Clinician Resource:

Hepatitis B Virus Screening and Management for Patients Receiving Systemic Treatment

Ontario Health-Cancer Care Ontario (OH-CCO)
Systemic Treatment Program & Project Working Group

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Ontario Health
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Background

Hepatitis B virus (HBV) infection is a vaccine-preventable viral infection that mainly affects the liver. It can cause both acute and chronic illness. There is no cure for HBV, though it can be successfully treated, when indicated, with a prolonged course or lifelong antiviral medications, which can help to slow disease progression and improve long-term survival. If left untreated, HBV infection can lead to permanent liver damage, liver cancer, and death.[1,2]

In 2019, a total of 4,912 cases of HBV were reported in Canada for a rate of 13.1 per 100,000 people. Of these, 178 were cases of acute HBV infection (0.5 per 100,000 people), 944 were cases of unspecified HBV infection (4.7 per 100,000 people), and 3,790 were cases of chronic HBV infection (10.2 per 100,000 people).[2]

HBV infection is spread through contact with infected blood or other bodily fluids. One of the most common mechanisms of HBV transmission is vertical transmission from an infected mother to her infant. Though HBV diagnosis rates are relatively low among the general population in Canada, higher risk groups[3] include:

- Individuals born in a region with moderate/high risk for HBV (**Fig. 1**)
- Individuals whose mother was born in a region with moderate/high risk for HBV **(Fig. 1)**
- HIV-positive persons
- Injection drug users
- Those with household or sexual contact with persons with HBV
- People on dialysis

Figure 1. Regions with a moderate to high risk for hepatitis B infection include, but are not limited to, Caribbean, Far East, the Middle East, Africa, South America, Eastern Europe, and Central Asia

HBV serologic testing involves measurement of several HBV-specific antigens and antibodies. Different serologic markers are used to identify different phases of HBV infection and to determine whether a patient has chronic HBV or is immune to HBV because of prior infection (clinically resolved) or vaccination **(Table 2).**[4]

Table 2. Common Hepatitis B Serology Markers

Markers	Interpretation
Hepatitis B surface antigen (HBsAg)	• A protein on the surface of hepatitis B virus; it can be detected in high levels in serum during acute or chronic hepatitis B virus infection. • The presence of HBsAg indicates that the person is infectious. • HBsAg is the antigen used to make hepatitis B vaccine
Hepatitis B surface antibody (anti-HBs)	• The presence of anti-HBs is generally interpreted as an indication of recovery and immunity from hepatitis B virus infection. • Anti-HBs also develops in a person who has been successfully vaccinated against hepatitis B
Total hepatitis B core antibody (anti-HBc)	• Appears at the onset of symptoms in acute hepatitis B and persists for life • The presence of anti-HBc indicates previous or ongoing infection with hepatitis B virus • Anti-HBc is negative in people who have been vaccinated against HBV unless they have been exposed to HBV infection

Adapted from Hepatitis B. Centers for Disease Control and Prevention, 2021.

HBV reactivation (HBVr) is the reappearance or rise of HBV DNA in the serum of patients with chronic or clinically resolved HBV infection. HBVr includes both:

- Exacerbation of chronic HBV infection in an HBsAg-positive patient (with ≥ 2 log10 rise in HBV DNA level)
- Reactivation of clinically resolved HBV, which can either arise from the reappearance of HBsAg (called reverse HBsAg seroconversion) or detection of HBV DNA with negative HBsAg.[5,6]

These virological events are often followed by a reactivation-related hepatitis [increase in alanine transaminase (ALT) or aspartate transaminase (AST) ≥ 3 x baseline]. The clinical presentation of HBVr (also called a “flare”) can vary from asymptomatic hepatitis to potentially fatal fulminant hepatic failure.[5–8] Risk of reactivation based on HBV serologic testing is presented in **Table 3.**[9]

Table 3. Interpretation of Hepatitis B Serology Test Results

HBsAg	Anti-HBc	Anti-HBs	Interpretation	Risk of Reactivation
+	+	-	Chronic HBV infection	**YES**
-	+	+ or -	Clinically resolved HBV infection	**YES**
-	-	-	No evidence of infection or vaccination	NO
-	-	+	Response to HBV vaccination	NO

Adapted from Hepatitis B Screening and Prophylaxis in Cancer Patients. Oetomo & Ferrier, 2012.

HBVr is an increasingly recognized complication following immunosuppression.[6] As most people with chronic or clinically resolved HBV are not aware of their infection, it has been strongly recommended by several international societies and guidelines that all patients should be screened for HBV prior to commencing any immunosuppressive therapy.[10–15] Early screening for HBV markers enables timely initiation of antiviral prophylaxis where indicated and reduces the risk of liver failure and death secondary to HBV reactivation.[16] Note that some patients with hematologic malignancy may have impaired antibody responses and may test negative for anti-HBc and anti-HBs despite past exposure to HBV. Physicians are advised to consider HBVr if hepatitis occurs during/post systemic cancer treatment in such patients despite negative serologies at baseline.

The risk of reactivation varies by patient, cancer type, immunosuppressive drug class, virological and serological status (**Table 4**) and peaks 10-90 days after immunosuppressive treatment is withdrawn. [6,8-54] As the patient recovers from treatment, the immunocompetent cells attack the hepatocytes that became infected during treatment, causing transaminitis.[8] Post-cancer treatment HBV flares have been reported to have high mortality rates of up to 41%.[7,43,51–55] Prophylactic antiviral therapy has been shown to be 80-100% effective in preventing HBVr and is more effective than starting antiviral therapy at or after the onset of HBVr.[56]

Table 4. Estimates of Risk of Reactivation without Antiviral Prophylaxis[6,9-54]

Cancer Types	Chronic HBV HBsAg+ Anti-HBc + Anti-HBs +/-	Clinically Resolved HBV HBsAg- Anti-HBc + Anti-HBs +/-
Hematological malignancies **with** B-cell depleting agents including anti-CD20 drugs, anti-CD38 drugs, BTK inhibitors, STC and/or CAR-T cell therapy	24-88% Best estimate > 50%	3-25% Best estimate 10%
Hematological malignancies **without** B-cell depleting agents	53-72%	3-20%
Solid Tumour	4-68%	0.3-9%

HBsAg-positive patients should be referred/managed in conjunction with an HBV specialist (Hepatologist, Infectious Diseases Specialist, Gastroenterologist). [6,13,15,35,58] While awaiting specialist consultation, antiviral prophylaxis should be started before and continued well after cessation of immunosuppression; generally, 12 to 18 months for immunosuppressive therapies associated with a high risk of HBVr [i.e. B-cell depleting agents including anti-CD-20 drugs, anti-CD38 drugs, Bruton tyrosine kinase (BTK) inhibitors, stem cell transplantation (STC), and chimeric antigen receptor (CAR) T-cell therapy] and 6 to 12 months for other agents.[6,13,15,35,58] There may be other agents that carry a risk of reactivation and the clinician is advised to consider the risk as literature evolves for newer agents, and to err on the side of caution when new immunosuppressive agents are introduced to the treatment plan. Liver function tests and HBV DNA should be tested at 3-to-6-month intervals during prophylaxis and for at least 1 year after cessation/or as recommended by the HBV specialist, due to a large proportion of reactivation cases occurring after antiviral withdrawal. [6,13,15,35,58]

Most guidelines also recommended that HBsAg-negative, anti-HBc positive patients on therapies with a high-risk of HBVr should be treated similarly to chronic HBV patients, with antiviral prophylaxis starting before immunosuppression, continued 12 to 18 months after cessation, and monitoring for 12 months after antiviral withdrawal.[6,13,15,58]

For HBsAg-negative, anti-HBc positive patients, receiving immunosuppressive treatments with moderate to low risk of HBVr, pre-emptive therapy, not prophylaxis, is generally recommended.[6,13,15] Pre-emptive therapy is based upon monitoring HBsAg and ALT every 1 to 3 months during and after immunosuppression and starting antiviral therapy if HBsAg reappears (so called reverse seroconversion).[6,13,15] As HBsAg reverse seroconversion can lead to a severe, even fatal, acute hepatitis, patients should be referred urgently to an HBV specialist and antiviral therapy should be started as early as possible, independently of ALT levels. [6,13,15]

As for choice of antiviral agents, most guidelines recommend entecavir, tenofovir disoproxil or tenofovir alafenamide as first-line therapy.[6,10] Tenofovir alafenamide is a newer pro-drug of tenofovir, more stable than tenofovir disoproxil in the plasma, and can provide similar efficacy with lower circulating concentration leading to less exposure for the kidneys, bones and other organs.[59] Currently, only entecavir and tenofovir disoproxil are funded in Ontario.

Entecavir, tenofovir disoproxil or tenofovir alafenamide are new-generation nucleoside analogues. They are safe and well-tolerated. They have low rates of viral resistance and studies have demonstrated superiority over lamivudine. A meta-analysis by Yang et al.[60] demonstrated that the rate of HBV reactivation was significantly lower in the entecavir group (11/228 patients or 4.82%) compared with the lamivudine group (66/365 patients or 18.08%) ($P < 0.001$). A prospective cohort by Picardi et al.[61] showed significantly lower HBV reactivation rates with tenofovir disoproxil (0/39 patients or 0%) compared with lamivudine (15/38 patients or 39.47%) ($P < .0001$). There are no studies to date investigating tenofovir alafenamide as a prophylactic agent.[13]

Objectives

Regional Cancer Programs have expressed the need for guidance on the appropriate care and management of Ontario cancer patients at risk for HBVr. Several professional organizations have published guidelines for screening and management of HBVr; however, due to limited evidence, there has been a lack of agreement on the optimal approach. Nevertheless, the following overarching principles hold across all guidelines:

Prevention of HBVr is critical and requires:

- recognizing the need to test cancer patients starting immunosuppressive treatment,
- stratifying risk based on virological data and immunosuppressive regimen, and
- tailoring management based on risk.

To help bridge the quality and safety gap, we developed an HBV Care Map for Ontario patients undergoing systemic treatment for hematological and solid tumor malignancies with a focus on preventing HBVr. Recommendations on when to test for HBV, which tests to order, how to interpret, manage, and follow positive test results, when to refer to an HBV Specialist, and when and how to prescribe anti-viral therapy were produced in collaboration with an expert panel.

Implementing the care map in oncology settings, can help improve care through:

- standardization of practice
- recognition of HBV prior to systemic treatment
- monitoring for viral proliferation during systemic treatment
- early detection of HBVr
- streamlining care for patients experiencing HBVr
- decreased incidence of HBVr, decreased interruption of systemic treatment, and decreased mortality resulting in better patient outcomes.

Development of Recommendations

A multidisciplinary, multi-organizational panel of experts in medical oncology, hematology, hepatology, gastroenterology, and infectious diseases was convened to develop the recommendations. All members completed a conflict-of-interest declaration. Members met via teleconference and corresponded through e-mail. Based on the consideration of the evidence and their clinical expertise, members were asked to contribute to the development of the guideline, provide critical review, and finalize the recommendations. The recommendations were informed by a targeted review of the literature. Much of the evidence consisted of systematic reviews of observational data, consensus guidelines, case series, and case reports. Members agreed that the ASCO Provisional Clinical Opinion Update[6] should serve as a foundational document. In clinically important areas where there was limited evidence, a lack of high-quality evidence or guidance that was not feasible in the Ontario context, expert consensus opinion was used to inform the recommendations. Members also chose to provide a rating for the type and strength of each recommendation **(Table 5)**.

Table 5. Definitions for the Type and Strength of Recommendations

Type of Recommendation

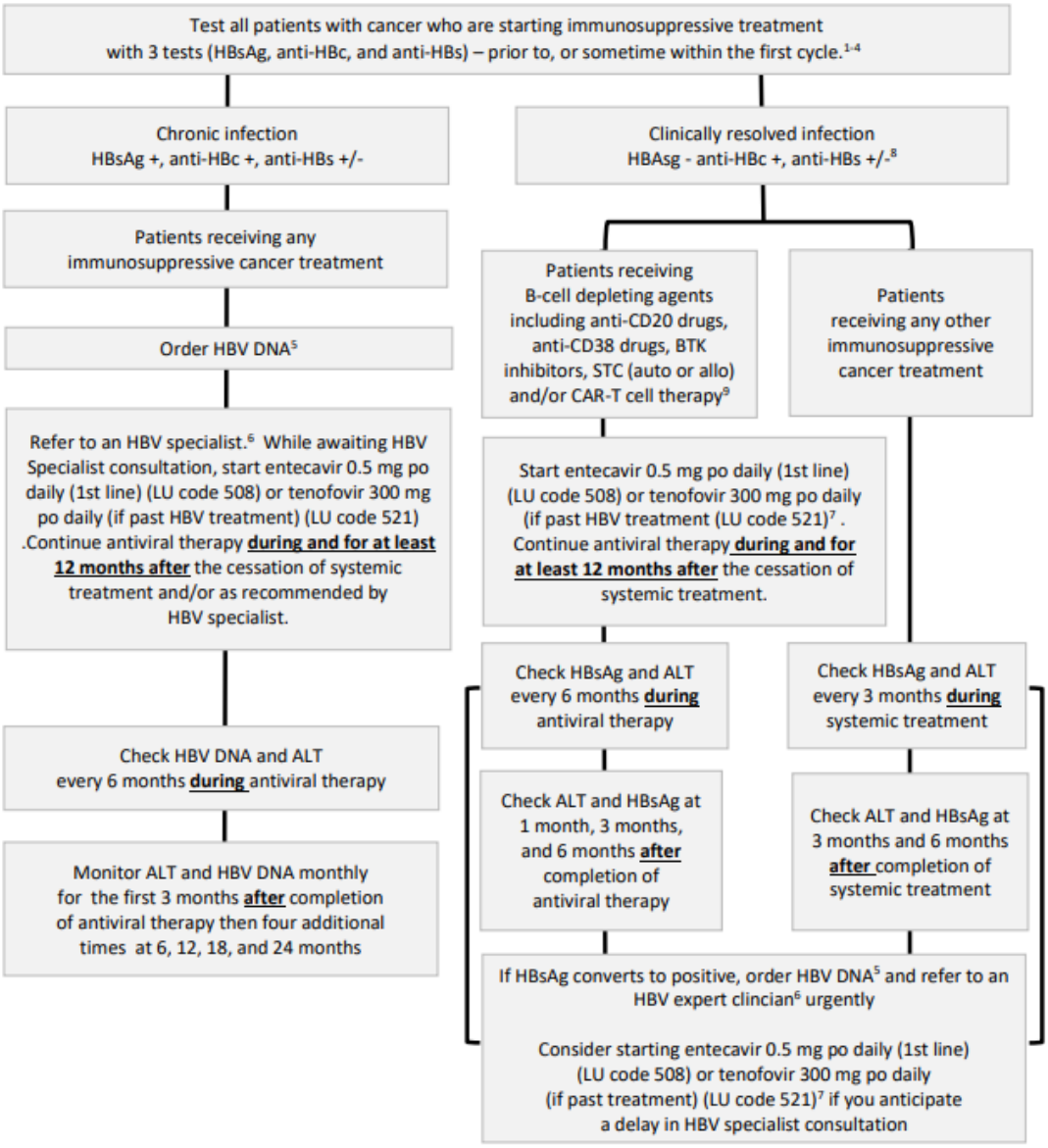
Evidence based	There was sufficient evidence from published studies to inform a recommendation to guide clinical practice**.**
Consensus based	The available evidence was deemed insufficient to inform a recommendation to guide clinical practice. Therefore, the expert panel used a consensus process to reach this recommendation, which is considered the best current guidance for practice.

Strength of Recommendation

Strong	There is high confidence that the recommendation reflects best practice. This is based on: a) strong evidence for a true net effect (e.g., benefits exceed harms); b) consistent results, with no or minor exceptions; c) minor or no concerns about study quality; and/or d) the extent of panelists' agreement.
Moderate	There is moderate confidence that the recommendation reflects best practice. This is based on: a) good evidence for a true net effect (e.g., benefits exceed harms); b) consistent results, with minor and/or few exceptions; c) minor and/or few concerns about study quality; and/or d) the extent of panelists' agreement.
Weak	There is some confidence that the recommendation offers the best current guidance for practice. This is based on: a) limited evidence for a true net effect (e.g., benefits exceed harms); b) consistent results, but with important exceptions; c) concerns about study quality; and/or d) the extent of panelists' agreement.

Adapted from: AHRQ Methods Guide for Comparative Effectiveness Reviews 2011; ICSI; GRADE; and USPSTF

Figure 2. Hepatitis B Virus Screening and Management Care Map



1. Hepatitis B surface antigen (HBsAg), Hepatitis B core antibody (anti-HBc) (total immunoglobulin (Ig) or IgG), and antibody to hepatitis B surface antigen (anti-HBs) 2. Some patients with hematologic malignancy may have impaired antibody responses and may test negative for anti-HBc and anti-HBs despite past exposure to HBV. Physicians are advised to consider HBV reactivation if hepatitis occurs during/post systemic cancer treatment in such patients despite negative serologies at baseline. 3. In most cases it is not necessary to delay cancer treatment while awaiting results of screening HBV tests (except for patients awaiting a bone marrow transplant and/or patients with unexplained hepatitis). 4. Special considerations: recent travel to an endemic country, ongoing risk factors (e.g., hemodialysis, IV drug use) and/or unexplained changes in liver enzymes. It may be reasonable to defer HBV testing in the absence of on-going risk factors if there is a result available in the past 12 months. 5. Public Health Labs: In addition to the local lab requestion, complete the HBV DNA Test Requisition Form available on the Public Health Ontario website and indicate the reason for the test (i.e., pre-treatment, post-treatment). Failure to do so may result in an auto-rejection if there is a test on file within the last 6 months. Hospital Labs: Indicate the reason for the test in clinic notes. 6. Hepatologist, Infectious Diseases Specialist, Gastroenterologist. 7. Both antivirals are well-tolerated. Currently, only entecavir and tenofovir disoproxil are funded in Ontario. Avoid Entecavir for Lamivudine-resistant HBV or in pregnant patients. Avoid Tenofovir if possible, in patients with renal impairment or patients receiving concurrent nephrotoxic therapy. For HIV co-infected patients, consult HIV Specialist. HBV antiviral therapy (typically Tenofovir) can often be incorporate into the HIV treatment regimen. 8. A positive anti-HBs test likely reduces the risk of reactivation. 9. Examples of anti-CD20 drugs include rituximab, obinutuzumab, and ofatumumab. Examples of anti-CD38 drugs include daratumumab and isatuximab. Examples of BTK Inhibitors include ibrutinib, acalabrutinib, and zanubrutinib. PD-1/PD-L1 blockades (e.g., pembrolizumab, nivolumab) and patients treated with transarterial chemoembolization may have an increased risk of HBV reactivation. There may be other agents that carry a risk of reactivation, and the clinician is advised to consider the risk as literature evolves for newer agents, and to err on the side of caution when new immunosuppressive agents are introduced to the treatment plan.

Recommendations

R1. Screening for cancer patients prior to immunosuppressive treatment

- Test all cancer patients who are starting immunosuppressive treatment (or have already started but have not been screened previously) with 3 tests: 1) hepatitis B surface antigen (HBsAg), 2) hepatitis B core antibody (anti-HBc) (total immunoglobulin (Ig) or IgG), and 3) antibody to hepatitis B surface antigen (anti-HBs) – prior to, or sometime within, the first cycle. *(Type of recommendation: Evidence based; benefits outweigh harms; Strength of recommendation: Strong*).
    - **Patient Education Resource** available in **Appendix A** to support clinical discussion.
    - Some patients with hematologic malignancy may have impaired antibody responses and may test negative for anti-HBc and anti-HBs despite past exposure to HBV. Physicians are advised to consider HBVr if hepatitis occurs during/post systemic cancer treatment in such patients despite negative serologies at baseline.

- In most cases it is not necessary to delay cancer treatment while awaiting results of screening HBV tests (except for patients awaiting a bone marrow transplant and/or patients with unexplained hepatitis). *(Type of recommendation: Evidence based; benefits outweigh harms; Strength of recommendation: Strong).*

- Consider retesting for HBV markers (HBsAg, HBcAb, HBsAb) when a new line of cancer treatment is planned/started. *(Type: Consensus based; benefits outweigh harms; Strength of recommendation: Moderate).*
    - Special considerations: recent travel to an endemic country, ongoing risk factors (e.g., hemodialysis, IV drug use) and/or unexplained changes in liver enzymes.
    - It may be reasonable to defer HBV testing in the absence of on-going risk factors if there is a result available in the past 12 months.

R2. Management for patients with chronic HBV (HBsAg+)

Initial Management:

- Order HBV DNA. *(Type: Consensus based; benefits outweigh harms; Strength of recommendation: Strong).*
    - Public Health Labs: In addition to the local lab requestion, complete the HBV DNA Test Requisition available on the Public Health Ontario website and indicate the reason for the test Failure to do so may result in an auto-rejection if there is a test on file within the last 6 months. Hospital Labs: Indicate the reason in clinic notes.

- Refer to a clinician experienced in HBV management (e.g., Hepatologist, Infectious Diseases Specialist, Gastroenterologist) *(Type: Consensus based, benefits outweigh harms; Strength of recommendation: Strong).*
- While awaiting HBV Specialist consultation, start entecavir 0.5 mg po daily (1st line) (LU code 508) or tenofovir 300 mg po daily (if past HBV treatment) (LU code 521). Continue antiviral therapy during and for at least 12 months after the cessation of systemic treatment and/or as recommended by HBV expert clinician. *(Type: Consensus based; benefits outweigh harms; Strength of recommendation: Strong).*
    - Both antivirals are well-tolerated.
    - Entecavir and tenofovir disoproxil are funded in Ontario.
    - Avoid Entecavir for Lamivudine-resistant HBV or in pregnant patients.
    - Avoid Tenofovir, if possible, in patients with renal impairment or patients receiving concurrent nephrotoxic therapy.
    - For HIV co-infected patients, consult HIV Specialist. HBV antiviral therapy (typically Tenofovir) can often be incorporated into the HIV treatment regimen.
    - Refer to **Clinical Considerations** in **Appendix B** for more information.

Monitoring recommendations during antiviral therapy:

- Check ALT and HBV DNA level every 6 months during antiviral therapy. *(Type: Consensus based; benefits outweigh harms; Strength of recommendation: Strong).*

Monitoring recommendations after the cessation of antiviral therapy:

- Monitor ALT and HBV DNA monthly for the first 3 months after stopping antivirals then four additional times at 6, 12, 18 and 24 months. *(Type: Consensus based; benefits outweigh harms; Strength of recommendation: Strong).*

R3. Management for patients with clinically resolved HBV (HBsAg-/Anti-HBc+)

3a. Immunosuppressive cancer treatments associated with a high risk of HBVr

Cancer treatments associated with an established high risk of HBVr include B-cell depleting including anti-CD20 drugs (e.g., rituximab, obinutuzumab, ofatumumab), anti-CD38 drugs (e.g., daratumumab, isatuximab), BTK Inhibitors (e.g., ibrutinib, acalabrutinib, zanubrutinib), STC (allogenic and autologous), and CAR T-cell therapy. PD-1/PD-L1 inhibitors (e.g., pembrolizumab, nivolumab) and patients treated with transarterial chemoembolization (TACE) may have an increased risk of HBVr. There may be other agents that carry a risk of reactivation, and the clinician is advised to consider the risk as literature evolves for newer agents, and to err on the side of caution when new immunosuppressive agents are introduced to the treatment plan.

Antiviral therapy:

- Start entecavir 0.5 mg po daily (1st line) (LU code 508) or tenofovir 300 mg po daily (if past treatment) (LU code 521). Continue antiviral therapy during and for at least 12 months after the cessation of systemic treatment. *(Type: Consensus based; benefits outweigh harms; Strength of recommendation: Strong).*
    - Both antivirals are well-tolerated.
    - Refer to **Clinical Considerations** in **Appendix B** for more information.

Monitoring recommendations during antiviral therapy:

- Check HBsAg and ALT every 6 months during antiviral therapy. *(Type: Consensus based; benefits outweigh harms; Strength of recommendation: Strong).*

Monitoring recommendations after the cessation of antiviral therapy

- Check HBsAg and ALT levels at 1 month, 3 months, and 6 months, after stopping antiviral therapy. *(Type: Consensus based; benefits outweigh harms; Strength of recommendation: Strong).*

At the earliest sign of HBV reactivation (HBsAg converts to positive):

- Order HBV DNA. *(Type: Consensus based; benefits outweigh harms; Strength of recommendation: Strong).*
    - Public Health Labs: In addition to the local lab requisition, complete the HBV DNA Test Requisition Form available on the Public Health Ontario website and indicate the reason for the test (i.e., pre-treatment, post-treatment). Failure to do so may result in an auto-rejection if there is a test on file within the last 6 months.
- Refer urgently to a clinician experienced in HBV management (e.g., Hepatologist, Infectious Diseases Specialist, Gastroenterologist). *(Type: Consensus, benefits outweigh harms; Strength of recommendation: Strong).*
- Consider starting entecavir 0.5 mg po daily (1st line) (LU code 508) or tenofovir 300 mg po daily (if past HBV treatment) (LU code 521) if you anticipate a delay in HBV Specialist consultation. *(Type: Consensus based; benefits outweigh harms; Strength of recommendation: Strong).*
    - Both antivirals are well-tolerated.
    - Refer to **Clinical Considerations** in **Appendix B** for more information.

3b. Immunosuppressive cancer treatments not associated with a high risk of HBVr

Monitoring recommendations during cancer treatment:

- Check HBsAg and ALT testing every 3 months during systemic treatment. *(Type: Consensus based; benefits outweigh harms; Strength of recommendation: Strong).*

Monitoring recommendations after cancer treatment:

- Check HBsAg and ALT at 3 months and 6 months after completion of systemic treatment. *(Type: Consensus based; benefits outweigh harms; Strength of recommendation: Strong).*

At the earliest sign of HBVr (HBsAg converts to positive):

- Order HBV DNA. *(Type: Consensus based; benefits outweigh harms; Strength of recommendation: Strong).*
    - Public Health Labs: In addition to the local lab requestion, complete the HBV DNA Test Requisition Form available on the Public Health Ontario website and indicate the reason for the test (i.e., pre-treatment, post-treatment). Failure to do so may result in an auto-rejection if there is a test on file within the last 6 months. Hospital Labs: Indicate reason in clinic notes.
- Refer to clinician experienced in HBV management (e.g., Hepatologist, Infectious Disease Specialist, Gastroenterologist) urgently. *(Type: Consensus, benefits outweigh harms; Strength of recommendation: Strong).*
- Consider starting entecavir 0.5 mg po daily (1st line) (LU code 508) or tenofovir 300 mg po daily (if past treatment) (LU code 521) if you anticipate a delay in HBV Specialist consultation. *(Type: Consensus based; benefits outweigh harms; Strength of recommendation: Strong).*
    - Both antivirals are well-tolerated.
    - Refer to **Clinical Considerations** in **Appendix B** for more information.

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Appendix A: Patient Education Resource

Hepatitis B and Cancer Medications - What you need to know

What is Hepatitis B?

Hepatitis B is a serious liver infection caused by a virus. Your liver is an organ that helps your body process nutrients, filter your blood and fight infections.
Hepatitis B may cause:

- No signs or symptoms. Many people who get the hepatitis B never feel sick and get better. They may not even know they have the infection.
- Illness for a few weeks (acute infection). An acute infection can make you feel tired and less hungry. Your skin and/or eyes may also turn yellow (jaundice).
- A serious life-long illness (chronic hepatitis B). Untreated chronic hepatitis B can lead to liver scarring (cirrhosis), liver cancer, and death. Chronic hepatitis B is known as a 'silent' disease because you can have it for many years before it causes any problems in your body.

How does Hepatitis B spread from person to person?

Hepatitis B spreads through **contact with blood and other body fluids** of an infected person. Since people can have the infection and not know it, they can also spread it to others without knowing it.
Most people who get hepatitis B get it from the following situations:

- Sexual contact with someone who is infected with hepatitis B
- A mother with hepatitis B spreading it to their baby during childbirth
- People with hepatitis B spreading it to children and other members of their household
- People who are exposed to blood or body fluids while at work (e.g., health care workers)
- Travel to parts of the world where hepatitis B is more common
- Getting tattoos, piercings, pedicures, manicures, or medical procedures with unclean equipment

Hepatitis B **cannot** be spread through touching objects, sneezing, coughing, hugging, or eating meals with someone who has hepatitis B.

How do I know if I have Hepatitis B?

Hepatitis B can only be diagnosed by a blood test.
The blood tests will show if you:

- Had hepatitis B and got better
- Have hepatitis B now
- Have never had hepatitis B

If you have had the hepatitis B vaccine it is likely that you are protected against the infection for life.

People receiving cancer medications will be tested for hepatitis B before treatment begins. This includes those who have been vaccinated for hepatitis B.

If you have hepatitis B it can cause problems such as liver damage or liver failure during your treatment. Your cancer care team will need to plan your care so that the hepatitis does not cause any health problems for you during treatment.

How will my hepatitis B be managed during cancer treatment?

Your cancer care team will use your blood test results to plan how to care for your hepatitis B during your treatment. Your health care team may:

- Monitor your hepatitis B and your liver health through blood tests every 3 to 6 months
- Prescribe medicine to keep your liver healthy. You will take the medicine during your cancer treatment, and for up to 12 months after your cancer treatment ends.
- Refer you to a doctor that specializes in liver health to help look after your hepatitis B.

Talk to a member of your cancer care team for more information about your care and treatment.

Appendix B: Clinical Considerations for Entecavir and Tenofovir

	Entecavir	Tenofovir
Advantages	• Low rate of resistance in treatment naïve patients • Can be used for patients on dialysis	• Can be used in patients who have had resistance to other drugs
Disadvantages	• Lack of safety data in pregnancy • Can cause increased ALT, lactic acidosis, and hepatomegaly	• Can cause nephrotoxicity, decreased bone mineral density, lactic acidosis, and hepatomegaly
Preferred For	Treatment of naïve patients, especially: • Patients with decompensated cirrhosis • Patients with renal impairment or those receiving concomitant therapy that may reduce renal function (with caution – monitor closely)	• Patients who have had prior antiviral treatment • Patients who are pregnant • For HIV co-infected patients, consult HIV Specialist. HBV antiviral therapy (typically tenofovir) can often be incorporated into the HIV treatment regimen
Do Not Use For	• HIV co-infected patients (consult with HIV Specialist) • Lamivudine-resistant HBV • Patients who are pregnant	• If possible: patients with renal impairment or patients receiving concurrent or recent nephrotoxic therapy
Dose Adjustments	Use with caution and decrease dose if reduced kidney function - consider: • CrCl 30-49 mL/min: full dose every other day (q 48hrs) • CrCl 10-29 mL/min: full dose every 72 hours • CrCl < 10 mL/min or dialysis: full dose every 7 days No dose adjustment required for hepatic impairment	Use with caution and decrease dose if reduced kidney function - consider: • CrCl 30-49 mL/min: full dose every other day (q 48hrs) • CrCl 10-29 mL/min: full dose every 72 to 96 hours • hemodialysis: full dose every 7 days • No data on use if CrCl < 10 mL/min No dose adjustment required for hepatic impairment