver disease and cirrhosis may include: hepatomegaly, splenomegaly, pruritus, fatigue, arthralgia, palmar erythema and oedema.

[e] The cut-offs for significant fibrosis or cirrhosis using non-invasive tests (APRI and transient elastography) have not been fully validated for children and adolescents.

[f] The upper limit of normal for ALT has been defined as <30 U/L for men and boys and <19 U/L for women and girls. Persistently normal or abnormal may be defined as two ALT values below or above the upper limit of normal at unspecified intervals during a 6- to 12-month period. ALT levels fluctuate with chronic hepatitis B and require longitudinal monitoring to determine the trend.

[g] All people with chronic hepatitis B should be monitored regularly for disease activity and progression and detection of HCC and, after stopping treatment, for evidence of reactivation. More frequent monitoring may be required for those with more advanced liver disease, during the first year of treatment or when adherence is a concern.

Fig. 5.2. Summary algorithm for the diagnosis, treatment and monitoring of chronic hepatitis C infection among adults and adolescents



[a] Persons who failed prior therapy with interferon, ribavirin, and/or sofosbuvir with HCV genotype 1, 2, 4–6 with cirrhosis should be treated for 12 weeks, and with HCV genotype 3 with or without cirrhosis should be treated for 16 weeks.
[b] Treatment for 24 weeks is recommended in those who are treatment experienced or with compensated cirrhosis.

Box 5.7. Further guidance and resources

- *Global hepatitis report 2024: action for access in low-and middle-income countries (11)*
- *Updated recommendations on treatment of adolescents and children with chronic HCV infection, and HCV simplified service delivery and diagnostics (3)*
- *Guidelines for the prevention, diagnosis, care and treatment for people with chronic hepatitis B infection (6)*
- *Guidelines for the care and treatment of persons diagnosed with chronic hepatitis C virus infection (60)*
- *Consolidated guidelines on HIV, viral hepatitis and STI prevention, diagnosis, treatment and care for key populations (8)*

6. Simplified service delivery for viral hepatitis

6.1. Introduction

Achieving the global targets for eliminating viral hepatitis requires expanding and transforming services to improve accessibility. The Global Health Sector Strategy on viral hepatitis (2022–2030) *(14)* emphasizes delivering high-quality, person-centred care based on evidence and innovative approaches. This ensures increased engagement across the care cascade for hepatitis B and C by tailoring services to diverse populations and settings, ultimately ensuring that no one is left behind. Fig. 6.1 illustrates the hepatitis B and C care cascade.

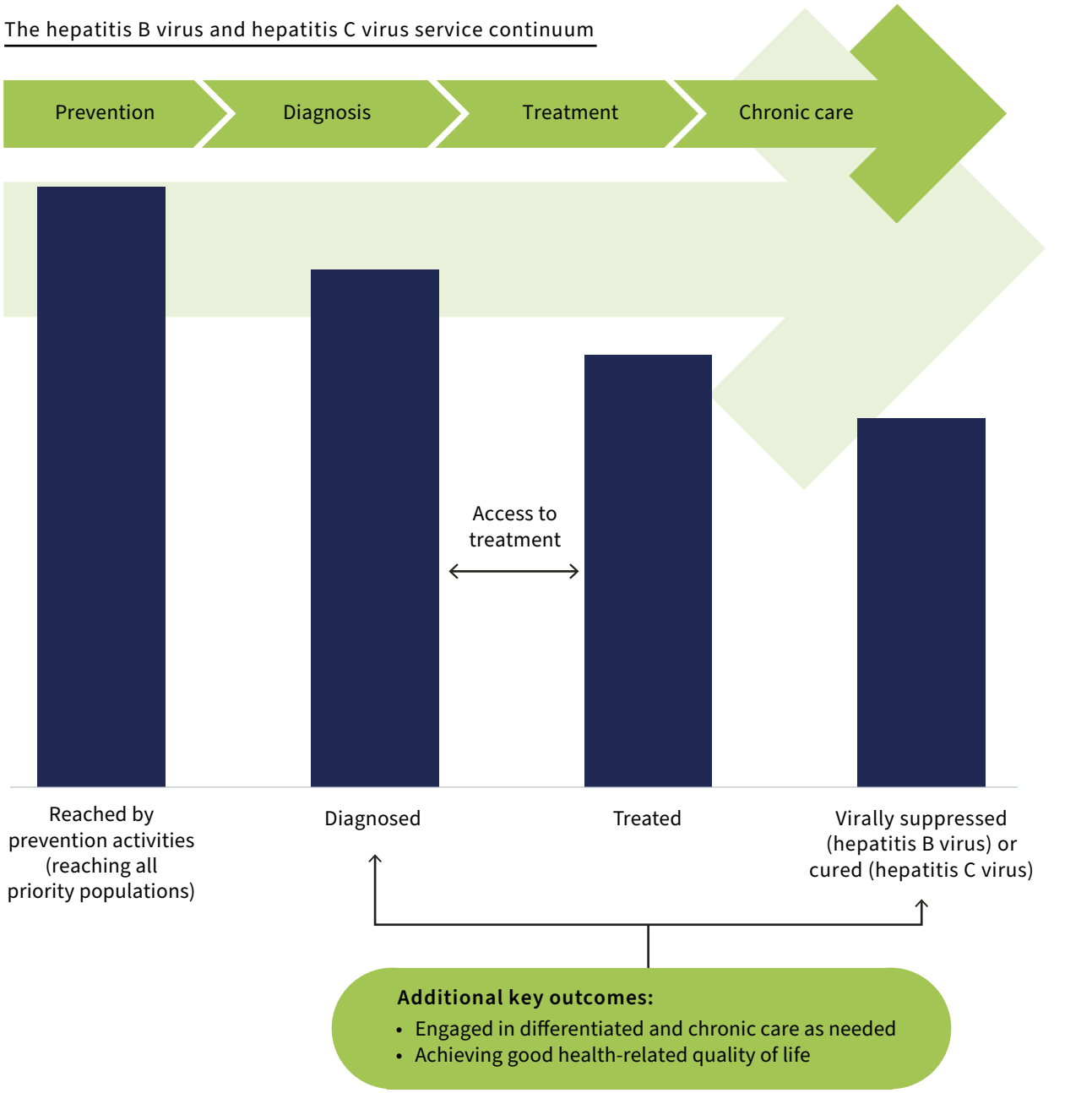
Reaching the Global Health Sector Strategy on viral hepatitis (2022–2030) targets will require rapid scale-up focusing on countries with a high burden of viral hepatitis, with 40 million people living with hepatitis B receiving treatment and 30 million people with hepatitis C being cured by 2026. If action is not taken, there will be an additional 9.5 million cases of viral hepatitis, 2.1 million cases of cancer and 2.8 million deaths by 2030 *(14)*.

Successful service delivery balances clinical effectiveness, operational feasibility, client acceptability and affordability, ensuring equitable, comprehensive and sustainable responses across the prevention-to-care continuum. Decisions on how to deliver hepatitis services involve planning, organizing, managing and delivering comprehensive health services that meet population needs and within the context of the national health systems *(17)*.

Hepatitis B and C services in many countries have remained heavily centralized, often tied to specialist hospital care. Even when testing is undertaken at the community level, there is often significant attrition because of the requirement for referral to hospital-based specialist care for further assessment and initiation and monitoring long-term antiviral therapy. The availability of simple, short-course, highly effective and safe direct-acting antiviral therapy for hepatitis C has made decentralization of hepatitis C care much more feasible. Similarly, the availability of effective oral treatment for hepatitis B and the adoption of simplified eligibility criteria offers a promising opportunity to strengthen the public health response to hepatitis B, even within the context of primary health care.

This chapter outlines key WHO recommendations for delivering hepatitis B and C services (Table 6.1, Box 6.3), with practical guidance for implementing simplified service delivery across all levels of the health system, including primary care, the private sector, communities and prisons and other closed settings (Table 6.2, 6.3).

Fig. 6.1. Service engagement cascade for hepatitis B and C



6.2. Summary of recommendations

Table 6.1. Summary of simplified service delivery recommendations for hepatitis C and B

	WHO guideline recommendations for HCV	WHO guideline recommendations for HBV *(3,6)*
Decentralization	We recommend delivery of HCV testing and treatment at peripheral health or community-based facilities, and ideally at the same site, to increase access to diagnosis, care and treatment. These facilities may include primary care, harm reduction sites, prisons and HIV/ART clinics as well as community-based organizations and outreach services.	• While there is no specific graded recommendation for HBV simplified service delivery, these recommendations align with the global hepatitis strategies (2022–2030) and can also be adopted or adapted for HBV • Integration of HBV testing in HIV/ART and ANC services is feasible and can be recommended especially for ANC where triple elimination recommends testing for HIV, syphilis and hepatitis B.
Integration	We recommend integration of HCV testing and treatment with existing care services at peripheral health facilities. These services may include primary care, harm reduction (needle and syringe programmes and opioid agonist maintenance therapy sites), prisons and HIV/ART services.	
Task sharing	We recommend delivery of HCV testing, care and treatment by trained non-specialist doctors and nurses to expand access to diagnosis, care and treatment.	
Remarks		
All strong recommendation with variable certainty of evidence among different populations. For decentralization and integration; moderate (people who inject drugs, prisoners); low (general population, people living with HIV).		

6.3. Practical considerations for simplified service delivery

6.3.1. Delivering prevention and testing services

Delivering hepatitis prevention and testing services requires strong collaboration with programmes such as immunization, HIV, TB, noncommunicable diseases, mental health, harm reduction and blood product and injection safety and is critical for achieving targets for eliminating hepatitis. Mobilizing and creating demand for viral hepatitis testing are essential to ensure that health-care workers offer testing and the affected populations seek and accept it. This requires training providers to deliver stigma-free services and design tailored, community-informed strategies that address discrimination. Effective approaches include mass-media campaigns, targeted digital outreach, community- and peer-led initiatives and network-based testing, such as couples counselling and giving priority to the contacts of diagnosed individuals. These strategies should be regularly evaluated and adapted based on feasibility and impact. Chapters 3 and 4 outline specific considerations for prevention and testing services.

6.3.2. Decentralization, integration and task sharing of testing and treatment services

Decentralization, integration and task sharing are key strategies for expanding access to hepatitis testing and treatment by bringing services closer to communities – through primary health care delivery platforms and community-based sites – rather than relying solely on centralized specialist hospitals. Primary care forms the foundation for integrated health services and lies at the heart of a primary health care approach. It is where most people's health needs are met and serves as the first point of contact for individuals, families, and communities. This approach reduces travel and waiting times, strengthens care linkage and supports early diagnosis and timely treatment, especially in low-resource, high-burden settings. These models, already effective for hepatitis C care in some countries, can be adapted for hepatitis B. Implementing these streamlined standardized approaches in primary care and other public health programmes enhances system efficiency, including for surveillance and monitoring (Box 6.1) *(3, 6)*.

Box 6.1. Applicability of service delivery recommendations

- In contrast to most clinical interventions, service delivery interventions are generally highly context specific in terms of both relative effectiveness and importance in a given context. Consistent with the burden of disease, much of the evidence supporting the recommendations in this chapter comes from studies undertaken in low- and middle-income countries.
- High-income countries with more resources, stronger health systems and fewer hepatitis cases favour a more individualized approach to care, although the overarching framework of the public health approach provides the setting within which this more personalized service delivery can occur.

Designing hepatitis programmes requires tailoring services to local context, health system capacity, client preferences and disease burden. Some of these approaches may not be appropriate for or acceptable to all clients. Service delivery decisions should be guided by programmatic data, service gaps and cost–benefit considerations. Adopting good practices (see Box 6.2) is essential to ensuring equitable access and high-quality service delivery. In many low-and middle-income countries, using HIV infrastructure (laboratory and pharmacy capacity, personnel, procurement and supply chain) provides an opportunity to expand care and treatment to people with hepatitis C as well as hepatitis B monoinfection and coinfection *(23)*.

Box 6.2. Good practice approaches that can promote access and delivery of high-quality services for people living with chronic hepatitis B and C

1. **Strategies to promote the uptake of testing and strengthen linkage to care, treatment and prevention.** This includes adopting existing recommendations from the 2017 WHO hepatitis testing guidelines *(2)* for using dried blood spots for serological and virological testing; peer and lay health worker support in community-based settings; electronic reminders and clinician prompts for facility-based testing; and providing testing as part of integrated services.
2. **Strategies to promote and sustain adherence to long-term antiviral therapy.** This includes adopting and adapting existing recommended strategies from the 2021 WHO consolidated HIV guidelines *(61)* for using peer counsellors, mobile text reminders, cognitive behavioural therapy, behavioural skills training and medication adherence training.
3. **Strategies to promote retention in care and track and re-engage those disengaged from care.** This includes adopting and adapting existing recommended strategies from the 2021 WHO consolidated HIV guidelines *(61)* for using lay adherence counsellors, peer and family support and adherence clubs.
4. **Integrating hepatitis testing, care and treatment with other services.** Examples include HIV services and primary care, and this aims to increase the efficiency and reach of hepatitis services. This includes adopting and adapting existing recommended strategies for integration from the updated 2022 WHO hepatitis C guidelines *(3)*.
5. **Decentralized testing and treatment services at primary health care facilities or HIV and ART clinics to promote access to care.** This is facilitated by task-sharing and a differentiated care approach. This includes adopting and adapting existing recommended strategies for decentralization from the updated 2022 WHO hepatitis C guidelines *(3)*.
6. **Task sharing.** This is supported by training and mentoring health-care workers and peer workers and includes adopting and adapting existing recommended strategies for task-sharing from the updated 2022 WHO hepatitis C guidelines *(3)*.
7. **Differentiated care strategy.** Various care needs need to be assessed with referral to specialists as appropriate for those with complex problems. This includes adopting and adapting existing recommended strategies for differentiated care from the updated 2022 WHO hepatitis C guidelines *(3)*.
8. **Community engagement and peer support.** These promote access to services and linkage to care, which includes addressing stigma and discrimination.

Sources: Updated recommendations on treatment of adolescents and children with chronic HCV infection, and HCV simplified service delivery and diagnostics (3) and *Guidelines for the care and treatment of persons diagnosed with chronic hepatitis C virus infection (60)*.

6.3.2.1. Practical considerations for implementing service decentralization

Expanding hepatitis B and C testing and treatment services from hospitals to primary care to the community requires clear planning, resource allocation and delegated authority. Service delivery models must be tailored to each country's context, considering the hepatitis burden, health system priorities and stakeholder input.

- Not all primary care sites are equipped for hepatitis care, and decentralization may not be appropriate everywhere. The relative benefits should be assessed according to the context. Facility selection should reflect the geographical distribution of the affected populations. When testing and treatment occur at different sites, strong referral and follow-up systems are critical.
- Decentralized testing requires access to quality-assured rapid diagnostic tests or DBS collection, efficient specimen referral networks and electronic systems for return results.
- There are now successful models of decentralized viral hepatitis C testing and treatment services, both in primary care for the general population and at harm reduction sites for people who inject drugs. In contrast, the delivery of decentralized hepatitis B treatment and care remains limited.
- Simplified treatment algorithms – using direct-acting antiviral drugs for hepatitis C and tenofovir or entecavir for hepatitis B – combined with training and supervision of non-specialist providers, can support more integrated and decentralized care. Community-based services should be linked to well-equipped facilities and supported by laboratory, monitoring and supply systems. Mobile outreach can extend services to underserved hot-spots.
- Adaptations are needed for key populations, such as people who inject drugs, who may face stigma or prefer care away from home. Ensuring that decentralized services are responsive to their needs is essential for equitable access.

6.3.2.2. Practical considerations for task sharing

Many countries with a high burden of chronic hepatitis B and C face critical shortages of trained health-care workers and specialists, posing a major challenge to decentralizing services. Specialist expertise is often limited or unavailable in peripheral facilities.

Thus task-sharing – the strategic redistribution of tasks from specialist providers to trained non-specialists such as primary care physicians, nurses or lay providers – is a pragmatic solution to address workforce shortages and support decentralized care.

- Effective task sharing with non-specialist doctors or nurses requires appropriate training and ongoing mentorship at the decentralized site, additional support or referral to tertiary or specialist sites for more complex cases and training to provide non-stigmatizing, nondiscriminatory health care, particularly for vulnerable populations. The roles for community health workers include health promotion, counselling, behavioural change communication, providing information to support referral, facilitating access to testing and treatment services, conducting point-of-care testing for hepatitis B or C and vary widely across countries and settings *(62)*.
- Each cadre of health-care workers should operate within defined roles based on their skills and responsibilities. For example, decentralized personnel should be trained to recognize signs of advanced liver disease and interpret basic tests (such as APRI and FIB-4) to support triage and appropriate referral – especially for older people or those needing advanced care.
- Supportive regulatory frameworks are essential to enable task sharing. Standards of care must be defined across all levels of the health system, including the private sector. In some settings, legislative or policy changes may be required.

6.3.2.3. Practical considerations for implementing integration

Integration refers to the co-location and coordinated delivery of services across disease areas, programmes or levels of care to improve efficiency, accessibility and health outcomes. In the context of hepatitis B and C, this may include opportunities for embedding testing, prevention, treatment and care into broader health services such as those for HIV, TB, STIs, noncommunicable diseases, antenatal care, contraception and family planning. Integration may also involve leveraging existing diagnostic and laboratory platforms and delivering hepatitis treatment through primary care and HIV clinics. Integration can address shared barriers such as stigma, discrimination or harmful legal environments.

Integration may also occur across systems such as governance, financing, human resources and workforce training, delivery platforms, data systems and supply chains and across other programmes.

- As with decentralization, integration must be tailored to country contexts – considering the hepatitis burden, health system capacity and community needs – to ensure that integration builds on existing successes and benefits the most vulnerable populations, without unintended setbacks.
- Currently, several countries provide some form of partial integration of policies and interventions across primary health care and within the HIV programmes, and a few provide integrated services with harm reduction programmes. Linkage with noncommunicable disease programmes, including cancer and chronic disease services, can maximize synergy across disease areas and strengthen the overall resilience of health systems, including surveillance and monitoring.
- Challenges to integration include fragmented health systems, vertical programme structures, workforce shortages, misaligned financing and siloed data systems. In addition, resistance to change, limited provider training and policy gaps can slow progress. Countries should strengthen governance, align funding streams, invest in workforce development and implement interoperable data systems to promote integration.
- Meaningful community engagement and cross-programme collaboration are also essential to drive ownership and sustain integrated hepatitis services.

6.3.3. Differentiated service delivery and chronic care

In nearly all countries, hepatitis treatment is delivered largely undifferentiated for individual needs and is based on a one-size-fits-all, clinic-based model. As national guidelines evolve towards comprehensive care, prevention, earlier diagnosis and treatment initiation, differentiated service delivery will become a critical component of recognizing the diversity of needs of people living with chronic hepatitis, as has been done for HIV. In the HIV context, differentiated service delivery is a person-centred approach that simplifies and adapts services across the care cascade in ways that both serve people's needs and optimize available resources in health systems. This definition could be easily applicable to other chronic diseases.

Differentiated service delivery offers a tailored approach, directing intensive clinical support to complex cases while shifting stable or asymptomatic people to district, primary and community-based services. Most people with chronic hepatitis B and C have early-stage liver disease and can be treated at a primary care facility or potentially even in the community. The model of differentiated care has proven effective in HIV and hepatitis C programmes to support decentralized care without compromising quality, ensuring that services are responsive to varying levels of clinical need (Tables 6.2 and 6.3) *(14)*.

People living with chronic hepatitis B, including coinfections with hepatitis D, and those cured of hepatitis C, but with advanced fibrosis, require long-term management of liver disease – especially decompensated cirrhosis and HCC. In many low- and middle-income countries, treatment options such as endoscopy, surgery, chemotherapy and liver transplantation remain limited. This underscores the need to prevent disease progression and ensure access to high-quality palliative and end-of-life care.

Careful consideration is required for children. Non-specialist paediatricians can treat children and adolescents with hepatitis C. However, direct-acting antiviral drug–experienced children and adolescents with hepatitis C and those with cirrhosis may be most appropriately managed under the supervision of a paediatric specialist. Few such data are available.

Adherence to longterm care and treatment in hepatitis B is critical for achieving viral suppression, improving health outcomes and preventing transmission. It involves early initiation and consistent use of antiviral therapy, supported by regular engagement with health-care providers. Tailored interventions are essential to address barriers such as stigma, mental health challenges and socioeconomic instability. A multidisciplinary approach – engaging clinicians, social workers and peer support – is key to sustaining adherence. Continual education, monitoring of viral load and reinforcing the benefits of treatment help to motivate individuals to remain in care and adhere to treatment over the long term.

Table 6.2. Potential differentiated care needs and approaches to managing chronic hepatitis B and C

Who? Category of people with hepatitis B and C *(3,6)*	What? Care needs	Where? Site	By whom? Caregiver
Clinically well and stable on treatment Clinically well and not yet requiring treatment	Standard care package: counselling, adherence support, treatment initiation and monitoring	Facility-based, including primary care or community-based settings, and mobile or outreach	Physician or nurse
Advanced liver disease or serious comorbidities HCC or previous treatment failure	Requiring more intensive clinical support and follow-up: management of liver-related complications (for example, variceal bleed, ascites, encephalopathy and regular HCC surveillance or treatment)	Facility-based: hospital	Physician
Mental health conditions, people who inject drugs or engage in alcohol misuse, adolescents and migrants	Requiring more intensive psychosocial or mental health support or intercultural and language support	Can be facility based or community based, harm reduction site	Physician and counsellor or peer support

Table 6.3: Examples of interventions in primary care such as comprehensive health centers, district facilities, general practice clinics or polyclinics and some private sector facilities

Activities	Description
Prevention	**Vaccination**: • hepatitis B birth dose (within 24 hours); • full childhood vaccination series according to the national schedule; and • catch-up hepatitis B vaccination for adolescents and adults at risk: health-care workers, household contacts and partners.
	Other prevention interventions • Harm reduction: needle and syringe programmes, opioid agonist maintenance treatment, • Infection prevention and control in health care (safe injections, sterilization and gloves with all procedures
Testing and diagnosis	Rapid diagnostic tests or laboratory-based immunoassay for **HBsAg and/or anti-HCV antibodies** • Routine screening (including with HIV or other testing) • Pregnancy screening and HBsAg in antenatal care (often integrated with HIV and syphilis) • Focused testing[a] according to national testing guidelines- including for most severely affected populations, age-based cohorts, key populations, health-care workers and household contacts of people with hepatitis B • Other testing options include HCV self-testing, dried blood spots (HBsAg and anti-HCV) if venous blood access is difficult

Table 6.3 (continued). Examples of interventions in primary care such as comprehensive health centers, district facilities, general practice clinics or polyclinics and some private sector facilities

Activities	Description
Further clinical/ laboratory evaluation	**Basic evaluation depends on local capacity, maturity of primary health care services, and available resources**. • Basic laboratory support: complete blood count, simple biochemistry if available • Non-invasive fibrosis assessment: APRI or FIB-4 (if laboratories are available) • Point-of-care testing for HCV-RNA or HBV DNA, when available (using GeneXpert machines or others) • Basic clinical assessment of signs and symptoms of chronic liver disease (ascites, jaundice etc.) • Abdominal ultrasound and elastography
Counselling	• Information, health promotion, behaviour change communication • Alcohol reduction, dietary and liver health, • Adherence counselling, including use of mobile reminders and electronic systems • Ongoing harm reduction and safer injection counselling
Hepatitis treatment and care[b]	**Initiation of treatment based on simplified eligibility criteria and treatment decision algorithm** can be done in clinically stable uncomplicated non-cirrhotic cases guided by local capacity, available support and resources • Maternal prophylaxis of hepatitis B for preventing mother-to-child transmission • Finite course of simplified direct-acting therapy for hepatitis C in adults or adolescents • Long-term hepatitis B treatment for adults with simple non-complex cases
Recording and reporting	• Patient registration • Accurate and timely recording of clinical and treatment data • Regular reporting to relevant health authorities and systems • Basic data analysis to inform programme monitoring and decision making
Monitoring of hepatitis treatment and chronic care	Although HCV care and Antenatal HBV prophylaxis for PMTCT are often short term, people with hepatitis B are often on lifelong care and need regular ongoing care and follow • Monitoring of HCV treatment for duration of DAA and beyond as needed • Monitoring of mothers on antiviral HBV prophylaxis for PMTCT (and their exposed infants) • For those taking antiviral medication for hepatitis B, monitoring and evaluation every 6–12 months a. Regular visits to monitor adherence and response, laboratory checks if available, occurrence of any adverse effects b. Refills and referral for complications • For those with chronic HBV, clinically stable and not on any treatment
Referrals and other linkages	• Linkage to facilities with available hepatitis diagnostic and other laboratory services • Linkage to other relevant services for infectious diseases (including TB, HIV, STI, others) or NCD (including mental health) and other chronic care services etc • Linkage to community support: peer navigators, lay health workers and networks • Referral to appropriate health care facility with specialized care, including secondary and tertiary care – Complex cases or requiring more intensive clinical support – Advanced liver disease or comorbidities and complications, HCC screening – Requiring more intensive psychosocial or mental health support – Children and adolescents may require experienced or paediatric consultation

[a] Focused testing: most severely affected populations, age-based cohorts, key populations, health-care workers and household contacts of people with hepatitis B.

[b] Treatment and care are more likely to be carried out in facility sites within primary health care based on local capacity and resources. Examples include comprehensive health centres, district hospitals, general practice clinics and private hospitals.

Box 6.3. Further guidance and resources

- *Guidelines for the prevention, diagnosis, care and treatment for people with chronic hepatitis B infection (6)*
- *Updated recommendations on treatment of adolescents and children with chronic HCV infection, and HCV simplified service delivery and diagnostics (3)*
- *Consolidated guidelines on HIV prevention, testing, treatment, service delivery and monitoring: recommendations for a public health approach, 2021 update (61)*
- *Integrating HIV, viral hepatitis and sexually transmitted infections with primary health care: learning from countries (23)*
- WHO UHC Service Planning Delivery & Implementation Platform *(18)*. This enables country users to choose between alternative interventions and assess the relevant resource requirements and costs related to their selection.

7. Strengthening strategic information for the viral hepatitis response

7.1. Introduction

Strategic information refers to systematically interpreted data used to guide planning, policy development and decision-making in viral hepatitis programmes. Monitoring and evaluation are core components of national programme management, enabling continual assessment of service delivery and outcomes. Monitoring involves routine data collection, and evaluation provides periodic analysis of programme effectiveness. Accurate recording and reporting of programmatic data informs managers about immediate outputs and outcomes of programme services, as well as the larger impact of resources invested into a programme. Clinician engagement in monitoring and evaluation ensures alignment with public health goals and supports evidence-informed improvements in care. Robust surveillance systems are essential to guide implementation and track progress.

Viral hepatitis surveillance, closely linked to monitoring and evaluation, serve distinct purposes and are used at different stages of programme implementation. Table 7.1 summarizes the three main purposes for hepatitis surveillance, their methods and implementers including acute hepatitis surveillance for outbreak detection, chronic infection monitoring through biomarker surveys and burden estimation of sequelae such as cirrhosis and hepatocellular carcinoma.

Table 7.1. Hepatitis surveillance: purposes, methods and implementers

Technical approaches	Objective of hepatitis surveillance		
	1. Surveillance for acute hepatitis that reflects new infections	**2. Surveillance for burden of chronic, prevalent hepatitis**	**3. Surveillance for burden of sequelae**
Objective of the surveillance activity	• Detect outbreaks • Describe trends in type-specific acute hepatitis and identify risk factors	• Estimate the prevalence of infections • Model incidence trends	• Estimate mortality from hepatitis B– or hepatitis C–associated HCC and decompensated cirrhosis
Surveillance methods	• Syndromic surveillance in the general population • Event-based surveillance • Enhanced case reporting (with in vitro diagnosis and collection of information on risk factors), countrywide or in sentinel sites • Regular testing of a defined population when screening registries are available (such as in prisons and among pregnant women with multiple antenatal care visits)	• Regular and repeated biomarkers surveys	• Sentinel surveillance sites for estimating the fraction of HCC and decompensated cirrhosis attributed to hepatitis B and C • Data on the mortality envelope is obtained from death registries

Table 7.1 (continued). Hepatitis surveillance: purposes, methods and implementers

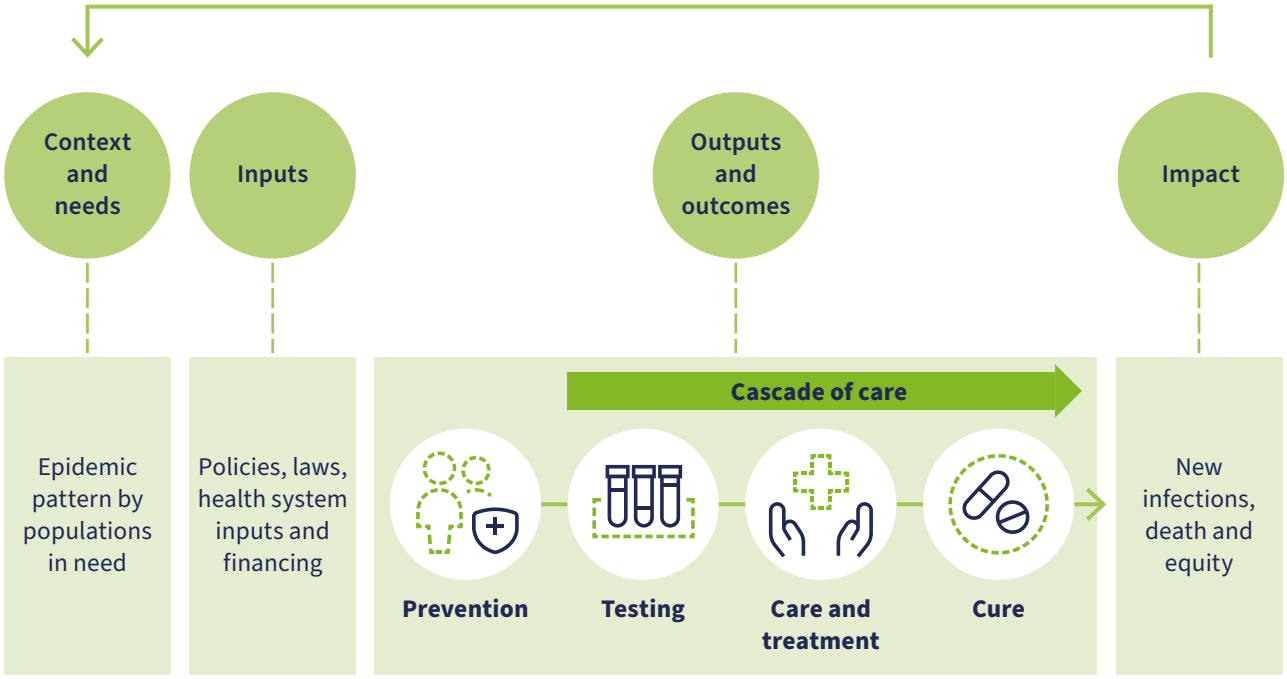
Technical approaches	Objective of hepatitis surveillance		
	1. Surveillance for acute hepatitis that reflects new infections	**2. Surveillance for burden of chronic, prevalent hepatitis**	**3. Surveillance for burden of sequelae**
Usual implementer	• Communicable disease surveillance • Communicable disease surveillance (if countrywide) • Hepatitis programme (if sentinel sites)	Hepatitis programme in coordination with the other actors implementing biomarker surveys	• Vital registration • Sentinel sites caring for people with decompensated cirrhosis and HCC • Cancer registries
Existing guidelines and protocols	Standard operating procedures for enhanced reporting of cases of acute hepatitis *(63)*	Template protocol for surveys to estimate the prevalence of biomarkers of infection with the hepatitis viruses (tool for adaptation and use at the country level) *(64)*	Protocol for surveillance of the fraction of decompensated cirrhosis and HCC attributable to viral hepatitis in clinical centres of excellence *(15)*

7.2. Key indicators for monitoring viral hepatitis programmes

The WHO consolidated guidelines on person-centred viral hepatitis strategic information *(7)* provide comprehensive guidance for monitoring national and global progress toward eliminating hepatitis. The guideline outlines a menu of indicators for monitoring hepatitis programmes, including 10 core indicators (Fig. 7.1). These core indicators span the full results chain. They begin with prevalence (C1), which provides contextual insight into the proportion of the population infected, and include the availability of drugs and diagnostics (A2), which reflects the health system's capacity to test and treat hepatitis B and C. Prevention is captured through indicators C3 to C5, while the cascade of care and cure – encompassing diagnosis, treatment, and treatment outcomes – is measured through indicators C6 to C8. Finally, impact is assessed through incidence (C9) and mortality (C10). The guidelines provide detailed metadata for each indicator, outlining definitions, measurement methods and data sources to support standardized implementation and reporting.

Table 7.2 presents list of selected indicators along with the key data elements required for routine programme monitoring and management. Most of these data elements are collected through routine patient monitoring, as exemplified in the WHO template patient management card (Annex 1). Collection of these data elements serves multiple purposes: enhancing individual patient care, supporting programme management, and enabling the calculation of core indicators essential for tracking progress toward hepatitis elimination (Box 7.1).

Fig. 7.1. Core indicators for monitoring hepatitis programmes



C1. Prevalence of chronic hepatitis B and C

C2. Existence of a costed national strategic plan for eliminating viral hepatitis

C3. HBV vaccination and elimination of mother-to-child transmission of HBV

C4. Harm reduction among people who inject drugs: needles and syringes distributed and opioid agonist maintenance treatment

C5. Facility-level injection safety and blood safety

C6. Testing and diagnosis coverage

C7. Treatment coverage

C8. Cure for HCV and HBV DNA suppression

C9. Incidence of hepatitis B and C

C10. Mortality from hepatitis B and C

Table 7.2. Selected indicators for viral hepatitis

Indicator area	Key data elements to be collected	Key indicators for programme monitoring
Prevention of viral hepatitis B and C		
Hepatitis B vaccination coverage and elimination of vertical transmission	• Date of birth • Date of hepatitis B vaccine birth dose • Date of three doses of hepatitis B vaccine • Number of live births • Date and result of HBsAg test (among pregnant women)	• Number of pregnant women attending antenatal care services • Proportion of pregnant women tested for HBsAg • Proportion of pregnant women tested positive
Harm reduction	• Number of needles and syringes distributed by needle–syringe programmes • Number of people who inject drugs • Number of people who inject drugs and are receiving opioid agonist maintenance therapy • Number of opioid-dependent people	• Percentage of people who inject drugs who are opioid dependent receiving opioid agonist maintenance therapy • Number of needles and syringes distributed per person who injects drugs per year
Facility-level injection safety	• Number of sampled health-care facilities where all therapeutic injections are given with single-use, standard disposable or autodisable syringes	• Proportion of health-care facilities with single-use standard disposable or autodisable syringes
Blood safety	• Number of blood units screened for bloodborne diseases, including hepatitis B and C • Total number of blood units donated	• Proportion of blood donated by donors screened for bloodborne infection
Testing and diagnosis of viral hepatitis B and C		
Hepatitis B testing and diagnosis	• Hepatitis B test (HBsAg) date and results • Date of first hepatitis B diagnosis • HBV viral load test date and results • Hepatitis B e antigen test date and results	• Hepatitis B testing coverage • Hepatitis HBsAg test positivity • Proportion of people with chronic hepatitis B who have been diagnosed
Hepatitis C testing and diagnosis	• Anti-HCV test date and results • Date of first hepatitis C diagnosis • HCV core antigen • HCV RNA test date and results	• Anti-HCV screening coverage • Anti-HCV test positivity • Proportion of people with chronic hepatitis C who have been diagnosed
Hepatitis D testing and diagnosis	• Anti-HDV test date and results • HDV RNA test date and results	• Hepatitis D testing coverage • Proportion of people with chronic hepatitis B who are coinfected with hepatitis D
Treatment for viral hepatitis B and C		
Hepatitis B treatment initiation and continuation	• Hepatitis B treatment initiation date • Hepatitis B regimen prescribed	• Proportion of people with hepatitis B initiating antiviral therapy • Proportion of people with hepatitis B currently receiving antiviral therapy • Proportion of people with hepatitis B not initiating treatment with annual follow-up • Proportion of treatment attrition among people with chronic hepatitis B in the reporting year • Proportion of people with chronic hepatitis B treated and achieving HBV DNA viral suppression

Table 7.2 (continued). Selected indicators for viral hepatitis

Indicator area	Key data elements to be collected	Key indicators for programme monitoring
Hepatitis C treatment initiation	• Hepatitis C treatment initiation date • Hepatitis C regimen prescribed • Hepatitis C sustained viral response test date and results	• Proportion of people with hepatitis C initiating treatment • Proportion of people with hepatitis C treated and achieving cure
Viral hepatitis sequalae surveillance	• Cirrhosis or decompensated cirrhosis diagnosis • Alpha fetoprotein test date and results • Ultrasound date and results • HCC evaluation date and results (alpha fetoprotein etc.) • Death (date)	• % of people with HCC with chronic hepatitis B • % of people with HCC with chronic hepatitis C • % of people with decompensated cirrhosis with chronic hepatitis B • % of people with decompensated cirrhosis with chronic hepatitis C
Comorbidities and risk factors	• HIV status and ART history • Pregnancy status • Metabolic dysfunction–associated steatotic liver disease	

7.3. Strengthening country surveillance for viral hepatitis: practical considerations

7.3.1. Practical considerations for implementing person-centred data monitoring for viral hepatitis

Strengthening surveillance systems is essential to track individuals as they move through the cascade of care and to ensure long-term retention in care. As hepatitis programmes mature, monitoring national-level outcomes becomes increasingly important for assessing progress toward elimination targets.

To be sustainable, surveillance systems for viral hepatitis must be integrated within the broader health information system. This requires alignment with national digital health strategies and interoperability frameworks. WHO provides standards, tools and guidance to support countries in developing digital health policies, strategic plans and roadmaps, including maturity models for system interoperability *(65, 66)*.

The following are key considerations.

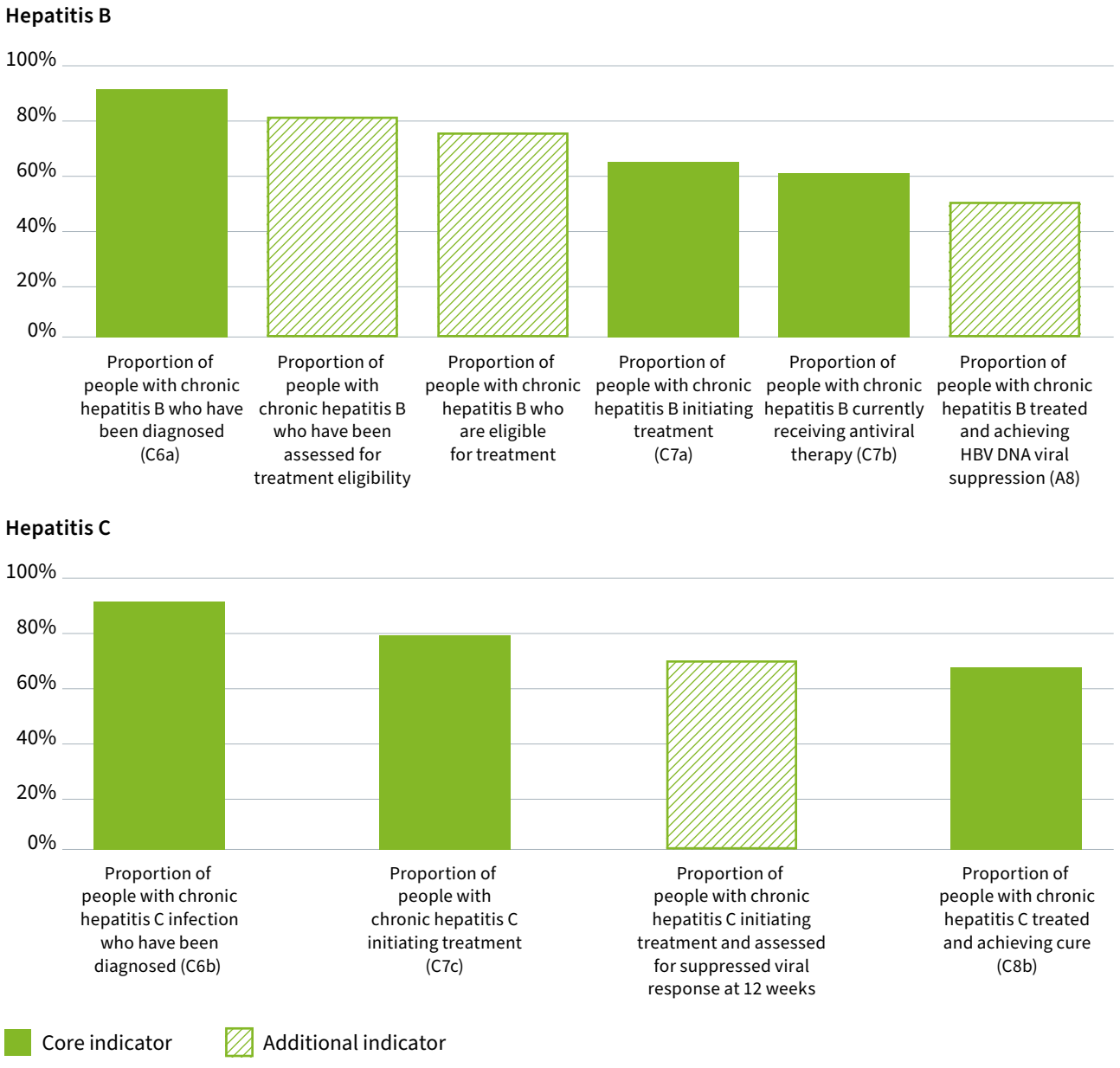
- **Facility-level integration:** most routine health information systems are based at health facilities, collecting both patient-level clinical data and aggregated data for programme monitoring. Hepatitis patient monitoring systems at the facility level should be linked, when feasible, with:
  - antenatal care services (for testing pregnant women and monitoring exposed infants);
  - outpatient and inpatient services for individuals receiving treatment;
  - pharmacy systems for drug dispensing;
  - laboratory and radiology units for disease staging and follow-up; and
  - oncology and transplant units, if applicable.
- **National and subnational integration:** hepatitis programme data should be linked with other health sector data sources, including:
  - cancer registries;
  - immunization units;
  - laboratory information systems;
  - pharmaceutical supply systems;
  - civil registration and vital statistics (for mortality tracking); and
  - other disease programmes, such as those for HIV, diabetes and TB, to monitor comorbidities.
- **Community-based services:** surveillance systems must also capture data from services delivered outside health facilities, such as mobile clinics and outreach by peer or community health workers. These services are especially important for reaching high-risk populations that may not access facility-based care.
- **Civil society engagement:** involving civil society in monitoring and evaluation is critical. Their participation helps to assess the effectiveness of services and understand the experiences, perceptions and needs of people living with hepatitis B or C and those of key populations and the broader community.

Monitoring the cascade of testing and treatment of hepatitis B and C

The cascade of care is a key tool for visualizing how individuals progress through the stages required for effective hepatitis control – from prevention to diagnosis, treatment and ultimately cure. It provides a structured way to assess programme performance and communicate progress toward national and subnational targets.

- Cascade metrics offer a clear and accessible means to track how well programmes are advancing toward key elimination goals.
- They help to identify trends, measure progress and reveal gaps or bottlenecks across service areas.
- By highlighting disparities between stages, the cascade reveals strengths and weaknesses in patient follow-up and coordination between services, from primary prevention to viral suppression.
- Regular programme reviews should assess each stage of the cascade to evaluate performance, identify gaps and understand how these relate to trends in incidence and mortality.
- Findings from cascade analysis can inform strategic decision-making, guiding efforts to improve diagnosis, treatment initiation and cure rates among people living with hepatitis.

Fig. 7.2. Core and additional indicators in the cascade of care for hepatitis B and C



Box 7.1. Further guidance and resources

- *Consolidated guidelines on person-centred viral hepatitis strategic information: using data to support country scale-up of hepatitis prevention, diagnosis and treatment services (7)*
- Standard operating procedures for enhanced reporting of cases of acute hepatitis *(63)*
- Template protocol for surveys to estimate the prevalence of biomarkers of infection with the hepatitis viruses *(64)*
- Protocol for surveillance of the fraction of decompensated cirrhosis and HCC attributable to viral hepatitis in clinical centres of excellence *(15)*

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Annex 1. WHO template for a chronic hepatitis B and C patient management card

IDENTIFICATION:

Name: _____

Gender: |_| Female |_| Male |_| Transgender male |_| Transgender female |_| Other **Sex assigned at birth**: |_| Female |_| Male |_| Other

Date of birth (DD/MM/YYYY): _____ / _____ / _____ **Age (years)**: _____ **Marital status:** |_| Single |_| Married |_|Divorced or separated |_|Widowed|_|N/A

Address: _____**Residing district**_____ **Telephone number**_____ **Unique identifier** |_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|
Patient clinic ID number: |_|_|_|_|_|_|_|_|_||_|_|_|_|_|_|_|_|**Enrolment date: ___ / ___ / ___ Health district** _____ **Health unit or facility** _____

ART or direct-acting antiviral drugs initiation site _____ **Clinician or team**_____

LABORATORY:

HBsAg: |_|Positive|_| Negative|_|Indeterminate |_| Not done **Date of first diagnosis of hepatitis B**: ___ / ___ / ___

HBV DNA (IU/mL): |___|Value|_| Negative |_|Indeterminate |_| Not done **HBeAg**: |_|Positive|_| Negative |_|Indeterminate |_| Not done

HDV RNA (IU/mL): |_|Positive|_|Negative |_|Indeterminate |_| Not done **Anti-HDV (to be done if HBV+):** |_|Positive|_| Negative |_|Indeterminate |_| Not done

Anti-HCV: |_|Positive|_| Negative |_|Indeterminate |_| Not done **Date of first diagnosis of hepatitis C:** ___ / ___ / ___

HCV RNA (IU/mL): |_|Value|_| Negative |_|Indeterminate |_| Not done **HCV genotype**: |_| **HCV core antigen**: |_|Positive|_| Negative |_|Indeterminate |_| Not done

HIV: |_|Positive|_| Negative |_| Indeterminate |_| Not done **Latest HIV viral load** (copies/mL): _____|_| Not done **CD4 count**:_____ Í 109/L |_| Not done

COMORBODITIES, RISK FACTORS AND CONCOMITANT TREATMENT

HIV treatment regimen: _____ **Date HIV treatment started**___ / ___ / ___ **Tuberculosis:** |_|Active|_| Receiving treatment|_| No

Injecting drug use:|_|Active (past 12 months) |_| Past history |_| No **Daily alcohol consumption units**: |_| **Metabolic syndrome**: |_|

LIVER AND RENAL ASSESSMENT AND DISEASE STAGING

Staging date: ___ / ___ / ___

ALT: ___ IU/L **AST**: ___ IU/L **PLT**:____ /mL **Clinical diagnosis of cirrhosis**:|_|Yes|_| No **If yes, Child-Pugh score**:

APRI score: ___ |_| Not done **FIB4:** ____ |_| Not done **Transient elastography (kPa)**:_____ |_| Not done **Liver biopsy stage (F):** _____ |_| Not done

Bilirubin: Total____µmol/L and Direct: _____µmol/L__ **Ultrasound scan**: _____**Prothrombin time/INR**:_____

Creatinine_____ eGFR _____Serum albumin_____

HEPATITIS B TREATMENT AND CARE

Past experience with treatment: |_|Yes|_| No **Past treatment regimen: ____Hepatitis B treatment started**: _____**Date started:** __ / ___ / __ **Date stopped:** __ / ___ / __

First annual viral response assessment **Date tested**: ___ / ___ / ___ **HBV DNA (IU/mL)**: |_|Positive|_|Negative |_| Not done **ALT**: ____ IU/L

HEPATITIS C TREATMENT

Past experience with treatment: |_|Yes|_| No **Past treatment regimen:**___ **Hepatitis C treatment started**____: **Date started**: ___/ ___/ __ **Date completed**: __ / __/__

12 weeks post-treatment RNA test date: ___ / ___ **:** |_|Yes|_| No. **HCV RNA (IU/mL)**: |_|Positive|_|

HEPATITIS SEQUALAE

Cirrhosis: |_|Yes|_| No. If yes cirrhosis, **Ascites:** |_|Yes|_| No. If yes, degree of ascites |_| Mild |_| Moderate |_| Severe

History of hepatic encephalopathy: |_| Yes|_| No. Presence of oesophageal or fundal varices **:** |_| Yes|_| No

Hepatocellular carcinoma (HCC): if yes, BCLC stage _____ Number of focal lesions _____ Largest in size _____ cm Extrahepatic spread |_| Yes|_| No

Others: _____

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