**ALGORITHMS VALIDATED FOR USE IN MASSACHUSETTS’ ESP INSTALLATION – Notifiable disease case reporting**

**Last Updated: January 18, 2018**

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| Condition | **Active Tuberculosis** |
| Initial flag | Applies only to patients who currently do not have and have never previously been flagged for the condition. |
| Criteria | Any one of the following:* Prescription for pyrazinamide or (PZA not CAPZA\*)
* Order for AFB smear or culture followed by ICD9 code for TB within 60 days
* Order for two or more anti-TB medications followed by an ICD9 code for TB within 60 days
 |
| Diagnosis Codes | Tuberculosis | ICD-9 | 010.00-018.99 |
| Medications | Isoniazid or (INH not INHAL\* not INHIB\*) |
| Ethambutol |
| Rifampin |
| Rifabutin |
| Rifapentine |
| Pyrazinamide or (PZA not CAPZA\*) |
| Streptomycin |
| Para-aminosalicyclic acid |
| Kanamycin |
| Capreonmycin |
| Cycloserine |
| Ethionamide |
| Moxifloxacin |
| Algorithm last updated | 8/11/2008 |
| Notes | This algorithm is currently under review and will be revised to encompass TB infection. ICD-10 codes will be added. |

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| Condition | **Acute Hepatitis A Virus** |
| Criteria | Any one of the following:* ICD code for jaundice
* Alanine aminotransferase (ALT) greater than two times upper limit of normal
* Aspartate aminotransferase (AST) greater than two times upper limit of normal

**AND** * Positive IgM antibody to Hepatitis A within a 14-day period of the above
 |
| Diagnosis Codes | Jaundice | ICD-9 | 782.4 | Jaundice, not of newborn |
| ICD-10 | R17 | Unspecified jaundice |
| Algorithm last updated | 5/23/2017 |

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| Condition | **Acute Hepatitis B Virus** |
| Case Components *(used to define criteria for case)* | 1. Diagnosis code for jaundice
2. Alanine aminotransferase (ALT) >5x upper limit of normal
3. Aspartate aminotransferase (AST) >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
 |
| Criteria*Someone is considered a case if they meet any of the criteria to the right.*  | Criteria 1: (Case Component #1 or #2 or #3) *and* #4 within 14 day period |
| Criteria 2:(#1 or #2 or #3) and (#9 or #10) and #5 within 21 day period, and1. No prior positive result for #5 or #7 ever, and
2. No code for #8 at this encounter or in the past
 |
| Criteria 3:(#1 or #2 or #3) *and* (#9 or #10) *and* #7 within 21 day period, *and** 1. No prior positive result for #5 or #7 ever, *and*
	2. No code for #8 at this encounter or in the past
 |
| Criteria 4:#5 “reactive” with record of #5 “non-reactive” within the prior 12 months, *and** 1. No prior positive test for #5 or #7 ever, *and*
	2. No code for #8 at this encounter or in the past.
 |
| Diagnosis Codes | Jaundice | ICD-9 | 782.4 | Jaundice, not of newborn |
| ICD-10 | R17 | Unspecified jaundice |
| Algorithm last updated | 5/23/2017 |

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| Condition | **Chronic Hepatitis B Virus** |
| Case Components for Criteria *(used to define criteria for case)* | 1. Diagnosis code for jaundice, not of newborn
2. Alanine aminotransferase (ALT) >5x upper limit of normal
3. Aspartate aminotransferase (AST) >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
 |
| Criteria*Someone is considered a case if they meet any one of the criteria to the right.*  | Criteria 1: Any patient with (#5 or #6 or #7) who does not fulfill criteria for [acute hepatitis B](#HepB) |
| Criteria 2:Any patient with (#5 or #6 or #7) who fulfilled criteria for acute hepatitis B more than 12 months prior to the current positive test (#5 or #6 or #7) |
| Diagnosis Codes | Jaundice | ICD-9 | 782.4 | Jaundice, not of newborn |
| ICD-10 | R17 | Unspecified jaundice |
| Algorithm last updated | 5/23/2017 |

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| Condition | **Acute Hepatitis C Virus** |
| Case Components for Criteria *(used to define criteria for case)* | 1. Diagnosis code for jaundice
2. Alanine aminotransferase (ALT) >200
3. Hepatitis C ELISA = “REACTIVE”
	1. If Hep C ELISA result is quantitative then interpret as follows:
	* If ELISA Index ≥11 then ELISA is positive
	* If ELISA Index ≤0.80 then ELISA is negative
	* If ELISA Index between 0.80 and 10.99 then ELISA is positive only if positive RIBA or positive Hep C RNA or positive ELISA (with index ≥11) within the next 7 days.
4. Hepatitis C Signal Cutoff Ratio ≥3.8
5. Hepatitis C RIBA = “POSITIVE”
6. Hepatitis C RNA = “DETECTED” or viral load above the limit of detection of the test
7. Diagnosis code for chronic Hepatitis C
8. Total bilirubin > 1.5
 |
| Criteria*Someone is considered a case if they meet any one of the criteria to the right.*  | Criteria 1: (#1 or #2 or #8) and #3 positive and #4 positive (if done) and #5 positive (if done) and #6 positive (if done) within a 28 day period; AND no prior positive #3 or #5 or #6 ever; AND no diagnosis code for #7 ever prior to this encounter |
| Criteria 2:(#1 or #2 or #8) and #6 positive and #4 positive (if done) and #5 positive (if done) and within a 28 day period; AND no prior positive #3 or #5 or #6 ever; AND no diagnosis code for #7 ever prior to this encounter |
| Criteria 3:#6 positive and record of (#3 or #6 negative within the prior 12 months) AND no prior positive #3 or #5 or #6 or #7 ever |
| Criteria 4:#3 positive and record of (#3 or #6 negative within the prior 12 months) AND no prior positive #3 or #5 or #6 or #7 ever |
| Diagnosis Codes | Jaundice | ICD-9 | 782.4 | Jaundice, not of newborn |
| ICD-10 | R17 | Unspecified jaundice |
| Chronic hepatitis C | ICD-9 | 070.54 | Chronic hepatitis C without mention of hepatic coma |
| ICD-10 | B18.2 | Chronic viral hepatitis C |
| Algorithm last updated  | 5/23/2017 |

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| Condition | **Chlamydia** |
| Criteria | Positive result for Chlamydia trachomatis culture, nucleic acid probe, nucleic acid amplification assay, or enzyme immunoassay |
| Algorithm last updated | 6/20/2016 |

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| Condition | **Gonorrhea** |
| Criteria | Positive result for N. gonorrhoeae culture, nucleic acid probe, nucleic acid amplification assay, or enzyme immunoassay |
| Algorithm last updated | 6/20/2016 |

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| Condition | **HIV** |
| Criteria | Classify patient as HIV positive if any of the following conditions are true:1. Positive Western Blot
2. Positive HIV Antigen/Antibody test AND positive HIV ELISA (any time window)
3. HIV RNA Viral Load > 200 copies/mL.
4. HIV Qualitative PCR
5. ≥2 ICD codes for HIV and history of prescription for ≥3 HIV meds ever
6. HIV on problem list and history of prescription for ≥3 HIV meds ever
7. Concurrent prescriptions for 3 or more *different* antiretrovirals for at least 1 month
8. If patient prescribed combo pill then count as 2 or 3 meds as appropriate
9. Rationale for prescription criteria:
	1. Need med-based detection to capture patients on treatment with negative viral loads (since they’d be classified as negative using lab criteria alone)
	2. 3 meds/3 months criteria to exclude patients on treatment for hepatitis B and patients receiving pre- or post-exposure prophylaxis
10. Two approaches to meeting this criteria are valid: (a) based on the frequency and number of pills dispensed or (b) two start dates for each of 3 or more antiretrovirals at least 30 days apart but no more than 400 days apart.
	1. The start dates for any set of 3 drugs need not be the same. For example, if 2 drugs are started Jan 1, and the 3rd drug is started Jan 10, this would count as meeting the 3 or more meds criteria as of Jan 10.
	2. The sets of prescriptions for 3 or more antiretrovirals need not be for the same combination of drugs.
 |
| Diagnosis Codes | HIV | ICD-9 | 042 | HIV disease |
| V08 | Asymptomatic HIV infection status |
| ICD-10 | Z21 | Asymptomatic HIV infection status |
| B97.35 | Human immunodeficiency virus, type 2 [HIV 2] as the cause of diseases classified elsewhere |
| B20-B24 | Human immunodeficiency virus (HIV) disease |
| O98.7 | HIV complicating pregnancy or childbirth |
| Medications | NRTI | Zidovudine (AZT) |
| Didanosine (DDI) |
| Stavudine (D4T) |
| Lamivudine (3TC) |
| Emtricitabine (FTC) |
| Tenofovir (TDF) |
| Abacavir (ABC) |
| Tenofovir + Emtricitabine |
| Zidovudine + Lamivudine |
| Abacavir + Lamivudine |
| Abacavir + Lamivudine + Zidovudine |
| NNRTIs | Efavirenz |
| Nivarapine |
| Rilpivirine |
| Etravirine |
| Delavirdine |
| Integrase Inhibitors | Raltegravir |
| Dolutegravir |
| Elvitegravir |
| Fusion Inhibitors | Enfuvirtide |
| Maraviroc |
| Protease Inhibitors | Tipranavir |
| Ritonavir |
| Indinavir |
| Darunavir |
| Saquinavir |
| Atazanavir |
| Nelfinavir |
| Fosamprenavir |
| Lopinavir + Ritonavir |
| Single Tablet Combos | Efavirenz + Tenofovir + Emtricitabine |
| Rilpivirine + Tenofovir + Emtricitabine |
| Dolutegravir + Abacavir + Lamivudine |
| Elvitegravir + Cobicistat + Tenofovir + Emtricitabine |
| Dolutegravir + Cobicistat |
| Algorithm last updated | 12/8/2017 |
| Notes | This is a case detection algorithm. Additional work is underway to enable longitudinal reporting of HIV-related care via ESP. |

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| Condition | **Syphilis** |
| Criteria | Any one of the following three criteria: |
| * + (Diagnosis code (ICD-9 Code 090-097 or ICD10 A50-A53) or TP-IGM) AND an order/prescription for at least ONE of the following antibiotics within a 14 day period:
		1. "PENICILLIN G" or "PEN G"
		2. "DOXYCYCLINE" for ≥7 days
		3. "CEFTRIAXONE" dose ≥1 gram
 |
| * + Serum RPR or VDRLvalue greater than or equal to 1:8 and any of the following:
1. Lab test TPPA with result "reactive" ever in the past and up to 1 month following the positive RPR or VDRL OR
2. Lab test FTA-ABS with result "reactive" ever in the past and up to 1 month following the positive RPR or VDRL
3. Lab test TP-IGG with result “positive” or “reactive” ever in the past and up to 1 month following positive RPR or VDRL
 |
| * + Positive CSF test for syphilis. Any of the following:
1. VDRL-CSF value “reactive” or ≥ 1:1
2. TPPA-CSF with result “reactive” or “positive” or equivalent
3. FTA-ABS-CSF with result “reactive” or “positive” or equivalent
 |
| Diagnosis Codes | Syphilis | ICD-9 | 091.0 to 091.2 | Primary syphilis |
| 091.3 to 091.9 | Secondary syphilis |
| 092.x | Early latent syphilis |
| 096.x | Late latent syphilis |
| 094.x | Neurosyphilis syphilis |
| 090.0 to 090.4, 090.9 | Congenital (infant) syphilis |
| 090.5 to 090.7 | Late congenital syphilis |
| ICD-10 | A50 | Congenital |
| A51.0 to A51.2 | Primary |
| A51.3 to A51.4 | Secondary |
| A51.5 | Early syphilis, latent |
| A51.9 | Early syphilis, unspecified |
| A52.0 | Cardiovascular syphilis |
| A52.1 to A52.3 | Neurosyphilis |
| A52.7 | Other symptomatic late syphilis |
| A52.8 | Late syphilis, latent |
| A52.9 | Late syphilis, unspecified |
| A53.0 | Latent syphilis, unspecified as early or late |
| A53.9 | Syphilis, unspecified |
| Algorithm last updated | 2/22/2017 |

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