State of Kentucky HIV/AIDS Certification for Medical Professionals

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Southeastern AIDS Training Center (SEATEC)
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Participants will be able to:

- Discuss AIDS epidemiology
- Describe transmission of HIV/AIDS
- Demonstrate knowledge of current HIV treatment
- Discuss post exposure prophylaxis
Introduction
Untreated HIV

- Deterioration of immune function
- Crucial immune cells called **CD4 positive (CD4+) T cells** are disabled

- A healthy, uninfected person usually has 500 to 1,200 CD4+ T cells per cubic millimeter (mm³) of blood

- When the CD4+ T cell count falls below 200/mm³, a person becomes particularly vulnerable to the **opportunistic infections** and cancers that typify AIDS
HIV Positive

- Patient’s tests are ELISA positive
- ELISA test is repeated and is positive
- Test is confirmed by western blot
- Patient is now said to be “HIV positive”
Acquired Immunodeficiency Syndrome

AIDS

- HIV+
  - CD4 cell count that is or ever has been < 200 cells/mm$^3$

- HIV+
  - AIDS defining illness such as PCP, MAC, toxoplasmosis, Kaposi’s Sarcoma, etc
  - Regardless of CD4 cell count

- Once AIDS always AIDS
  - Immune reconstitution but still AIDS
At the end of 2006, 488,861 people in the United States were living with HIV/AIDS.
Year of Initiation of Confidential Name-Based HIV Case Surveillance as of April 2008

American Samoa 2001
Guam 2000
Northern Mariana Islands 2001
Puerto Rico 2003
U.S. Virgin Islands 1998
Reported Cases of HIV Infection (not AIDS), 2007—47 States, the District of Columbia, and 5 U.S. Dependent Areas
N = 63,230*

Note: Data from 47 states, the District of Columbia, and 5 U.S. dependent areas with confidential name-based HIV infection reporting as of 2007.
*Includes 151 persons who were residents of areas without HIV infection surveillance but who were reported by areas with HIV infection surveillance. Includes 316 persons whose area of residence is unknown.
Proportion of AIDS Cases among Adults and Adolescents by Transmission Category and Year of Diagnosis 1985–2006—United States and Dependent Areas

Note. Data have been adjusted for reporting delays and cases without risk factor information were proportionally redistributed.

*Heterosexual contact with a person known to have, or to be at high risk for, HIV infection.
## Estimated Numbers and Percentages of HIV/AIDS Cases among Adults and Adolescents, by Transmission Category 2007—34 States

<table>
<thead>
<tr>
<th>Transmission category</th>
<th>No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male-to-male sexual contact</td>
<td>22,472</td>
<td>53</td>
</tr>
<tr>
<td>Injection drug use</td>
<td>4,939</td>
<td>12</td>
</tr>
<tr>
<td>Male-to-male sexual contact and injection drug use</td>
<td>1,260</td>
<td>3</td>
</tr>
<tr>
<td>High-risk heterosexual contact*</td>
<td>13,627</td>
<td>32</td>
</tr>
<tr>
<td>Other/not identified†</td>
<td>198</td>
<td>&lt;1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>42,496</td>
<td></td>
</tr>
</tbody>
</table>

Note. Data include persons with a diagnosis of HIV infection regardless of their AIDS status at diagnosis.
Data from 34 states with confidential name-based HIV infection reporting since at least 2003.
Data have been adjusted for reporting delays and missing risk-factor information.

*Heterosexual contact with a person known to have, or to be at high risk for, HIV infection.
†Includes hemophilia, blood transfusion, perinatal exposure, and risk factor not reported or not identified.
Percentages of HIV/AIDS Cases among Adults and Adolescents, by Sex and Transmission Category 2007—34 States

Note: Data include persons with a diagnosis of HIV infection regardless of their AIDS status at diagnosis. Data from 34 states with confidential name-based HIV infection reporting since at least 2000. Data have been adjusted for reporting delays and missing risk-factor information.

*Heterosexual contact with a person known to have, or to be at high risk for, HIV infection.
†Includes hemophilia, blood transfusion, perinatal exposure, and risk factor not reported or not identified.
### Reported Cases of HIV Infection (not AIDS), by Age Group at Diagnosis, Cumulative through 2007—47 States, the District of Columbia, and 5 U.S. Dependent Areas

<table>
<thead>
<tr>
<th>Age (years)</th>
<th>No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;13</td>
<td>5,821</td>
<td>2</td>
</tr>
<tr>
<td>13–14</td>
<td>529</td>
<td>&lt;1</td>
</tr>
<tr>
<td>15–24</td>
<td>53,579</td>
<td>16</td>
</tr>
<tr>
<td>25–34</td>
<td>114,163</td>
<td>34</td>
</tr>
<tr>
<td>35–44</td>
<td>103,080</td>
<td>30</td>
</tr>
<tr>
<td>45–54</td>
<td>44,938</td>
<td>13</td>
</tr>
<tr>
<td>55–64</td>
<td>12,120</td>
<td>3</td>
</tr>
<tr>
<td>&gt;65</td>
<td>3,360</td>
<td>&lt;1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>337,590</td>
<td></td>
</tr>
</tbody>
</table>

Note. Data from 47 states, the District of Columbia, and 5 U.S. dependent areas with confidential name-based HIV infection reporting as of 2007.
Percentages of AIDS Cases among Adults and Adolescents, by Race/Ethnicity and Year of Diagnosis 1985–2007—United States and Dependent Areas

Note: Data have been adjusted for reporting delays.
*Hispanics/Latinos can be of any race.
†Includes Asian and Pacific Islander legacy cases.
## Estimated Number of AIDS Cases and Rates for Male Adults and Adolescents, by Race/Ethnicity 2006—50 States and DC

<table>
<thead>
<tr>
<th>Race/Ethnicity</th>
<th>Cases</th>
<th>Rate (cases per 100,000 population)</th>
</tr>
</thead>
<tbody>
<tr>
<td>White, not Hispanic</td>
<td>9,267</td>
<td>11.2</td>
</tr>
<tr>
<td>Black, not Hispanic</td>
<td>11,540</td>
<td>82.9</td>
</tr>
<tr>
<td>Hispanic</td>
<td>5,388</td>
<td>31.3</td>
</tr>
<tr>
<td>Asian/Pacific Islander</td>
<td>423</td>
<td>7.5</td>
</tr>
<tr>
<td>American Indian/Alaska Native</td>
<td>118</td>
<td>12.2</td>
</tr>
<tr>
<td><strong>Total</strong>*</td>
<td>26,989</td>
<td>22.4</td>
</tr>
</tbody>
</table>

*Note. Data have been adjusted for reporting delays.*

*Includes 254 male adults and adolescents of unknown race or multiple races.*
Reported Cases of HIV Infection (not AIDS) in Children <13 Years of Age at Diagnosis, 2007—47 States, the District of Columbia, and 5 U.S. Dependent Areas

N=657*

Note. Data from 47 states, the District of Columbia, and 5 U.S. dependent areas with confidential name-based HIV infection reporting as of 2007.

*Includes 11 persons who were residents of areas without HIV infection surveillance but who were reported by areas with HIV infection surveillance. Includes 13 persons whose area of residence is unknown.
**Mortality**

- Persons dying of HIV disease increasingly consist of:
  - Women (27% in 2005)
  - Non-Hispanic blacks (55% in 2005)
  - Residents of the South (51% in 2005)
  - Persons 45 years of age and older (53% in 2005)

- HIV remains a leading cause of death among persons 25 to 44 yrs
Estimated Number of Adults and Adolescents Living with AIDS by Region, 1993–2006—50 States and DC

Note. Data have been adjusted for reporting delays.
HIV and Minorities
Percentages of AIDS Cases and Population by Race/Ethnicity, Reported in 2007—50 States and DC

- AIDS cases: N = 37,281*
  - American Indian/Alaska Native: <1%
  - Asian†: <1%
  - Hispanic/Latino†: <1%
  - Black/African American: 48%
  - Native Hawaiian/Other Pacific Islander: <1%
  - White: 31%

- U.S. population: N = 301,621,157
  - Hispanic/Latino†: 15%
  - Native Hawaiian/Other Pacific Islander: 4%
  - White: 66%
  - Asian†: 12%

*Includes 411 persons of unknown race or multiple races.
†Hispanics/Latinos can be of any race.
‡Includes Asian and Pacific Islander legacy cases.
AIDS Rates for Black/African American Adults and Adolescents, Reported 2003–2007—50 States and DC

Total rate=66.8

Rate (per 100,000)
- <50.0
- 50.0–100.0
- >100.0

Note: Excludes cases from U.S. dependent areas because of the lack of census information by race and age categories for these areas.
AIDS Rates for Hispanic/Latino* Adults and Adolescents
Reported 2003–2007—50 States and DC

Total rate=23.4
Rate (per 100,000)
- <20.0
- 20.0 – 50.0
- >50.0

Note: Excludes cases from U.S. dependent areas because of the lack of census information by race and age categories for these areas.
*Hispanics/Latinos can be of any race
AIDS in Blacks/African Americans

Of the 1,030,832 AIDS cases reported to CDC through 2007, blacks/African Americans accounted for

- 41% of total
- 60% of women
- 59% of heterosexual persons at high risk*
- 59% of children aged <13 years

Of AIDS cases reported during 2007, 47% were in black/African American adults and adolescents.

*High-risk heterosexual contact with a person known to have, or to be at high risk for, HIV infection.
AIDS in Hispanics/Latinos*

Of the 1,030,832 AIDS cases reported to CDC through 2007, Hispanics/Latinos accounted for

19% of total
19% of women
21% of heterosexual persons at high risk†
23% of children aged <13 years

Of AIDS cases reported during 2007, 20% were in Hispanic/Latino adults and adolescents.

*Hispanics/Latinos can be of any race.
†High-risk heterosexual contact with a person known to have, or to be at high risk for, HIV infection.
Women and HIV

American Red Cross

Sex

prevention
Proportion of AIDS Cases among Female Adults and Adolescents, by Transmission Category 2006—United States and Dependent Areas

- Sex with injection drug user: 11%
- Injection drug use: 24%
- Other/not identified: 2%
- Sex with men of other or unspecified risk factor: 62%
- High-risk heterosexual contact*: 73%

*Heterosexual contact with a person known to have, or to be at high risk for, HIV infection.
†Includes blood transfusion, perinatal exposure, and risk factor not reported or not identified.
‡Includes sex with a bisexual male, a person with hemophilia, and HIV-infected transfusion recipient, or an HIV-infected person with an unspecified risk factor.

Note: Data have been adjusted for reporting delays and cases without risk factor information were proportionally redistributed.
Estimated Number and Proportion* of AIDS Cases among Female Adults and Adolescents 1985–2006—United States and Dependent Areas

Note. Data have been adjusted for reporting delays.
*Proportion of all cases that were diagnosed among females.
Reported AIDS Cases among Adults and Adolescents by Sex and Race/Ethnicity, 2007—United States and Dependent Areas

Includes Asian and Pacific Islander legacy cases.
*Hispanics/Latinos can be of any race
†Includes persons of unknown race or multiple races.
Proportion of HIV/AIDS Cases and Population among Female Adults and Adolescents, by Race/Ethnicity 2006—33 States

HIV/AIDS cases N = 9,252*
- 1% White, not Hispanic
- 15% Black, not Hispanic
- 18% Hispanic
- 65% Asian/Pacific Islander
- <1% American Indian/Alaska Native

Female Population, 33 States N = 80,394,944
- 71% White, not Hispanic
- 11% Black, not Hispanic
- 13% Hispanic
- 1% Asian/Pacific Islander
- 3% American Indian/Alaska Native

Note: Data include persons with a diagnosis of HIV infection regardless of their AIDS status at diagnosis. Data from 33 states with confidential name-based HIV infection reporting since at least 2003. Data have been adjusted for reporting delays. *Includes 412 female adults and adolescents of unknown race or multiple races.
### Estimated Number of HIV/AIDS Cases and Rates for Female Adults and Adolescents, by Race/Ethnicity

2006—33 States

<table>
<thead>
<tr>
<th>Race/Ethnicity</th>
<th>Cases</th>
<th>Rate (cases per 100,000 population)</th>
</tr>
</thead>
<tbody>
<tr>
<td>White, not Hispanic</td>
<td>1,664</td>
<td>2.9</td>
</tr>
<tr>
<td>Black, not Hispanic</td>
<td>6,033</td>
<td>56.2</td>
</tr>
<tr>
<td>Hispanic</td>
<td>1,400</td>
<td>15.1</td>
</tr>
<tr>
<td>Asian/Pacific Islander</td>
<td>79</td>
<td>3.2</td>
</tr>
<tr>
<td>American Indian/Alaska Native</td>
<td>35</td>
<td>4.6</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>9,252</td>
<td>11.5</td>
</tr>
</tbody>
</table>

Note: Data include persons with a diagnosis of HIV infection regardless of their AIDS status at diagnosis. Data from 33 states with confidential name-based HIV infection reporting since at least 2003. Data have been adjusted for reporting delays. *Includes 41 female adults and adolescents of unknown race or multiple races.
<table>
<thead>
<tr>
<th>Case Type</th>
<th>Number of Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cases living with AIDS</td>
<td>2802</td>
</tr>
<tr>
<td>Total AIDS Cases (living and deceased)</td>
<td>4764</td>
</tr>
</tbody>
</table>
Figure 2. Cumulative AIDS Cases by Area Development District (ADD) of Residence at Time of Diagnosis through December 31, 2007

Cumulative AIDS Cases by ADD

- 34 - 96
- 97 - 189
- 190 - 393
- 394 - 916
- 917 - 2209

[Map showing cumulative AIDS cases by ADD across different districts in Kentucky, with specific numbers for each region indicated.]
Figure 1. Kentucky AIDS Cases by Year of Report and Year of Diagnosis, 1993-2005*
Figure 3. Percentage of Cumulative Kentucky AIDS Cases by Sex as of December 31, 2007

- Female: 15%
- Male: 85%

N=4,764
African Americans represent approximately 7.5% of the general Kentucky population. African American cases are up from 29% in 2002.
Figure 9. Percentage of Cumulative Kentucky Adult/Adolescent AIDS Cases by Transmission Category through December 31, 2007

- MSM: 55%
- IDU: 14%
- MSM/IDU: 6%
- Heterosexual: 16%
- Hemophilia: 2%
- Transfusion: <1%
- Undetermined: 7%

N=4,730
BCC Patient Statistics
Patient Race 2006

- White: 78%
- Black: 17%
- Hispanic: 5%
Patient Gender 2006

- Female: 19%
- Transgender: 1%
- Male: 80%
Patient Age 2006

- 25-44 yrs: 58%
- 45-64 yrs: 36%
- 65 years or older: 2%
- 0-2 yrs: 0%
- 2-12 yrs: 1%
- 13-24 yrs: 3%
## CADR 2002- 2006

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSM</td>
<td>282</td>
<td>289</td>
<td>311</td>
<td>343</td>
<td>378</td>
</tr>
<tr>
<td>IDU</td>
<td>48</td>
<td>37</td>
<td>33</td>
<td>33</td>
<td>32</td>
</tr>
<tr>
<td>MSM &amp; IDU</td>
<td>8</td>
<td>15</td>
<td>15</td>
<td>17</td>
<td>19</td>
</tr>
<tr>
<td>Hemophilia/coagulation disorder</td>
<td>12</td>
<td>8</td>
<td>7</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>Heterosexual</td>
<td>108</td>
<td>137</td>
<td>151</td>
<td>178</td>
<td>193</td>
</tr>
<tr>
<td>Receipt of Transfusion of blood</td>
<td>12</td>
<td>9</td>
<td>10</td>
<td>15</td>
<td>13</td>
</tr>
<tr>
<td>Perinatal Transmission</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>Other</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Undetermined/Unknown</td>
<td>9</td>
<td>10</td>
<td>12</td>
<td>16</td>
<td>20</td>
</tr>
</tbody>
</table>
Conclusion:

- HIV/AIDS Continues
- HIV transmission trends
  - Heterosexual risk factor has increased
  - Increase in those <25 yrs
- Racial/Ethnic minorities
  - ~Half of those with HIV/AIDS are African American
- Women
  - Women of color are affected most
- Kentucky is part of the epidemic
Modes of Transmission of HIV/AIDS
The most common methods of transmission of HIV are:

- Unprotected sex with an infected partner
- Sharing needles with infected person

Almost eliminated as risk factors for HIV transmission are:

- Transmission from infected mother to fetus
- Infection from blood products
HIV SCREENING AND TESTING

Know your HIV status?
Text: Your Zip Code
To: KnowIt or 566948
To find HIV Test Centers near you.

www.hivtest.org
“Routine HIV testing urged for nearly all Americans. Early detection would cut rate of infection, AIDS experts say”
Assoc Press, Feb 2005
CDC: Screening
Sept 2006

- 13-64 yrs of age-opt-out testing
- Those at high risk -yearly
- Incorporate into routine medical care
- Prevention counseling/written consent not recommended
- Pregnant women
  - Opt-out testing
  - Repeat screening in 3rd trimester in areas with high rates of HIV infection among pregnant women
CDC: Make HIV tests part of routine medical care for all Americans 13-64

- 250,000 people may be infected and not know
- Treatment results in improved health
- Routine HIV testing may decrease transmission (changes in sexual behavior when tested+)
- Routine testing may reduce stigma
## Awareness of HIV Status among Persons with HIV, United States

<table>
<thead>
<tr>
<th>Category</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number HIV infected</td>
<td>1,039,000 – 1,185,000</td>
</tr>
<tr>
<td>Number unaware of their HIV infection</td>
<td>252,000 - 312,000 (24%-27%)</td>
</tr>
<tr>
<td>Estimated new infections annually</td>
<td>40,000</td>
</tr>
</tbody>
</table>

*Glynn M, Rhodes P.  2005 HIV Prevention Conference*
New CDC/JAMA Data released of 08.06.08
The New Estimates

U.S. HIV Epidemic Worse Than Previously Known

According to the new surveillance system, approximately 56,300 new HIV infections occurred in the United States in 2006. This number is approximately 40% higher than CDC's previous estimate of 40,000 new infections per year, which was based on less precise methods (see box on page 5).
### Source of HIV Tests and Positive Tests

- 38% - 44% of adults age 18-64 have been tested
- 16-22 million persons age 18-64 tested annually in U.S.

<table>
<thead>
<tr>
<th>Source</th>
<th>HIV tests*</th>
<th>HIV+ tests**</th>
</tr>
</thead>
<tbody>
<tr>
<td>Private doctor/HMO</td>
<td>44%</td>
<td>17%</td>
</tr>
<tr>
<td>Hospital, ED, Outpatient</td>
<td>22%</td>
<td>27%</td>
</tr>
<tr>
<td>Community clinic (public)</td>
<td>9%</td>
<td>21%</td>
</tr>
<tr>
<td>HIV counseling/testing</td>
<td>5%</td>
<td>9%</td>
</tr>
<tr>
<td>Correctional facility</td>
<td>0.6%</td>
<td>5%</td>
</tr>
<tr>
<td>STD clinic</td>
<td>0.1%</td>
<td>6%</td>
</tr>
<tr>
<td>Drug treatment clinic</td>
<td>0.7%</td>
<td>2%</td>
</tr>
</tbody>
</table>

*National Health Interview Survey, 2002
**Suppl. to HIV/AIDS surveillance, 2000-2003
Late HIV Testing is Common
Supplement to HIV/ AIDS Surveillance, 2000-2003

• Among 4,127 persons with AIDS*, 45% were first diagnosed HIV-positive within 12 months of AIDS diagnosis ("late testers")

• Late testers, compared to those tested early (>5 yrs before AIDS diagnosis) were more likely to be:
  - Younger (18-29 yrs)
  - Heterosexual
  - Less educated
  - African American or Hispanic

*16 states
Reasons for testing: late versus early testers

Supplement to HIV/AIDS Surveillance, 2000-2003

- Late (Tested < 1 yr before AIDS dx)
- Early (Tested >5 yrs before AIDS dx)

Reasons for testing:
- Illness
- Self/partner at risk
- Wanted to know
- Routine check up
- Required
- Other
Public Health Need for Rapid HIV Tests

- High rates of non-return for test results
  - *In 2000, 31% did not return for results of HIV-positive conventional tests at publicly funded sites*
- Need for immediate information or referral for treatment choices
  - Perinatal settings
  - Post-exposure treatment settings
- Screening in high-volume, high-prevalence settings
## Four FDA-approved Rapid HIV Tests

<table>
<thead>
<tr>
<th></th>
<th>Sensitivity (95% C.I.)</th>
<th>Specificity (95% C.I.)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>OraQuick Advance</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- whole blood</td>
<td>99.6 (98.5 - 99.9)</td>
<td>100 (99.7-100)</td>
</tr>
<tr>
<td>- oral fluid</td>
<td>99.3 (98.4 - 99.7)</td>
<td>99.8 (99.6 – 99.9)</td>
</tr>
<tr>
<td>- plasma</td>
<td>99.6 (98.5 - 99.9)</td>
<td>99.9 (99.6 – 99.9)</td>
</tr>
<tr>
<td><strong>Uni-Gold</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>99.7 (99.0 – 100)</td>
<td>99.7 (99.0 – 100)</td>
</tr>
<tr>
<td><strong>Recombigen</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- whole blood</td>
<td>100 (99.5 – 100)</td>
<td>99.7 (99.0 – 100)</td>
</tr>
<tr>
<td>- serum/plasma</td>
<td>100 (99.5 – 100)</td>
<td>99.8 (99.3 – 100)</td>
</tr>
<tr>
<td>Four FDA-approved Rapid HIV Tests</td>
<td>Sensitivity (95% C.I.)</td>
<td>Specificity (95% C.I.)</td>
</tr>
<tr>
<td>----------------------------------</td>
<td>------------------------</td>
<td>------------------------</td>
</tr>
<tr>
<td><strong>Reveal G2</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>serum</td>
<td><strong>99.8 (99.2 – 100)</strong></td>
<td><strong>99.1 (98.8 – 99.4)</strong></td>
</tr>
<tr>
<td>plasma</td>
<td><strong>99.8 (99.0 – 100)</strong></td>
<td><strong>98.6 (98.4 – 98.8)</strong></td>
</tr>
<tr>
<td><strong>Multispot</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>serum/plasma</td>
<td><strong>100 (99.9 – 100)</strong></td>
<td><strong>99.9 (99.8 – 100)</strong></td>
</tr>
<tr>
<td>HIV-2</td>
<td><strong>100 (99.7 – 100)</strong></td>
<td></td>
</tr>
</tbody>
</table>
Confirmatory Testing

- Confirmatory test is essential (not just EIA)

- For Western blot:
  - Venipuncture for whole blood
  - Oral fluid specimen

- Follow-up testing of persons with negative or indeterminate Western blot results after 4 weeks
HIV Testing Practices in EDs

• Survey of 95 Academic EDs

• For patients with suspected STDs:
  • 93% screen for gonorrhea
  • 88% screen for chlamydia
  • 58% screen for syphilis
  • 3% screen for HIV

HIV Testing Practices in EDs

- Survey of 154 ED providers
  - Average: 13 STD patients per week
  - Only 10% always recommend HIV test
- Reasons for not testing for HIV:
  - 51% concerned about follow up
  - 45% not a “certified” counselor
  - 19% too time-consuming
  - 27% HIV testing not available

-Fincher-Mergl et al, 2002: AIDS Pat Care STDs
Consent to test

- No person can test for HIV w/o informed consent
- Consent is given if:
  - Person signs a general consent form for medical procedures w/testing included
  - In an emergency when consent can not be reasonably obtained
  - HOWEVER:
    - Results must be confidential & used for diagnostic or medical treatment only
    - Physician is responsible for informing patient of a positive test & providing information, counseling
KY HIV/AIDS Reporting requirements

- Physicians & Medical Laboratories must report:
  - A positive test result within 5 business days
  - CD4+ assay
  - HIV detectable Viral Load Assay
  - A positive serological test result
  - A diagnosis of AIDS that meets the proper criteria and use the proper forms
RECOGNIZING ACUTE HIV
Acute Retroviral Syndrome

- 40 to 90% of acutely infected pts will experience symptoms
- Often not recognized by clinicians
- Can be asymptomatic
- Providers need to maintain a high level of suspicion of acute HIV

Guidelines for the Use of Antiretroviral Agents in HIV-1 Infected Adults and Adolescents
Definitions

• **Primary HIV**
  – Initial phase (up to 6 mo after acquisition)
  – Characterized by a transient period of unchecked viral replication followed by destruction of memory CD4+ T cells

• **Acute HIV**
  – Transient symptomatic illness
  – Lasts about 2-4 weeks.
  – High-titer HIV-1 replication
  – Detectable HIV RNA with negative or indeterminate HIV antibody test
28 year old male presents to your office:

- 5 day history of fever (101), sore throat, headache, sores on tongue, rash
- Exam:
  - Diffuse adenopathy
  - Exudative pharyngitis
  - Aphthous ulcers
  - Rash-macular, erythematous, non-pruritic
  - Mild splenomegaly
Oral Ulcers in Acute HIV Infection

Differential?
Acute HIV DDX

- Influenza
- Epstein-Barr virus mononucleosis
- Severe (streptococcal) pharyngitis
- Primary/Secondary syphilis
- Primary CMV infection
- Toxoplasmosis
- Drug reaction
- Viral hepatitis
- Primary HSV infection
- Rubella
- Brucellosis
- Malaria
- West Nile Virus
Acute Retroviral Syndrome

- Fever-96%
- Adenopathy-74%
- Pharyngitis-70%
- Rash-70%
- Myalgia/arthralgia-54%
- Diarrhea-32%

- Headache-32%
- Nausea/vomiting-27%
- Hepatosplenomegaly-14%
- Weight loss-13%
- Thrush-12%
- Neurologic symptoms-12%
Other Signs and Symptoms

- Aseptic meningitis
- Oral and genital lesions
- Fatigue
- Retro-orbital pain
- Night Sweats
- Thrombocytopenia
- Leukopenia
- Transaminitis
WHAT QUESTIONS MIGHT YOU ASK?
Areas to Assess

- Exposure to blood
- Substance abuse
- Sexual behaviors
- Other pertinent health history
The Process

- Assure confidentiality
- Be non-judgmental
- Imbed into the comprehensive assessment
- Ask less threatening questions first
### Exposure Risks (average, per episode, involving HIV-infected source patient)

<table>
<thead>
<tr>
<th>Activity</th>
<th>Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percutaneous (blood)</td>
<td>0.3%</td>
</tr>
<tr>
<td>Mucocutaneous (blood)</td>
<td>0.09%</td>
</tr>
<tr>
<td>Receptive anal intercourse</td>
<td>0.3 - 3%</td>
</tr>
<tr>
<td>Insertive anal intercourse</td>
<td>0.06%</td>
</tr>
<tr>
<td>Receptive vaginal intercourse</td>
<td>0.1 – 0.2%</td>
</tr>
<tr>
<td>Insertive vaginal intercourse</td>
<td>0.03 – 0.14%</td>
</tr>
<tr>
<td>Receptive oral (male)</td>
<td>0.06%</td>
</tr>
<tr>
<td>Female-female orogenital</td>
<td>4 case reports</td>
</tr>
<tr>
<td>IDU needle sharing</td>
<td>0.67%</td>
</tr>
<tr>
<td>Vertical (no prophylaxis)</td>
<td>24%</td>
</tr>
</tbody>
</table>
Sexual behaviors

- Are you now or have you ever been sexually active?
- Do you have sex with men, women, or both?
- Do you know about the sexual activities of your partner(s)?
- Have you ever had anonymous sex?
- Have you ever exchanged sex for money or drugs?
DON’T SAY:

• You don’t have sex, do you?
• So, you’re monogamous with your spouse, right?
• You’re married? Then you aren’t at risk for HIV, are you?
<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Partners</td>
</tr>
<tr>
<td>2.</td>
<td>Sexual Practices</td>
</tr>
<tr>
<td>3.</td>
<td>Past STDs</td>
</tr>
<tr>
<td>4.</td>
<td>Pregnancy History</td>
</tr>
<tr>
<td>5.</td>
<td>Protection from STDs</td>
</tr>
</tbody>
</table>
Diagnosis
Why do we Care about Diagnosing PHI?

• Public Health:
  – Patients with PHI are likely to be highly infectious
  – Diagnosis of HIV infection may lead to safer sex

• Personal Health
  – 40% of patients with HIV not diagnosed until they have AIDS
  – Antiretroviral therapy (ART) during PHI may alter the natural course of HIV disease
Diagnostic Testing: HIV Antibody

- The gold standard for diagnosis of HIV infection when used with confirmatory Western Blot

- Problems with Acute HIV
  - Antibody conversion typically 22-27 days following infection

**Acute HIV Infection: Laboratory Testing**

- Detectable HIV RNA (>10,000c/ml)
- Negative or indeterminate HIV AB
- Low-positive HIV RNA <10,000 copies/ml may be false positive
- If diagnosis is made by HIV RNA testing, confirmatory serologic testing should be performed subsequently (Elisa and Western Blot)
Diagnostic Testing: Viral Load

• More sensitive than HIV antibody or p24 Ag test\(^3\) in Acute HIV
• Positive 1 to 3 weeks before antibody test\(^1\)
• Typically high level, greater than 50,000-100,000 copies/mL\(^2,3\)
• False positives can occur
  – Most false positives are low level(<10,000 copies/mL)
  – HIV VL <10,000 copies/mL should probably be considered “indeterminate”

Detection of HIV by Diagnostic Tests

- Symptoms
- p24 Antigen
- HIV RNA
- HIV EIA*
- Western blot

Weeks Since Infection

*3rd generation, IgM-sensitive EIA
*2nd generation EIA
*viral lysate EIA

After Fiebig et al, AIDS 2003; 17(13):1871-9
Diagnostic Test

- HIV RNA
  - 100,000
  - 10,000
  - 1,000
  - 10
- P24 +
- Ab
- +
- -

Exposure

Symptoms

Days
0 20 30 40 50

HIV-1 Antibodies
1 mil
100,000
10,000
1,000
100
10
10
Acute HIV Infection: Treatment

Possible Benefits:
- Decrease the severity of acute disease
- Alter the viral “set point”
- Reduce the rate of mutation
- Preserve immune function
- Reduce risk of viral transmission

Possible Risks:
- Drug-related toxicity
- Earlier emergence of drug resistance
- Limitation of future treatment options
- Potential need for indefinite treatment
- Adverse effects on quality of life
Primary HIV Infection: Conclusions

- PHI is under-diagnosed
- May represent a critical opportunity to intervene
- A high index of suspicion, recognition of key signs & symptoms, and lab testing are required for the diagnosis
- Treatment is controversial
Volt - the unit of electric potential force. Force required to send 1 ampere of current through 1 ohm of resistance.

Current - the unit of current. The current which 1 watt can send through a resistance of 1 ohm.

Ohm - the unit of resistance. The resistance offered to the passage of current through 1 volt.

Coulomb - the unit of quantity of current. The quantity of current which circulates by 1 ampere per 1 second.

Farad - the unit of capacity. The capacity of a conductor or container which will hold one coulomb under the pressure of 1 volt.

Watt - the unit of power. The power to do work when 1 ampere of current flows through 1 ohm under the pressure of 1 volt.

Joule - the unit of work. The work done by one watt in one second.
Chronic HIV Disease

- Individuals known to be at risk for HIV infection should be screened for antibodies on a regular basis (minimum is yearly).
- Patients may remain asymptomatic (clinical latency) for 2-8 years before they present for medical care.
- At about 8 years, constitutional symptoms begin to appear.
Chronic HIV Disease

• Late stage disease
  – CD4 count <200 cells
  – Development: opportunistic infections, selected tumors, wasting, and neurologic complications

• Untreated person
  – Median survival after the CD4 has fallen to <200, is 3.7 years.

• Untreated person,
  – CD4 count at the time of the first AIDs defining illness is 60-70 cells, and the median survival is 1.3 years.
LIVING WITH CHRONIC HIV
Chronic HIV Disease

Figure 6. Natural history of HIV-1 infection.
AIDS Defining Conditions

- M.A.C./M Kansasii-disseminated
- Cryptococcal disease
- PCP
- HIV dementia
- Histoplasmosis extrapulm.
- Cervical Cancer
- Cryptosporidiosis/Isosporiasis
- HSV-bronchitis, pneumonitis, esophagitis, ulcer (>1mo)
- Salmonella septicemia
- Lymphoma
- Toxoplasmosis
- PML
- CMV
- Kaposi’s sarcoma
- Candidiasis-esophagus, trachea, bronchi, lungs
- Wasting syndrome
- Coccidioidomycos, extrapulmonary
- Mycobacteria. Tb
- Bacterial Pneumonia (>2/yr)
Opportunistic Infections
Introduction

- OIs cause substantial morbidity and mortality
- Incidence is lower among patients on effective ART, but OIs remain an important cause of illness in those with suboptimal response to ART
Effect of ART on the Incidence and Management of OIs

- ART is key to reducing morbidity associated with HIV
- ART reduces incidence of OIs and improves survival,
- Reduces overall mortality in HIV infection
- Improvement in immune function can resolve or lessen the severity of certain OIs
Correlation of Complications with CD4 Cell Counts

- 200-500 CD4
- Bacterial pneumonias
- Pulmonary TBC
- Kaposi’s sarcoma
- Oral Hairy Leukoplakia
- B-cell lymphoma
- ITP
- Cervical cancer
Correlation of Complications with CD4 Cell Counts <200

- PCP
- Disseminated histoplasmosis and Coccidioidomycosis
- Cardiomyopathy
- Miliary TBC
- PML
- Wasting
- Dementia
- NHL
Correlation of Complications with CD4 Cell Counts

- <100
  - Disseminated HSV
  - Toxoplasmosis
  - Cryptococcus
  - Cryptosporidiosis
  - Candida esophagitis
  - Microsporidiosis

- <50
  - Disseminated CMV
  - Disseminated MAI
  - CNS lymphoma
Selected Points to Remember About Opportunistic Infections

- PCP is the most common AIDS-defining infection
- Oropharyngeal candidiasis is frequent in HIV+ persons, even early stages on
Seborrheic Dermatitis                      Kaposi’s Sarcoma
Bacterial Disease:

- Rates much higher than in HIV uninfected

Organisms:

- *S. pneumoniae*
  - >150 times more common than in HIV uninfected
  - Recurrence in 8-25% within 6 months

- *H. influenzae*
  - 40 times more common in HIV infected

- *P. aeruginosa*

- *S. aureus*
Mycobacterium Avium Complex
Disseminated MAC:

- CD4 count < 50/mm³
- Symptoms:
  - Fever, night sweats, weight loss, fatigue, diarrhea, abdominal pain
- Physical exam or imaging:
  - Hepatomegaly, splenomegaly, or lymphadenopathy
- Laboratory:
  - Anemia, elevated liver alkaline phosphatase
• Subacute onset, days-weeks
• Exertional dyspnea, fever, nonproductive cough
• Chest exam
  – Normal, diffuse dry rales, tachypnea, tachycardia (especially with exertion)
• X-ray
  – Bilateral, interstitial symmetrical infiltrates, can be normal
  – Pneumothorax is relatively common
  – Atypical: blebs, nodules and cysts
• CT scan: ground glass attenuation
  – Negative thin-section does not exclude PCP
Candidiasis

- Erythematous
- Pseudomembranous
Cryptococcosis:

Cerebrospinal fluid with *C. neoformans*, India ink stain. Budding yeast indicated by arrow.

Credit: Images courtesy AIDS Images Library
www.aidsimages.ch
Histoplasmosis:

- Disseminated multiorgan disease: fever, fatigue, weight loss
  - Respiratory symptoms in 50%
- Isolated pulmonary disease: usually with higher CD4 count
- CNS, GI, and skin manifestations possible
- Can have pancytopenia
Histoplasmosis:

Acute disseminated histoplasmosis, chest x-ray (L) and CT scan (R)

Credit: Images courtesy AIDS Images Library
www.aidsimages.ch
Histoplasmosis:

Credit: Image courtesy AIDS Images Library
www.aidsimages.ch
THINK HERPES SIMPLEX!
**Herpes Simplex Virus Disease:**

- HSV-1: prevalence 80% among adults in United States
- HSV-2: prevalence 22% among persons aged $\geq 12$ years in United States
- 95% of HIV-infected persons are seropositive for either HSV-1 or HSV-2
- Risk with HIV is 15 to 25x greater than population
- In HIV, more severe, more likely to disseminate, more likely to be refractory or acyclovir-resistant
Varicella Zoster Virus

Disease:

- Herpes zoster (shingles): prodrome of pain in affected dermatome, then characteristic skin lesions in same dermatome
**Toxoplasma gondii**

**Encephalitis**

- Focal encephalitis with headache, confusion, or motor weakness and fever
- Focal neurological abnormalities
- Seizures, altered mental status, coma
**Toxoplasma gondii** Encephalitis:

- **Imaging**
  - MRI of brain: often multiple contrast-enhancing lesions, often with edema
  - PET or SPECT may help distinguish TE from lymphoma

- **Detection of organism** (brain biopsy)

- **CSF PCR** 50% sensitive

Credit: P. Volberding, MD, UCSF Center for HIV Information Image Library
Conclusions

• Opportunistic Infections still exist
• OI can be the presenting diagnosis of HIV infected patients
• Providers must remain vigilant
Exposure Control Plan:

– Must be established by any employer having employees with occupational exposure
– Must be reviewed & updated at least annually
– Must include schedule and implementation for:
  • Exposure Determination
  • Methods of Compliance
  • HIV & HBV Research Laboratories & Production Facilities
  • Hepatitis B Vaccination & Post-Exposure Evaluation & Follow-up
  • Communication of Hazards to Employees
  • Recordkeeping, of this standard
  • Procedure for the evaluation of circumstances surrounding exposure incidents
– Designed to eliminate or minimize exposure
HIV transmission
Post Exposure Prophylaxis
Five Basic principles should govern management after occupational exposure:

- Treatment should be immediately available.
- Exposure should be confirmed.
- A PEP regimen with best chance of adherence should be selected.
- Adverse effects should be anticipated, monitored and treated.
Which of the following body substances most easily transmits HIV?

1. Feces and saliva
2. Blood
3. Breast milk and tears
4. Vaginal secretions and urine
Transmission

- Sexual transmission
- Blood and blood products
- Breast milk
- Occupational transmission of HIV: health care and laboratory workers
- Maternal - fetal/infant transmission
- Other body fluids if BLOODY
Transmission

- Tears, urine (neither implicated in transmission)
- Saliva (only implicated through oral sex)
Mode of transmission

- Sexual intercourse and oral sex
- Bidirectional transmission
  * male to female ~1 in 500 exposures
  * female to male less efficient ~1 in 1000 exposures
Mode of transmission

- Sexual intercourse and oral sex
  - Cofactors for transmission
    - Syphilis, genital ulcers, traumatic intercourse, inflammatory genital tract diseases, uncircumcised male
Mode of transmission

- Perinatal
  - 25% transmission in absence of prophylaxis
  - Transmission via breast milk correlated with viral load
- Household exposure
  <10 cases
  - All cases with risk of blood or body fluid exposures
Mode of transmission

Occupational Exposure

• HIV transmission
  – 20/6135 cases (0.335%)
• Mucosal HIV exposure
  – 1/1143 (0.09%)
• Intact skin exposure
  – 0/2712
• Occupational exposure
  - High risk exposure: hollow bore needle, visible blood on needle or device, deep puncture, device used in blood vessel, advanced disease in source patient
  - Risk of transmission: 0.3%
  - 57 confirmed and 139 possible transmissions
Mode of transmission
Occupational Needlestick Exposure

- Deep Injury Odds Ratio 15
- Visible Blood in a device OR 6.2
- Needle in a artery or vein OR 4.3
- Advanced HIV OR 5.6
• Clean the exposed site with an antiseptics
• Irrigate the eyes with copious amount of water
• No evidence that squeezing the wound reduces the risk of transmission
Case: Occupational Exposure

- A 32 yo female ICU nurse is starting an IV on a patient with advanced HIV
- As she inserts the needle and accesses the vein, the patient jerks and the needle punctures her forearm
Q. You evaluate her and decide that

1. This is a high risk exposure
2. This is a low risk exposure
High Risk Factors

- Larger quantity of blood
  - Hollow bore needle
  - Needle visibly contaminated with blood
  - Needle in vein or artery
  - Deep injury
- Source with terminal illness
  - Plasma viral load
Q. You tell her the risk of HIV transmission with a needlestick is

1. 1/333 (0.3%)
2. 1/500 (0.2%)
3. 1/100 (1%)
4. 1/1000 (0.1%)
Rule of 3

- The rate of Hepatitis B transmission with a needlestick is 30%
- Hepatitis C 3%
- HIV 0.3%
Estimate of Risk

Percutaneous exposure to blood: 0.3%
Mucous membrane exposure to blood: 0.09%
Nonintact skin exposure to blood: < 0.09%
Other body fluids exposure: less than blood risk
You decide she should receive HIV PEP. Which of the following would be important in determining the status of the source patient:

1. CD4 cell count
2. HIV viral load
3. ART history
4. Resistance history
5. Clinical status of the patient
6. All of the above
Source Assessment: Laboratory Testing

• Do not delay PEP while awaiting source patient laboratory results. The decision to start PEP is based on the clinical risk assessment.

• Consider testing options:
  – rapid vs standard HIV antibody test kit
  – antibody testing vs direct virus assay
  – no option currently to test discarded needles
Timing of PEP

- 1-2 hours
- 24 hours
- 72 hours
- 1 week (or more?)

- Start as soon as possible
- Efficacy decreases as time passes
- Do not delay pending test results
Source Assessment: Laboratory Testing

- Rapid EIA should be considered.
  - A negative result allays anxiety and prevents overuse of PEP
  - All positive tests must be confirmed with a Western Blot
Source Assessment: Laboratory Testing

• Standard EIA may be preferred, especially if it can be performed in 24-48 hours.

• Direct virus assays (p24 or viral load) not recommended, unless source is suspected to be in the window period.
  – Not standardized for diagnosis.
  – High false positive rate (2-5%).
Timing of ART

• Preferably within hours rather than days
  - animal studies less benefit if >48 hours from exposure
• 28 days PEP
  - 17~47% HCW did not complete 28 days
• Discontinue if source patient found to be HIV negative
Antiretroviral
Choices

- Basic 2-drug PEP
  - AZT (d4T or TDF)+ 3TC (FTC)
- Expanded 3-drug PEP (PI based)
  - LPV/r preferred, tAPV, tDV/r, SQV/r, NFV
  - EFV if PI resistance
- Avoid
  - ABC, DLV, NVP, ddC
- Pregnant or breast feeding
  - HCW avoid
  - EFV, IDV, ddI+d4T
Immediately after giving the injection, a nurse is accidentally stuck with the needle when a patient became agitated. When is the best time for the employer to test the nurse for HIV antibodies to determine if she became infected as a result of the needle stick?

1. Immediately and then again in 6 weeks
2. Immediately and then again in 3 months
3. Immediately, in 6 weeks, 12 weeks, and in 6 months
4. In 6 weeks and then in 1 year
Follow up of PEP

- All exposed HCW
  - Follow up counseling, postexposure test
  - HIV Ab testing at 6 weeks, 12 weeks, and 6 months
- If PEP given
  - CBC, CMP at baseline and 2 weeks
Occupational exposure

- 25 yo nurse is splashed in her eye and mouth with urine from a patient with advanced AIDS
- The patient was recently diagnosed with PML.
- His current CD4 count is 10 and VL is 100,000.
- His current ART is AZT/3TC/Kaletra.
You recommend:

1. Wait until you get the source genotype before starting PEP
2. Start PEP with AZT/3TC/EFV
3. She does not need PEP
4. Start PEP with AZT/3TC/Kaletra
Occupational Exposure

- Feces, nasal secretions, saliva, sputum, sweat, tears, urine, and vomitus are not considered potentially infectious unless they are visibly bloody;
- The risk for transmission of HIV infection from these fluids and materials is low. MMWR 2005
Risk of Occupational Exposure to HIV

- Mucosal contact, contact with broken skin
  - Transmission by this route has been documented (pooled risk estimate: 0.1%)

- Bite wound
  - Not quantified. Possible route of transmission in 2 cases of non-occupational exposure.

- Infectious Material
  - Documented: Blood, blood products, bloody fluids, breast milk
  - Possible: Cerebrospinal fluid, exudates, serosal fluids, amniotic fluid
  - Unlikely: Saliva, urine, feces
• Never recap needles, only use one hand
• Dispose of all sharps and contaminated supplies in designated containers
• Beware of sharps, all the time
Conclusions

• Consult with an expert
• Regimens should be chosen to minimize potential drug toxicities and maximize adherence
• Consider history and resistance of the source person
• Timing: the sooner the better, but interval beyond which there is no benefit is unclear
National Clinicians’ Post-Exposure Prophylaxis Hotline (PEPline)

888 / HIV-4911
888 / 448 - 4911

24-hours/day

www.cdc.gov
www.hivatis.org
Initial Evaluation
Antiretrovirals
Therapeutic Arsenal

- Nucleoside Reverse Transcriptase Inhibitors (NRTIs)
- Non-nucleoside Reverse Transcriptase Inhibitors (NNRTIs)
- Protease Inhibitors (PIs)
- Nucleotide Reverse Transcriptase Inhibitors
- Fusion Inhibitors
- Co-receptor antagonists
- Integrase Inhibitors
Nucleoside Reverse Transcriptase Inhibitors (NRTIs)

- Inhibit reverse transcriptase enzyme
- Plagued with drug resistance and intra-class resistance
- Multiple newer combination drug products
Nucleoside Reverse Transcriptase Inhibitors (NRTIs)

- **Zidovudine** (AZT, Retrovir®) - Marrow suppression
- **Didanosine** (ddI, Videx EC®) - Peripheral neuropathy
- **Stavudine** (d4T, Zerit®) - Peripheral neuropathy
- **Lamivudine** (3TC, Epivir®) - Headache, Nausea
- **Emtricitabine** (FTC, Emtriva®) - Headache, Nausea
- **Abacavir** (ABC, Ziagen®) - Hypersensitivity

Combivir® - AZT/3TC
Trizivir® - AZT/3TC/ABC
Truvada® - FTC/TF
Epzicom® - 3TC/ABC
• Tenofovir (Viread®)
  – 300 mg PO QD
  – Efficacy against Hepatitis B
  – Nausea/vomiting
Nucleotide Reverse Transcriptase Inhibitors

- Inhibit reverse transcriptase enzyme
- Requires less intracellular phosphorylation and activation
- Less amenable to resistance
- Salvage therapy
Non- nucleoside Reverse Transcriptase Inhibitors

- Structurally distinct from the NRTIs
- Resistance remains a problem as does cross-resistance
Non-nucleoside Reverse Transcriptase Inhibitors

Nevirapine (Viramune®)
200mg qd X 2 weeks
Rash, Diarrhea
then 200mg BID

Delavirdine (Rescriptor®)
400mg TID
Rash, Headache

Efavirenz (Sustiva®)
600mg Qhs
Rash, CNS Disengagement

Etravirine (Intelence)
200mg BID
Atripla®
Emtricitabine 200 mg +
Tenofovir 300 mg +
Efavirenz 600 mg

- First triple therapy single pill option
- Gold standard?
- Unprecedented manufacturer cooperation
- Cost comparable
- Single co-pay?
- 1 PO Qhs
Protease Inhibitors

- Among the most potent of the antiviral medications
- Resistance develops quickly, especially in cases of non-adherence
- Wide intra-class resistance
- Boosting
Protease Inhibitors

**Saquinavir (Invirase®)**
500mg BID
Nausea, vomiting, diarrhea

**Ritonavir (Norvir®)**
600mg BID
D/I, GI distress, perioral tingling

**Indinavir (Crixivan®)**
800mg q8h
Nephrolithiasis, increased bilirubin

**Nelfinavir (Viracept®)**
1250mg BID
Diarrhea, nausea
# Protease Inhibitors

<table>
<thead>
<tr>
<th>Name</th>
<th>Dose/Details</th>
<th>Side Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lopinavir/Ritonavir (Kaletra ®)</td>
<td>2 Caps BID</td>
<td>Nausea, Hyper TG, diarrhea</td>
</tr>
<tr>
<td>Fosamprenavir (Lexiva®) (variable)</td>
<td>700mg BID</td>
<td>Nausea, diarrhea</td>
</tr>
<tr>
<td>Atazanavir (Reyataz®)</td>
<td>400mg QD</td>
<td>Increased bilirubin</td>
</tr>
<tr>
<td>Tipranavir (Aptivus®) (boosted)</td>
<td>500mg BID</td>
<td>Nausea, diarrhea</td>
</tr>
<tr>
<td>Darunavir (Prezista®) (boosted)</td>
<td>600mg BID</td>
<td>Nausea, diarrhea</td>
</tr>
</tbody>
</table>
**Fusion Inhibitors**

- **Enfurvitide (Fuzeon®)**
  - 90mg SQ BID
  - $$
  - Injection site reactions
  - Salvage therapy
Co-Receptor Antagonists

- AKA “chemokine receptor blockers”
- Block either CCR5 or CXCR4
- Concern regarding trophism [CXCR4 associated with increased virulence]
- Theoretical concerns: malignancy, infection, others?
- Father of the class – CCR5 antagnoist
- Indicated for tx experienced patients only
- Requires trophic assay before use - $$$ [TroFile™]
- Dose: 150 mg PO BID – varies with concurrent drug use
- Pneumonia? Malignancy? Cardiovascular complications? Trophic conversion?
Integrase Inhibitor: Isentress

• Indicated for treatment experienced
• Dose: 400mg BID
• Side effects
  – Diarrhea, Nausea, H/A
• Some elevated CPK
Treatment

- Symptomatic or
- Viral Load > 100,000 copies/ml or
- CD4\(^+\) cell count < 350 cells/mm\(^3\)
• Monotherapy is never appropriate
• Regimens most often consist of 3 antiretroviral medications
• Typical backbones: 2 NRTIs + 1 NNRTI
  2 NRTIs + 1 PI
• Ritonavir boosting of PIs now very common
Goal of Therapy

To reduce and maintain plasma HIV RNA levels (viral load) below the point of detection

Ultrasensitive testing

<50 COPIES/ML
Viral Load

- Quantifies viral burden
  - Reflects number of HIV RNA particles in circulation
- Not a diagnostic tool
- Monitoring tool
- RT-PCR
  - Ultra-sensitive PCR (threshold <50 particles)
## Indications for Initiating ART: Chronic Infection

<table>
<thead>
<tr>
<th>Clinical Category and/or CD4 Count</th>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>History of AIDS-defining illness</td>
<td>Initiate ART</td>
</tr>
<tr>
<td>CD4 &lt;350 cells/mm³</td>
<td></td>
</tr>
<tr>
<td>Pregnant women</td>
<td></td>
</tr>
<tr>
<td>HIV-associated nephropathy</td>
<td></td>
</tr>
<tr>
<td>Hepatitis B coinfection, when HBV treatment is indicated*</td>
<td></td>
</tr>
</tbody>
</table>

*Treatment with fully suppressive drugs active against both HIV and HBV is recommended.
### Indications for Initiating ART: Chronic Infection

<table>
<thead>
<tr>
<th>Clinical Category and/or CD4 Count</th>
<th>Recommendation</th>
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<tbody>
<tr>
<td>CD4 &gt;350 cells/mm³, asymptomatic, without conditions listed above</td>
<td>Optimal time to initiate ART is not well defined. Consider individual patient characteristics and comorbidities.</td>
</tr>
</tbody>
</table>
Monitoring and Altering Therapy

- Viral load should be checked 30 days following initiation of a new or initial anti-HIV regimen.
- After stabilization, viral load should be checked every 3 months.
Monitoring and Altering Therapy

- Therapy should be changed when patients do not achieve an undetectable viral load or when viral load was previously undetectable and is now 2,000-5,000 copies/ml.
- When altering a regimen, always begin 3 drugs to which the patient is treatment-naïve.
- Do not add a 4th drug to a failing regimen.
Treatment Failures

• In cases of treatment failure always consider:
  Non-adherence
  Infection
  Vaccinations
Drug Toxicity or Adverse Effects

- Doses of drugs should not be decreased in response to an adverse effect or toxicity.
- Clinicians should D/C the drug and substitute another drug from the same class.
Due to the limited number of antiviral medications available, patients with multiple treatment failures may exhaust all possible drug combinations.
## Antiretroviral Resistance Testing

<table>
<thead>
<tr>
<th>Technique</th>
<th>Advantage</th>
<th>Limitation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Genotyping</td>
<td>- Availability</td>
<td>- Indirect measure</td>
</tr>
<tr>
<td></td>
<td>- Days to results</td>
<td>- Expert interpretation required</td>
</tr>
<tr>
<td></td>
<td>- Less technical</td>
<td>- Minor species not tested</td>
</tr>
<tr>
<td>Phenotyping</td>
<td>- Direct measure of susceptibility</td>
<td>- Costly</td>
</tr>
<tr>
<td></td>
<td>- More familiar reporting results (IC&lt;sub&gt;50&lt;/sub&gt;, IC&lt;sub&gt;90&lt;/sub&gt;)</td>
<td>- Weeks to results</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- More technical</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Minor species not detected</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Breakpoints undefined</td>
</tr>
</tbody>
</table>
Other Assessment and Monitoring Studies

• HLA-B*5701 screening
  – Recommended before starting abacavir, to reduce risk of hypersensitivity reaction (HSR)
  – HLA-B*5701-positive patients should not receive abacavir
  – Positive status should be recorded as an abacavir allergy
  – If HLA-B*5701 testing is not available, abacavir may be initiated, after counselling and with appropriate monitoring for HSR

• Coreceptor tropism assay
  – Should be performed when CCR5 antagonist is being considered
  – Consider in patients with virologic failure on a CCR5 antagonist
Conclusions
Conclusions

• HIV is still with us
• ART is effective but complicated
• There are newer options but options are still limited
• Remember: ART is Chemotherapy
• There is help nationally and regionally!
• Support, motivate, and educate healthcare providers
• Provide customized training, education, and assistance through preceptorships
• Promote quality HIV/AIDS care throughout Kentucky
• Teleconferencing throughout state
• Warm line: call for specific cases (1-866-777-9969)
• Website at www.mc.uky.edu/kyaetc
• Jennifer Edwards, 859 323 9969, Program Coordinator
• Alice C. Thornton, Medical Director,
Bluegrass Care Clinic

Bluegrass Care Clinic
University of Kentucky Chandler Medical Center
800 Rose Street
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Alice Thornton, MD, Project Director

Website:
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Patient Services Coordinator

- Patient health and adherence education
- (859) 323-5544
- Available to triage via telephone
- Coordinates inpatient and outpatient care

Barbara Davis
Service Area

HIV primary care to indigent persons in the highly rural, medically underserved 63-county service area (central, eastern KY)

Bluegrass Care Clinic

KEY
- BCC Service Area
- Lexington
- Pikeville
- Ashland

Lexington Care Coordinator Region
Cumberland Valley Care Coordinator Region
Portsmouth, OH - Title III Service Area
Heartland Cares

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Matthew 25

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Cynthia Burton,
Executive Director
WINGS Clinic

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  Louisville, KY 40292
  phone: 502-852-1483
  fax: 502-852-0651

Deborah Wade, Program Director

Anna Huang, MD, Medical Director

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Web Sites to Access the Guidelines

- http://www.aids-etc.org