**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, 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 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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