HIV-2 Surveillance Update

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HIV-2

- Retrovirus similar to HIV-1 with env, gag, and pol components that induce antibodies that cross react with those components in HIV-1
- HIV-2 has an epidemiologic link to West Africa, including historic association with colonization and migration of people
- HIV-2 generally are resistant to NNRTI medications, and so may be undertreated if not differentiated from HIV-1
- Some HIV-2 infections may be indolent compared to HIV-1, but may present as Stage 3
- HIV-2 infections have been associated with heterosexual transmission
HIV-2 Risk Factors

• Native of West Africa or other endemic area
• Sex partners of person from country where HIV-2 is endemic or known HIV-2 infected
• Persons who received blood transfusion or had non-sterile injection in country where HIV-2 endemic
• Persons who shared needles with person from HIV-2 endemic country, or with person known HIV-2 infected
• Children of women with risk factors for HIV-2 infection or who are known HIV-2 infected
What Prompted HIV-2 Testing in the Past?

Both HIV-1 screening and confirmatory tests are positive but patient has:

- risk factor for HIV-2, or
- undetectable or extremely low HIV-1 viral load when patient not on antiretroviral therapy, or
- antiretroviral therapy seems ineffective because of:
  - persistently low CD4 levels, or
  - decreasing CD4 count and/or signs and symptoms of clinical deterioration
What are COPHI?

Cases of public health importance (COPHI) are those cases where either:

- the risk factor reported is unusual
- or where other circumstances exist, such as unusual strains of HIV

COPHI necessitate investigation, and communication with CDC
COPHI consist of 2 basic types

Unusual risk factors
• Transplants, transfusions, hemophilia, occupational, non-neonatal pediatric, and others

Special diagnostic (problems)
• Difficulty detecting atypical HIV strains (HIV-2; possible Group O; others)

Human immunodeficiency virus (HIV) is categorized into two types, HIV-1 and HIV-2. Worldwide, most HIV infections are HIV-1, whereas HIV-2 largely has been confined to persons in or from West Africa (1,2). HIV-1 and HIV-2 have the same routes of transmission, and both can cause acquired immunodeficiency syndrome (AIDS) (3); however, HIV-2 infections should be differentiated from HIV-1 infections because they are less likely to cause AIDS and their clinical management differs (4,5). CDC’s current surveillance case definition for HIV infection applies to both variants of HIV (6) but lacks criteria for differentiating information to discern whether or not they were duplicate reports. An additional 29 cases were excluded because they did not meet any of the three working definition criteria.

The remaining 166 cases met one or more of the criteria of the working definition and were analyzed by diagnostic test results, reason for suspecting HIV-2 infection, region of report, country of birth, race/ethnicity, sex, age, and transmission risk factor. Poisson regression was used to assess trends in the annual number of diagnoses. The year of diagnosis was defined as the year of the first positive HIV test, which in some cases
Number of reported cases of HIV-2 infection, by analytic category* and year of diagnosis - United States, 1987-2009

242 possible cases reported to CDC

47 cases excluded as missing identifiers

29 cases excluded for insufficient lab data

166 confirmed HIV-2 cases

Torian et al. MMWR60(29);985-988, July 29 2011
<table>
<thead>
<tr>
<th>Positive HIV-2 laboratory test result</th>
<th>HIV-1 immunoblot results</th>
<th>Total</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Positive</td>
<td>Indeterminate</td>
<td>Negative</td>
</tr>
<tr>
<td>TDAI only</td>
<td>46</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>TDAI + NAT</td>
<td>29</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>TDAI + IB</td>
<td>0</td>
<td>24</td>
<td>1</td>
</tr>
<tr>
<td>IB only</td>
<td>0</td>
<td>24</td>
<td>1</td>
</tr>
<tr>
<td>NAT only</td>
<td>22</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>IB + NAT + TDAI</td>
<td>0</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>IB + NAT</td>
<td>0</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>RIPA</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total (%)</strong></td>
<td><strong>97 (58)</strong></td>
<td><strong>63 (38)</strong></td>
<td><strong>3 (2)</strong></td>
</tr>
</tbody>
</table>

**Abbreviations:** HIV = human immunodeficiency virus; TDAI = type-differentiating antibody immunoassay positive for HIV-2 and negative for HIV-1; NAT = HIV-2 nucleic acid test (DNA or RNA); IB = positive HIV-2 immunoblot antibody test and negative or indeterminate HIV-1 immunoblot antibody test; RIPA = HIV-2 radioimmunoprecipitation assay.
HIV-2 Surveillance Case Definition

One or more of the following criteria:

FDA-approved HIV1/HIV-2 type-differentiating antibody immunoassay (TDAI) test result positive for HIV-2 and negative for HIV-1

Or

Positive HIV-2 NAT result (DNA test)

Or

Positive HIV-2 Western blot (WB) (or immunoblot or line assay) result and negative or indeterminate HIV-1 WB result

Or

Diagnosis of HIV-2 infection by a laboratory expert experienced in differentiating HIV-2 from HIV-1 if laboratory evidence for HIV-2 is ambiguous
Undifferentiated HIV Surveillance Case Definition

The HIV type is “undifferentiated” if a laboratory expert or definitive NAT results cannot resolve ambiguous antibody-test evidence for HIV-2:

- HIV-1/HIV-2 type-differentiating (TDAI) test result is “undifferentiated” (positive for both HIV-1 and HIV-2)

or

- HIV-2 WB is positive and HIV-1 WB is positive
Dual HIV
Surveillance Case Definition

The HIV type is “dual” (both 1 and 2) if both an HIV-1 NAT and an HIV-2 NAT are positive.
<table>
<thead>
<tr>
<th></th>
<th>2010</th>
<th>2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total SD Requests</td>
<td>17</td>
<td>43</td>
</tr>
<tr>
<td>HIV-2</td>
<td>10</td>
<td>23</td>
</tr>
<tr>
<td>Undifferentiated</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Dual Infections</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>HIV-1</td>
<td>3</td>
<td>12</td>
</tr>
<tr>
<td>Not HIV (1 or 2)</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Case LTF</td>
<td>0</td>
<td>2</td>
</tr>
</tbody>
</table>

- 60 possible cases reported to COPHI Coordinator
- 33 confirmed HIV-2 cases
- 3 cases undifferentiated HIV
- 1 case dual HIV-1/HIV-2
- 15 cases HIV-1
33 HIV-2 Cases Diagnosed 2010-2011

Demographics

- **Gender**
  - Male: 13
  - Female: 20

- **Area of Birth**
  - West Africa: 26
  - Other Africa: 0
  - North America: 4
  - Asia: 3
  - Europe: 0

New Case Definition Criteria

<table>
<thead>
<tr>
<th>Case Definition Options</th>
<th>Total (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1: TDAI positive HIV-2 only</td>
<td>21 (64%)</td>
</tr>
<tr>
<td>2: HIV-2 DNA NAT positive</td>
<td>5 (15%)</td>
</tr>
<tr>
<td>3: HIV-2 WB positive with HIV-1 WB negative or indeterminate</td>
<td>9 (27%)</td>
</tr>
<tr>
<td>4: Expert laboratory opinion for ambiguous results</td>
<td>2 (6%)</td>
</tr>
</tbody>
</table>

This total exceeds 100% as some cases met more than one criterion
Cases confirmed as HIV-2 using laboratory-based surveillance case definition and review by CDC COPHI coordinators
When to Contact the CDC COPHI Coordinator for Discordant Lab?

• All cases of HIV-2

• Unusual HIV-1 strains, especially if the patient has possible false-negative screening tests (e.g. Group O suspected)

• Diagnostic uncertainty