ESP CASE DETECTION ALGORITHM

HEPATITIS B

Acute and Chronic Hepatitis B

Document Version 4.0

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Modification History

Version	Date	Modification	By
4.0	03/01/2022	Updated medication list and reporting window for medications and added core antibody test to related labs	DPM, DPH, CII
3.0	7/15/2019	Chronic hepatitis B algorithm revised	DPM and DPH
2.14	6/17/2019	Reviewed chronic algorithm with DPH and added their comments	DPM
2.13	4/26/2018	Added language that chronic Hep B and Hep B in pregnancy have not yet been implemented in reporting	DPM
2.12	10/11/2017	Added ESP Logo and MDPH branding	DPM

2.11	7/5/2017	Transferred to updated template	DPM
2.1	5/23/2017	Removed hepatitis A and hepatitis C labs from data included in case reports to DPH.	DPH/DPM
2.0	3/6/2017	• Updated algorithm format. • Added appropriate ICD-10-CM diagnosis codes.	DPM
1.0	7/21/2009	Original circulated version.	DPM

Section 1. Overview

The purpose of this document is to describe the criteria used to identify new HEPATITIS B cases from electronic medical records (EMR) using ESP and report them to the Massachusetts Department of Public Health (MDPH). In addition, ESP will make a presumptive classification of whether a case is acute or chronic. This indicator will be added to case reports for MDPH review, but final classification is at MDPH's discretion.

Section 2. Criteria used to identify cases using ESP data

I.   CASE TYPES

This document includes algorithms to identify acute and chronic hepatitis B.

II.   TIME WINDOW

There is no recurrence window for hepatitis B. A case is considered incident if it is the first time the criteria is met and it has not been previously reported.

III.   CASE CRITERIA

A.   CASE COMPONENTS*

1. Diagnosis code for jaundice, not of newborn
2. Alanine aminotransferase (ALT) >2.5x upper limit of normal
3. Aspartate aminotransferase (AST) >2.5x upper limit of normal
4. IgM antibody to Hepatitis B Core Antigen = "REACTIVE"
5. Hepatitis B Surface Antigen = "REACTIVE"
6. Hepatitis B "e" Antigen = "REACTIVE"
7. Hepatitis B Viral DNA
8. Diagnosis of Chronic Hepatitis B
9. Total bilirubin > 1.5
10. Calculated bilirubin = (direct bilirubin + indirect bilirubin) = value > 1.5

*See Section 4 for codes used to define each component.

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B. CRITERIA FOR ACUTE HEPATITIS B CASES

Summary of Case Components					
1	Jaundice ICD9/10 Code	5	Hep B Surface Antigen	9	Total bilirubin >1.5
2	ALT >2.5x ULN	6	Hep B "e" Surface Antigen	10	Calculated bilirubin >1.5
3	AST >2.5x ULN	7	Hep B viral DNA		
4	IgM antibody to Hep B Core Antigen	8	Diagnosis for chronic Hep B		

Classify patient as having acute hepatitis B if any of the following conditions are true:
   a) (#1 or #2 or #3) *and* #4 within 14-day period
   b) (#1 or #2 or #3) *and* (#9 or #10) *and* #5 within 21-day period, *and*
       a. No prior positive result for #5 or #7 ever, *and*
       b. No code for #8 at this encounter or in the past
   c) (#1 or #2 or #3) *and* (#9 or #10) *and* #7 within 21-day period, *and*
       a. No prior positive result for #5 or #7 ever, *and*
       b. No code for #8 at this encounter or in the past
   d) #5 "reactive" with record of #5 "non-reactive" within the prior 6 months, *and*
       a. No prior positive test for #5 or #7 ever, *and*
       b. No code for #8 at this encounter or in the past.

Notes:
   - For definition (b) and (c), cases should be reported immediately upon fulfilling criteria. However, if a diagnosis for #8 appears within 30 days following fulfillment of the conditions for the case, then case should be changed from acute hepatitis B to chronic hepatitis B.
   - For definition (d), "date collected" (or if unavailable, then "date ordered") should be used for comparison of dates.

C. CRITERIA FOR CHRONIC HEPATITIS B CASES

Classify patient as having chronic hepatitis B if any of the following conditions are true:
   e) Any patient with (#5 or #6 or #7) who does not fulfill criteria for acute hepatitis B (above)
   f) Any patient with (#5 or #6 or #7) who fulfilled criteria for acute hepatitis B more than 6 months prior to the current positive test (#5 or #6 or #7)

Section 3. Specifications for reporting diseases/conditions to the Massachusetts Department of Public Health

I. INITIAL CASE REPORTING CRITERIA

All cases should be immediately reported to MDPH upon initial detection.

II. CASE REPORT UPDATE CRITERIA

A repeat report should be sent to MDPH every time a patient has another positive/reactive test result for #5, #6, or #7, or a new medication order

III.   DATA TO INCLUDE IN REPORTS TO MDPH

A. Demographic

Name	Last, first, middle
Date of birth	yyyy/mm/dd
Age	
Social security number	
Gender	Male / Female
Race	American Indian / Asian / Black / White / Other / Unknown
Ethnicity	Hispanic / Non-Hispanic / Unknown
Marital Status	Single / Married / Other, Unknown
Address	Line 1, line 2, city, state, zip, country
Phone	xxx-xxx-xxxx
Language spoken	
Medical record number	
Country of birth	
PCP	Name, office address, phone number, email

B. Lab Ordering Facility Information

Facility name	
Facility address	Line 1, line 2, city, state, zip
Facility contact person	
Contact person email	
Contact person phone	xxx-xxx-xxxx
Facility phone	xxx-xxx-xxxx
Facility NPI	

C. Encounter Data

See Table 5 below for the NA codes to send provider fields in HL7 messages

Lab test ordering provider	Name and NPI
Prescribing provider	Name and NPI
Primary care provider	Name and NPI
Managing treatment provider	Name and NPI
Treatment encounter facility name	
Treatment encounter facility address	Line 1, line 2, city, state, zip
Treatment encounter facility NPI	

D. Laboratory Results

Most recent result within 14-day period of day on which case was established. See Table 4 for LOINCs.

Hep B Surface Antigen	

IgM to Hep B Core Antigen	
Hep B "e" antigen	
Hep B DNA	
ALT	
AST	
Hep E antibody	
Total bilirubin	
Direct bilirubin	
Indirect bilirubin	
Hepatitis B Core Antibody	

E. Pregnancy

If a patient is pregnant, pregnancy information from the most recent medical encounter will be reported when 1) an acute or chronic HBV case is identified and 2) there is a new positive HBV laboratory result or new HBV medication order for an acute or chronic HBV case.

Pregnancy flag active	Yes
Expected date of delivery	=EDD
Number of weeks pregnant	=40 – [(EDD – present date) / 7]
Date of pregnancy status	Date of medical encounter that pregnancy data was collected

F. Symptoms

If any of the following diagnosis codes (see Table 2, below) or vital sign findings are present in the 14 days preceding or 30 days following the case date then they should be reported:

Fever	Diagnosis code or measured temperature >100.4 degrees Fahrenheit
Jaundice	
Abdominal pain	
Nausea and Vomiting	
Diarrhea	

G. Medications

Report all medications from the specified hepatitis B medications list (see Table 3, below) on or after the case date

Prescription for Hepatic B medication	Text string including medication name, dose, frequency, and duration (calculated using start and end date).
Treatment date	Date on which each prescription was ordered.

IV.   CRITERIA TO REVOKE A CASE

For ACUTE hepatitis B cases identified using condition (b) or (c), the case should be changed to CHRONIC hepatitis B if a diagnosis code for chronic hepatitis B within the following 30 days.

Section 4. *Codes, laboratory tests, and medications used to identify criteria listed in Section 2 and supplementary reporting information in Section 3.*

I. DIAGNOSIS CODES

Table 1. Diagnosis Codes Used to Identify Case Components

Component Name	Code Type	Code	Description
Jaundice (#1)	ICD-9-CM	782.4	Jaundice, not of newborn
	ICD-10-CM	R17	Unspecified jaundice
Chronic Hepatitis B (#8)	ICD-9-CM	070.32	Chronic viral hepatitis B without mention of hepatic coma without mention of hepatitis delta
	ICD-10-CM	B18.0	Chronic viral hepatitis B with delta-agent
	ICD-10-CM	B18.1	Chronic viral hepatitis B without delta-agent

Table 2. Diagnosis Codes Used to Identify Symptoms

Symptom	Code Type	Code	Description
Fever	N/A	Temperature >100.4	Measured temperature if available, ELSE "fever".
	ICD-9-CM	780.60	Fever, unspecified
	ICD-10-CM	R50.9	Fever, unspecified
Jaundice	ICD-9-CM	782.4	Jaundice
	ICD-10-CM	R17	Unspecified jaundice
Abdominal pain	ICD-9-CM	789*	Abdominal pain
	ICD-10-CM	R10*	Abdominal and pelvic pain
Nausea & Vomiting	ICD-9-CM	787.0	Nausea and vomiting
	ICD-9-CM	787.01	Nausea with vomiting
	ICD-10-CM	R11.2	Nausea with vomiting, unspecified
	ICD-9-CM	787.02	Nausea alone
	ICD-10-CM	R11.0	Nausea
	ICD-9-CM	787.03	Vomiting alone
	ICD-10-CM	R11.10	Vomiting, unspecified
	ICD-10-CM	R11.11	Vomiting without nausea
Diarrhea	ICD-9-CM	787.91	Diarrhea
	ICD-10-CM	R19.7	Diarrhea, unspecified

II. MEDICATIONS

Table 3. Hepatitis B medications

Generic names	Brand names
Adefovir Adefovir Dipivoxil	Hepsera
Entecavir	Baraclude
Interferon Alfa-2b	Intron A
Lamivudine	Epivir Epivir-HBV Zeffix Heptodin
Peginterferon Alfa-2a	Pegasys
Telbivudine	Tyzeka Sebivo
Tenofovir disproxil Tenofovir Disproxil Fumarate	Viread Vemlidy

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Generic names	Brand names
Tenofovir Tenofovir alafenamide	

III. LAB TESTS LOINCS

Table 4. Laboratory Test LOINC Mapping

Component Name	LOINC	LOINC Name
ALANINE AMINOTRANSFERASE (ALT)	1742-6	ALT SerPl-cCnc
ASPARTATE AMINOTRANSFERASE (AST)	1920-8	AST SerPl-cCnc
IGM ANTIBODY TO HEPATITIS B CORE ANTIGEN	31204-1	Hepatitis B virus core Ab.IgM : ACnc : Pt : Ser : Ord :
HEPATITIS B SURFACE ANTIGEN	5195-3	Hepatitis B virus surface Ag : ACnc : Pt : Ser : Ord :
HEPATITIS B E ANTIGEN	13954-3	Hepatitis B virus little e Ag : ACnc : Pt : Ser : Ord : EIA
HEPATITIS B VIRAL DNA	*See Table 4*	*See Table 4*
HEPATITIS B CORE ANTIBODY	16933-4	Hep B virus core Ab: ACnc: Pt: Ser: Ord:
TOTAL BILIRUBIN	33899-6	Bilirubin.glucuronidated+bilirubin.non-glucuronidated:SCnc:Pt:Ser:Plas:Qn
DIRECT BILIRUBIN	29760-6	Bilirubin.glucuronidated : SCnc:Pt:Ser:Plas:Qn
INDIRECT BILIRUBIN	14630-8	Bilirubin.non-glucuronidated:SCnc:Pt:Ser:Plas:Qn

Table 4. Hepatitis B Viral DNA positivity and LOINC Mapping Criteria by Test

Component Name	LOINC	LOINC Name	Positive result
HEP B DNA PCR (QL)	29610-3	Hepatitis B virus DNA : ACnc : Pt : Ser/Plas : Ord : Probe.Amp.Tar	"POSITIVE" or "DETECTED"
HEP B VIRAL DNA IU/ML	5009-6	Hepatitis B virus polymerase DNA : ACnc : Pt : Bld : Ord : Probe.Amp.Tar	>100
HEP B DNA COPIES/ML	5009-6	Hepatitis B virus DNA : ACnc : Pt : xxx : Ord : Probe.Amp.Tar	>160
HEPATITIS B DNA, QN, IU/COPIES	5009-6	Hepatitis B virus DNA : ACnc : Pt : xxx : Ord : Probe.Amp.Tar	>50 *
HEPATITIS B DNA IU/ML, QUANT	5009-6	Hepatitis B virus DNA : ACnc : Pt : xxx : Ord : Probe.Amp.Tar	>50
HEPATITIS B DNA LOG IU/ML, QUANT	16934-2	Hepatitis B virus polymerase DNA : ACnc : Pt : Bld : Ord : Probe.Amp.Tar	>1.7
HBV DNA QUANT INTERPRETATION	29610-3	Hepatitis B virus DNA : ACnc : Pt : Ser/Plas : Ord : Probe.Amp.Tar	"POSITIVE" or "DETECTED"
HEPATITIS B DNA QUANT COPIES/ML	5009-6	Hepatitis B virus DNA : ACnc : Pt : xxx : Ord : Probe.Amp.Tar	>40
HEPATITIS B DNA QUANT IU	5009-6	Hepatitis B virus DNA : ACnc : Pt : xxx : Ord : Probe.Amp.Tar	>200

* Result field says "SEE BELOW". Comment field has the result in the following format:
"Result: 421 IU/ml (2.62 log IU/ml)"   A positive result for us is >50 IU/ml.

Table 5. NA Codes for provider reporting fields

NA code	Description
NA-1746	Prescribing provider name
NA-1747	Prescribing provider NPI
NA-1748	Treatment encounter facility name
NA-1749	Treatment encounter facility address
NA-1750	Treatment encounter facility city
NA-1751	Treatment encounter facility state
NA-1752	Treatment encounter facility NPI
NA-1753	Primary care provider name
NA-1754	Primary care provider NPI
NA-1755	Ordering provider name
NA-1756	Ordering provider NPI
NA-1757	Lab ordering facility name
NA-1758	Lab ordering facility address
NA-1759	Lab ordering facility city
NA-1760	Lab ordering facility state
NA-1761	Lab ordering facility NPI
NA-1762	Managing treatment provider name
NA-1763	Managing treatment provider NPI

IV.   CODE MAINTENANCE STRATEGY

Continuously screen all incoming Lx_Component_Name fields for the text strings: "HEP" or "HBV" or "ALT" or "SGPT" or "AST" or "SGOT" or "AMINOTRANS" or "BILI" not "CAST" not "FASTING" not "YEAST" not "URINE" not "URO"