Appendix Table 1. International Classification of Diseases (ICD) -9, ICD -10, and Systematized Nomenclature of Medicine Clinical Terms (SNOMED) codes included in the algorithms

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| --- | --- | --- |
| **Code Type** | **Code** | **Description** |
| ICD9 | 042\* | Human immunodeficiency virus [HIV] disease (includes AIDS, AIDS like syndrome, AIDS related Complex, Symptomatic HIV infection, HIV1) |
| ICD9 | 043\* | HIV infection causing other specified conditions |
| ICD9 | 044\* | Other HIV infection |
| ICD9 | 79.53 | HIV 2 diagnosis |
| ICD9 | V08 | Asymptomatic HIV infection status |
| ICD10 | B20\* | Human immunodeficiency virus [HIV] disease |
| ICD10 | B97.35 | Human immunodeficiency virus, type 2 [HIV 2] as the cause of diseases classified elsewhere |
| ICD10 | O98.7\* | Human immunodeficiency virus [HIV] disease complicating pregnancy, childbirth and the puerperium |
| ICD10 | Z21\* | Asymptomatic human immunodeficiency virus [HIV] infection status |
| ICD10 | Z53.20 | Procedure and treatment not carried out because of patient’s decision for unspecified reasons (for HIV) |
| SNOMED | 19030005 | Human immunodeficiency virus (organism) |
| SNOMED | 89293008 | Human immunodeficiency virus type 1 (organism) |
| SNOMED | 36115006 | Human immunodeficiency virus type 2 (organism) |
| SNOMED | 165816005 | Human immunodeficiency virus positive (finding) |
| SNOMED | 365866002 | Finding of human immunodeficiency virus status (finding) |
| SNOMED | 86406008 | Human immunodeficiency virus infection (disorder) |
| SNOMED | 80191000119101 | Symptomatic human immunodeficiency virus I infection (disorder) |
| SNOMED | 72621000119104 | Human immunodeficiency virus (HIV) II infection category B1 (disorder) |
| SNOMED | 72631000119101 | Human immunodeficiency virus (HIV) II infection category B2 (disorder) |
| SNOMED | 87117006 | Human immunodeficiency virus infection with acute lymphadenitis (disorder) |
| SNOMED | 385351002 | Human immunodeficiency virus Centers for Disease Control and Prevention category (observable entity) |
| SNOMED | 103406000 | Human immunodeficiency virus Centers for Disease Control and Prevention category A1 (finding) |
| SNOMED | 103407009 | Human immunodeficiency virus Centers for Disease Control and Prevention category A2 (finding) |
| SNOMED | 103408004 | Human immunodeficiency virus Centers for Disease Control and Prevention category A3 (acquired immunodeficiency syndrome) (finding) |
| SNOMED | 103409007 | Human immunodeficiency virus Centers for Disease Control and Prevention category B1 (finding) |
| SNOMED | 103410002 | Human immunodeficiency virus Centers for Disease Control and Prevention category B2 (finding) |
| SNOMED | 103411003 | Human immunodeficiency virus Centers for Disease Control and Prevention category B3 (acquired immunodeficiency syndrome) (finding) |
| SNOMED | 103412005 | Human immunodeficiency virus Centers for Disease Control and Prevention category C1 (acquired immunodeficiency syndrome) (finding) |
| SNOMED | 103413000 | Human immunodeficiency virus Centers for Disease Control and Prevention category C2 (acquired immunodeficiency syndrome) (finding) |
| SNOMED | 103414006 | Human immunodeficiency virus Centers for Disease Control and Prevention category C3 (acquired immunodeficiency syndrome) (finding) |
| SNOMED | 103415007 | Human immunodeficiency virus World Health Organization class I (finding) |
| SNOMED | 103416008 | Human immunodeficiency virus World Health Organization class II (finding) |
| SNOMED | 103417004 | Human immunodeficiency virus World Health Organization class III (finding) |
| SNOMED | 103418009 | Human immunodeficiency virus World Health Organization class IV (acquired immunodeficiency syndrome) (finding) |
| SNOMED | 406109008 | Human immunodeficiency virus enzyme-linked immunosorbent assay test positive (finding) |

Appendix Table 2. Included HIV laboratories in step 2 and their corresponding Logical Observation Identifiers Names and Codes (LOINC) and inclusion notes

| **LOINC code** | **Class** | **Name** | **Note** |
| --- | --- | --- | --- |
| 24467-3 | CD4 | CD3+CD4+ (T4 helper) cells [#/volume] in Blood | If presence, then include |
| 8123-2 | CD4 | CD3+CD4+ (T4 helper) cells/100 cells in Blood | If presence, then include |
| 54218-3 | CD4 | CD4/CD8 RATIO | If presence, then include |
| 49659-6 | Genotype/phenotype | HIV reverse transcriptase susceptibility panel by Genotype method | If presence, then include |
| 8251-1 | Genotype/phenotype | Service comment | With raw lab name specifying HIV genotyping or phenotyping; if presence, then include |
| 29541-0 | Viral load |  HIV 1 RNA [Log #/volume] (viral load) in Serum or Plasma by NAA with probe detection | Continuous with unit (Log\_copies/mL). If >=1.3 (equals to viral load >= 20 copies/mL) then considered positive (include) |
| 20447-9 | Viral load |  HIV 1 RNA [#/volume] (viral load) in Serum or Plasma by NAA with probe detection. | Continuous with unit (copies/mL). If >= 20 then considered positive (include) |
| 25835-0 | Viral load | HIV 1 RNA [Presence] in Serum or Plasma by NAA with probe detection. | Categorical, coded as “positive/reactive” (include) “negative/nonreactive/indeterminate” |
| 56888-1 | AgAb |  HIV 1+2 Ab+HIV1 p24 Ag [Presence] in Serum or Plasma by Immunoassay | Categorical, coded as “positive/reactive” (include) “negative/nonreactive/indeterminate |
| 18396-2 | AgAb | HIV 1 p24 Ag [Presence] in Serum or Plasma by Immunoassay | Categorical, coded as “positive/reactive” (include) “negative/nonreactive/indeterminate |
| 31201-7 | AgAb | HIV 1+2 Ab [Presence] in Serum or Plasma by Immunoassay. | Categorical, coded as “positive/reactive” (include) “negative/nonreactive/indeterminate |
| 29893-5 | AgAb | HIV 1 Ab [Presence] in Serum or Plasma by Immunoassay. | Categorical, coded as “positive/reactive” (include) “negative/nonreactive/indeterminate |
| 30361-0 | AgAb | HIV 2 Ab [Presence] in Serum or Plasma by Immunoassay. | Categorical, coded as “positive/reactive” (include) “negative/nonreactive/indeterminate |
| 5221-7 | AgAb | HIV 1 Ab [Presence] in Serum or Plasma by Immunoblot. | Categorical, coded as “positive/reactive” (include) “negative/nonreactive/indeterminate |
| 49580-4 | AgAb | HIV 1+2 Ab [Presence] in Unspecified specimen by Rapid immunoassay. | Categorical, coded as “positive/reactive” (include) “negative/nonreactive/indeterminate |
| 80203-3 | AgAb | HIV 1 and 2 Ab [Identifier] in Serum, Plasma or Blood by Rapid immunoassay. | Categorical, coded as “positive/reactive” (include) “negative/nonreactive/indeterminate |

Appendix Table 3. List of FDA approved antiretroviral medications for adults living with HIV

| **Generic name** | **Brand name** |
| --- | --- |
| Delavirdine | Rescriptor |
| Didanosine | Videx  |
| Enfuvirtide | Fuzeon |
| Etravirine | Intelence |
| Ibalizumab-uiyk | Trogarzo |
| Indinavir | Crixivan |
| Maraviroc | Selzentry |
| Nelfinavir | Viracept |
| Nevirapine | Viramune |
| Raltegravir | Isentress |
| Stavudine | Zerit |
| Abacavir | Ziagen |
| Dolutegravir | Tivicay |
| Doravirine | Pifeltro |
| Efavirenz | Sustiva |
| Emtricitabine | Emtriva |
| Fosamprenavir | Lexiva |
| Lamivudine | Epivir |
| Rilpivirine | Edurant |
| Ritonavir | Norvir |
| Saquinavir | Invirase |
| Tenofovir Disoproxil Fumarate | Viread |
| Zidovudine | Retrovir |
| Atazanavir | -- |
| Atazanavir Sulfate | Reyataz |
| Bictegravir | -- |
| Cobicistat | Tybost |
| Darunavir | -- |
| Elvitegravir | -- |
| Lopinavir | -- |
| Tenofovir Alafenamide | -- |
| Tipranavir | -- |
| Combination (Bolded=Both drug; not bolded=combination drug) |
| Abacavir- Lamivudine  | Epzicom |
| Abacavir- Lamivudine- Zidovudine | Trizivir |
| Atazanavir- Cobicistat | Evotaz |
| Atazanavir- Ritonavir | -- |
| Bictegravir- Emtricitabine- Tenofovir Alafenamide | Biktarvy |
| Darunavir- Cobicistat  | Prezcobix |
| Darunavir- Cobicistat- Emtricitabine- Tenofovir Alafenamide | Symtuza |
| Darunavir- Ritonavir | Prezista |
| Dolutegravir- Abacavir- Lamivudine | Triumeq |
| Dolutegravir- Lamivudine | Dovato |
| Dolutegravir- Rilpivirine | Juluca |
| Doravirine- Lamivudine- Tenofovir Disoproxil Fumarate | Delstrigo |
| Efavirenz- Lamivudine- Tenofovir Disoproxil Fumarate  | Symfi |
| Efavirenz-Emtricitabine- Tenofovir Disoproxil Fumarate | Atripla |
| Elvitegravir- Cobicistat- Emtricitabine- Tenofovir Disoproxil Fumarate  | Stribild |
| Elvitegravir- Cobicistat- Tenofovir Alafenamide- Emtricitabine | Genvoya |
| Emtricitabine (FTC)- Tenofovir Disoproxil Fumarate (TDF) | Truvada |
| Emtricitabine- Tenofovir Alafenamide | Descovy |
| Emtricitabine- Rilpivirine- Tenofovir Alafenamide | Odefsey |
| Emtricitabine- Rilpivirine- Tenofovir Disoproxil Fumarate | Complera |
| Fosamprenavir- Ritonavir | Lexiva |
| Lamivudine- Tenofovir Disoproxil Fumarate | Cimduo or Temixys |
| Lopinavir- Ritonavir | Kaletra |
| Saquinavir- Ritonavir | Invirase |
| Tipranavir-Ritanovir | Aptivus |
| Zidovudine- Lamivudine | Combivir |

Appendix Table 4. The changes in algorithm performance when encounter threshold criterion changed from 3+ to 2+

|  |  |  |
| --- | --- | --- |
|  | **Crude (95%CI)** | **Weighted (95%CI)** |
| The final algorithm with encounter threshold being 3 |
| Sensitivity (recall) | 96.81 (90.96, 99.34) | 98.54 (92.17, 100) |
| Specificity | 84.31 (71.41,92.98) | 97.55 (94.88, 100) |
| PPV (precision) | 91.92 (86.55, 97.29) | 80.9 (61.97, 99.82) |
| NPV | 93.48 (86.34, 100) | 99.84 (99.15, 100) |
| The sensitivity analysis algorithm with encounter threshold being 2 |
| Sensitivity (recall) | 97.87 (94.96, 100) | 99.03 (93.81, 100) |
| Specificity | 80.39 (69.50,91.29) | 87.41 (81.68, 93.13) |
| PPV (precision) | 90.20 (84.43, 95.97) | 45.33 (27.44, 63.23) |
| NPV | 95.35 (89.05, 100) | 99.88 (99.25, 100) |