

Hepatitis B Serologic Testing Guidance

The serologic patterns of chronic HBV infection are varied and complex. Serologic markers associated with HBV infection include hepatitis B surface antigen (HBsAg), antibody to HBsAg (anti-HBs), hepatitis B core antigen (HBcAg), antibody to HBcAg (anti-HBc), hepatitis B e antigen (HBeAg) and antibody to HBeAg (anti-HBe). Testing can also be performed to assess the presence and concentration of circulating HBV DNA. At least one serologic marker is present during each of the different phases of HBV infection (see figure 1 on the next page).

Serologic Markers of Hepatitis B

Hepatitis B surface antigen (HBsAg) is an antigenic determinant found on the surface of the virus. HBsAg can be identified in serum 30 to 60 days after exposure to HBV and persists for variable periods. During replication, HBV produces an excess of HBsAg.

Hepatitis B core antigen (HBcAg) is the nucleocapsid protein core of HBV. HBcAg is not detectable in serum by conventional techniques, but it can be detected in liver tissue of persons with acute or chronic HBV infection.

Hepatitis B e antigen (HBeAg), a soluble protein, is also contained in the core of HBV. HBeAg is detected in the serum of persons with high virus titers and indicates high infectivity.

Antibody to HBsAg (anti-HBs) develops during convalescence after acute HBV infection or following hepatitis B vaccination. The presence of anti-HBs indicates immunity to HBV. Anti-HBs is sometimes referred to as HBsAb but use of this term is discouraged because of potential confusion with HBsAg.

Total antibody to HBcAg (anti-HBc) indicates infection with HBV at an undefined time in the past.

IgM class antibody to HBcAg (IgM anti-HBc) indicates recent infection with HBV.

Antibody to HBeAg (anti-HBe) becomes detectable when HBeAg is lost and is associated with low infectivity of serum.

Interpretation of HBsAg Results

Commonly an HBsAg test is the preferred hepatitis B screening method. Interpretation of HBsAg results can sometimes be unclear, especially if the full scope of serologic results is not made available. Often times a series of HBsAg tests will be conducted. For example, some protocols include repeating the same HBsAg assay (EIA) multiple times, some may conduct follow-up assays that differ from the initial type of assay, and others may proceed to a neutralization assay. For these circumstances refer to the guidelines below.

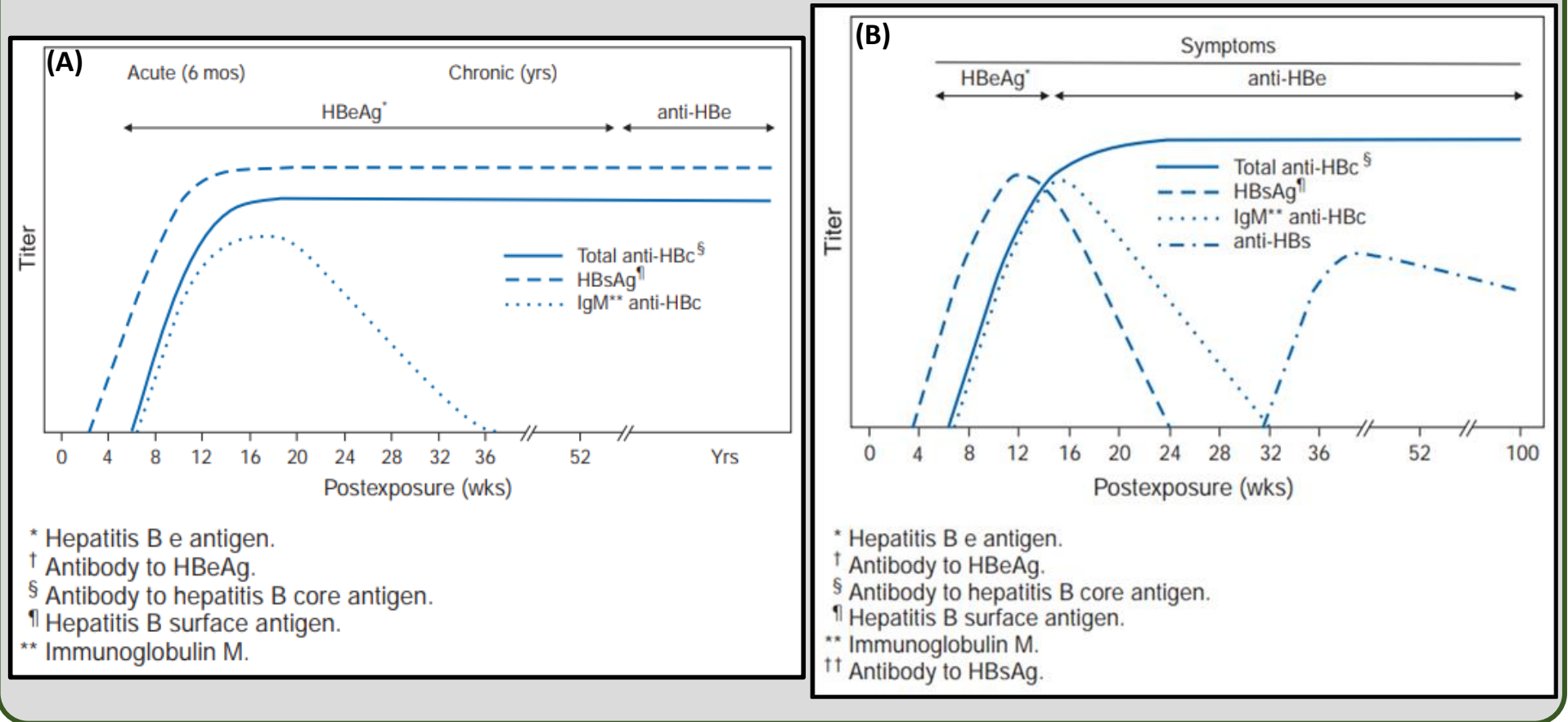
HBsAg Interpretation and Classification

- If the only reported result is a positive HBsAg and it **is not specified as confirmatory**:
 - Contact the testing laboratory to inquire about additional test results (occasionally HBsAg results may be falsely positive and repeated EIA/neutralization testing with negative results will not be electronically reported)
 - If the testing laboratory states 2 of 3 repeat EIA tests, or a neutralization test is negative: classify as Not a Case
 - If no other results are available: classify as a Probable Chronic case
- If the only reported result is a positive HBsAg and it **is specified as confirmatory**:
 - Classify as a Probable Chronic case

Hepatitis B Serologic Testing Interpretations

Serologic Marker				Interpretation
HBsAg	Total anti-HBc	IgM anti-HBc	Anti-HBs	
-	-	-	-	Never infected and no evidence of immunization
+	+	-	-	Chronic infection
+	+	+	-	Acute infection
-	+	-	+	Recovered from past infection and immune
-	-	-	+	Immune (natural or immunization)

Figure 1. Typical serologic course of acute HBV infection with progression to chronic infection (A) and recovery (B)



Please contact the Viral Hepatitis Unit with questions at 517-335-8165 or MDHHS-Hepatitis@michigan.gov.