HIV/AIDS: Where We Are and Where We’re Going

Dee Ann DeRoin, MD, MPH
Prairie Band Potawatomi Health Center
March 20, 2007
What is the global status of HIV/AIDS?
What are the common modes of transmission?
Who should be tested?
What are the newest tests for HIV?
What is the status of HIV in pregnancy?
How is HIV infection treated in 2006?
When to initiate antiretroviral therapy?
What antiretroviral medications are available?
What is a patient's prognosis?
How important is health maintenance for people living with HIV?
AIDS

This May Be the Most Dangerous Time Yet!

1980  Confusion  Hysteria  Ignorance  2006  Complacency
HIV Transmission

- Contact with infected body fluids (blood, semen, vaginal fluid, breast milk)
- Unprotected sex
- Sharing needles
- Mother to fetus
“My daughter is not ready yet. Would you like to join me in watching a Short video on AIDS?”
A global view of HIV infection
38.6 million people [33.4–46.0 million] living with HIV, 2005

Adult prevalence %

- 15.0 – 34.0%
- 5.0 – <15.0%
- 1.0 – <5.0%
- 0.5 – <1.0%
- 0.1 – <0.5%
- <0.1%
Global Estimates: 2005

- 40.3 million people are living with HIV
  - 17.5 million women
  - 2.3 million children under age 15
- The AIDS epidemic claimed more than 3 million lives
- Nearly 4.9 million people were newly infected with HIV in 2005.

Source - http://www.avert.org/aidsnews.htm
Although prevalence has gone up throughout most of Europe and Central Asia by 25% (to 1.6 million)…

- Kenya, Zimbabwe and some countries in the Caribbean region have recently experienced declines in HIV prevalence rates…

Downward trends are due to:

- Increased condom use
- Delay of first sex
- Reduction in the number of sexual partners
- Routine testing?

Source - http://www.avert.org/aidsnews.htm
There are currently an estimated 40,000 new HIV infections per year in the United States.

More than half of new HIV infections now occur in persons under 25 years old.

The estimated lifetime medical costs are an average of $200,655.

Each new infection results in a loss of approximately 23.9 quality-adjusted life years.
>462,000 people living with HIV/AIDS in 2004

17% \(^\uparrow\) prevalence from 2001 to 2004

Main risk: Sexual contact for both men and women
- Women: 71% heterosexual; 27% IDU

Disproportionate impact on Blacks & Hispanics

Campsmith M, et al. XVI IAC Toronto, Canada, Aug. 13-18, 2006; Abst. MOPE0551
Estimated Prevalence Rates for Adults and Adolescents Living with AIDS (per 100,000 population) 2004—United States

Note. Data adjusted for reporting delays.
* Includes persons whose state of residence is unknown or missing.
Proportion of HIV/AIDS Cases among Adults and Adolescents, by Transmission Category 2001–2004—35 Areas

Note. Data include persons with a diagnosis of HIV infection regardless of their AIDS status at diagnosis. Data from 35 areas with confidential name-based HIV infection reporting since at least 2000. 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 at high risk for HIV infection.
HIV/AIDS Diagnoses among Adults and Adolescents,
by Transmission Category — 33 States, 2001–2004

Males
(n ≈ 112,000)

- MSM 61%
- IDU 16%
- Heterosexual 17%
- MSM/IDU 5%
- Other 1%

Females
(n ≈ 45,000)

- Heterosexual 76%
- IDU 21%
- Other 3%
<table>
<thead>
<tr>
<th>Kansas AIDS Cases as of 6/30/2006</th>
<th>Incident AIDS Cases</th>
<th>Prevalent AIDS Cases</th>
<th>Cumulative AIDS Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
</tr>
<tr>
<td>ADULT/ ADOLESCENT</td>
<td>64</td>
<td>100.0</td>
<td>1211</td>
</tr>
<tr>
<td>PEDIATRIC (&lt;13 YEARS OLD)</td>
<td>.</td>
<td>.</td>
<td>6</td>
</tr>
<tr>
<td>Total</td>
<td>64</td>
<td>100.0</td>
<td>1217</td>
</tr>
<tr>
<td>Gender</td>
<td>Incident AIDS Cases</td>
<td>Prevalent AIDS Cases</td>
<td>Cumulative AIDS Cases</td>
</tr>
<tr>
<td>--------</td>
<td>---------------------</td>
<td>----------------------</td>
<td>-----------------------</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
</tr>
<tr>
<td>Male</td>
<td>53</td>
<td>82.81</td>
<td>1017</td>
</tr>
<tr>
<td>Female</td>
<td>11</td>
<td>17.2</td>
<td>200</td>
</tr>
</tbody>
</table>

Kansas AIDS Cases as of 6/30/2006
## AIDS Cases by Age 6/30/2006

<table>
<thead>
<tr>
<th>Age in Years</th>
<th>Newly Reported AIDS Cases</th>
<th>Prevalent AIDS Cases</th>
<th>Cumulative AIDS Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
</tr>
<tr>
<td>&lt;13</td>
<td>.</td>
<td>.</td>
<td>6</td>
</tr>
<tr>
<td>13 TO 14</td>
<td>.</td>
<td>.</td>
<td>1</td>
</tr>
<tr>
<td>15 TO 24</td>
<td>7</td>
<td>6.1</td>
<td>83</td>
</tr>
<tr>
<td>25 TO 34</td>
<td>33</td>
<td>28.7</td>
<td>435</td>
</tr>
<tr>
<td>35 TO 44</td>
<td>40</td>
<td>34.8</td>
<td>431</td>
</tr>
<tr>
<td>45 TO 54</td>
<td>25</td>
<td>21.7</td>
<td>169</td>
</tr>
<tr>
<td>55 TO 64</td>
<td>6</td>
<td>5.2</td>
<td>37</td>
</tr>
<tr>
<td>65 or Older</td>
<td>4</td>
<td>3.5</td>
<td>6</td>
</tr>
</tbody>
</table>
# Kansas AIDS Cases through June 30, 2006

<table>
<thead>
<tr>
<th>Race/Ethnicity</th>
<th>Incident AIDS Cases</th>
<th>Prevalent AIDS Cases</th>
<th>Cumulative AIDS Cases</th>
<th>% Total Pop</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>Hispanic</td>
<td>13</td>
<td>20.3</td>
<td>158</td>
<td>13.0</td>
</tr>
<tr>
<td>American-Indian Non-Hispanic</td>
<td>.</td>
<td>.</td>
<td>11</td>
<td>0.9</td>
</tr>
<tr>
<td>Asian/Pacific Islander Non-Hispanic</td>
<td>.</td>
<td>.</td>
<td>5</td>
<td>0.4</td>
</tr>
<tr>
<td>Black Non-Hispanic</td>
<td>20</td>
<td>31.3</td>
<td>282</td>
<td>23.2</td>
</tr>
<tr>
<td>White Non-Hispanic</td>
<td>31</td>
<td>48.4</td>
<td>744</td>
<td>61.1</td>
</tr>
<tr>
<td>Multi-Race Non-Hispanic</td>
<td>.</td>
<td>.</td>
<td>16</td>
<td>21</td>
</tr>
<tr>
<td>Unknown Non-Hispanic</td>
<td>.</td>
<td>.</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>
PROBLEMS with STATISTICS

- Data Problems with Native people
- We need to count HIV!
  
  how many new cases are we having?
  where are they occurring?
  who are they happening to?
- THEN we would know how and where to best use our limited resources
NEW U.S. HIV/AIDS DIAGNOSES, 2005

MALES  28,037  =  74%

FEMALES  9,893  =  26%

TOTAL  38,096

AIDS in INDIAN COUNTRY as of 2005

- 3,717 cases since early 1980’s
- 1,657 deaths
- 2,060 living with AIDS
- 198 new cases diagnosed in 2005

CDC, HIV/AIDS SR, vol. 17
NEW DIAGNOSES, 2000-2003

New cases diagnosed among AI/AN from 2000-2003:

- Males: 505 = 71%
- Females: 210 = 29%
## INFECTION RATES BY RACE

<table>
<thead>
<tr>
<th>Race/Ethnicity</th>
<th>2003 Rate/100,000</th>
<th>2005 Rate/100,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>AI/AN</td>
<td>10.4</td>
<td>10.6</td>
</tr>
<tr>
<td>African American</td>
<td>75.2</td>
<td>72.8</td>
</tr>
<tr>
<td>Hispanic</td>
<td>26.8</td>
<td>28.5</td>
</tr>
<tr>
<td>White</td>
<td>7.2</td>
<td>9.0</td>
</tr>
<tr>
<td>Asian/PI</td>
<td>4.8</td>
<td>7.6</td>
</tr>
</tbody>
</table>

Native infection rates have been higher than rates for whites since 1995. (CDC, HIV SR, v. 17)
SOURCE OF HIV INFECTION, US all races

- MEN
  - MSM 63%
  - Heterosexual 17
  - IDU 14
  - MSM/IDU 5
  - Other <1
SOURCE OF HIV INFECTION, US all races

- WOMEN
  - Heterosexual 79%
  - IDU 19
  - Other 2
<table>
<thead>
<tr>
<th>METHOD</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSM</td>
<td>61%</td>
</tr>
<tr>
<td>IDU</td>
<td>15</td>
</tr>
<tr>
<td>HETEROSEXUAL</td>
<td>12</td>
</tr>
<tr>
<td>MSM/IDU</td>
<td>11</td>
</tr>
<tr>
<td>OTHER</td>
<td>1</td>
</tr>
<tr>
<td>METHOD</td>
<td>%</td>
</tr>
<tr>
<td>------------------</td>
<td>----</td>
</tr>
<tr>
<td>HETEROSEXUAL</td>
<td>68</td>
</tr>
<tr>
<td>IDU</td>
<td>29</td>
</tr>
<tr>
<td>OTHER</td>
<td>2</td>
</tr>
</tbody>
</table>

**Males**
No. = 505
- Male-to-male sexual contact + injection drug use: 11%
- Heterosexual contact: 12%
- Injection drug use: 15%
- Male-to-male sexual contact: 61%
- Other: 1%

**Females**
No. = 210
- Injection drug use: 29%
- Heterosexual contact: 69%
- Other: 2%

*Note*: Based on data from 32 states with long-term, confidential name-based HIV reporting.
Total AIDS Rates, 1987-2003
United States and ID, OR & WA

Note for all slides: A change in the AIDS case definition led to a spike in AIDS case numbers in 1993, causing an artificial peak early in 1993. The temporary distortion almost entirely waned by 1996.
Total and AI/AN AIDS Rates, 1989-2003
United States
("Adults": Rate for adults/adolescents only. "Total": Rate for all ages.)
Total and AI/AN AIDS Rates by Sex, 1989-2003
United States
Estimated Number of AIDS Cases Among Male U.S. AI/AN by Age Group, 1998-2002

Estimated number of cases

- <13
- 13-19
- 20-24
- 25-34
- 35-44
- 45-54
- 55-64
- >65

Year

- 1998
- 1999
- 2000
- 2001
- 2002

The graph shows the estimated number of AIDS cases among male U.S. AI/AN by age group from 1998 to 2002. The data is represented across different years with distinct colors for each age group, allowing for a visual comparison of the trends over time.
Estimated Number of AIDS Cases Among Female U.S. AI/AN by Age Group, 1998-2002

<table>
<thead>
<tr>
<th>Year</th>
<th>&lt;13</th>
<th>13-19</th>
<th>20-24</th>
<th>25-34</th>
<th>35-44</th>
<th>45-54</th>
<th>55-64</th>
<th>&gt;65</th>
</tr>
</thead>
<tbody>
<tr>
<td>1998</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1999</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2001</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2002</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
HIV/AIDS RISK FACTORS
for
AMERICAN INDIAN/
ALASKA NATIVES
RISKS:
Alcoholism/substance abuse
Meth
Other STD’s
Domestic violence
Mental Health Issues
Inadequate Health Care
Inconsistent health education
Young population
ALCOHOLISM MORTALITY

American Indian/Alaska Natives death rate from alcoholism is 638% the US all races rate.

Trends in Indian Health, 2000-2001
CHLAMYDIA INFECTION RATES

Total and AI/AN Chlamydia Rates, 1996-2003
United States and NW States (ID, OR, WA)

- U.S. Total
- U.S. AI/AN
- NW Total
- NW AI/AN

Cases per 100,000 population

Report Year

CHLAMYDIA FACTS

- AI/AN women have the 2\textsuperscript{nd} highest rate of chlamydia infection among ethnic groups:
  nearly 3 times the rate for US women

- AI/AN men have nearly twice the chlamydia rate of US men of all races
CHLAMYDIA-INFECTED PERSONS ARE 3-5 TIMES MORE LIKELY TO GET INFECTED WITH HIV/AIDS IF EXPOSED
GONORRHEA INFECTION RATES

Total and AI/AN Gonorrhea Rates, 1996-2003
United States and NW States (ID, OR, WA)

Cases per 100,000 population

Report Year


U.S. Total U.S. AI/AN NW Total NW AI/AN
HEPATITIS in AI/AN- 2002

- Hepatitis B
  2nd highest rate in US
- Hepatitis C
  highest incidence of new cases
HUMAN PAPILLOMA VIRUS (HPV)

- Causes > 99% cancer of cervix
- AI/AN had one of the highest rates of death from cervical cancer, implying high rates of HPV infection: now third behind Hispanic and African American women
HPV RISK FACTORS for AI/AN WOMEN

- STD’s
- Substance abuse
- Education level
- Socioeconomic Factors
- Young age
- Partner risk
- Unequal/abusive relationships
- Smoking
Dramatic change in the U.S. death rate from HIV infection

Trends in Rates of Death from Leading Causes of Death Among Persons 25-44 Years Old, USA, 1982-1997

*Preliminary data

Trends in Age-Adjusted* Rates of Death due to the 7 Leading Causes and HIV Disease, USA, 1987–2002

Note: For comparison with data for 1999 and later years, data for 1987–1998 were modified to account for ICD-10 rules instead of ICD-9 rules.

*Standard: age distribution of 2000 US population
Time Line of HIV Infection

- Acute Infection
- Asymptomatic HIV Infection: 10-15 Years
- Symptomatic HIV Infection: 3-5 Years
- AIDS: ? Years
- DEATH?

Positive Ab Test result (6 months)
Primary Infection
- Possible acute HIV syndrome
- Wide dissemination of virus
- Seeding of lymphoid organs

Clinical Latency

Opportunistic disease

Constitutional symptoms

Death

Typical Course of Untreated HIV Infection

Pantaleo et al, NEJM, 1993
Signs of Acute Infection

- Fever (can be HIGH)
- Lymphadenopathy
- Rash (upper body, scattered oval macules)
- Ulcers: oral, pharyngeal, esophageal, genital
- Thrush

Source: http://hivinsite.ucsf.edu
Symptoms

- Flu-like symptoms
- Malaise, fatigue, myalgias, arthralgias
- Sore throat, mouth (no rhinnorhea)
- GI symptoms: abdominal pain, diarrhea
- Meningeal symptoms: headache, photophobia, stiff neck
- Dehydration symptoms

Source: http://hivinsite.ucsf.edu
Routine Lab Abnormalities

- WBC is LOW
- Lymphocytopenia
- Thrombocytopenia (100K)
- Mild transaminitis

Source: http://hivinsite.ucsf.edu
Diagnosis

- **Symptoms:** 3-6 weeks after exposure
- **Antibody seroconversion**
  - 1 to 10 weeks after onset of sx
- **HIV-1 RNA tests (PCR, bDNA)**
  - Positive 1 - 2 weeks before antibody
  - Risk of false positives - only use if high pre-test probability

Source: http://hivinsite.ucsf.edu
Late testing is common.

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

MMWR  June 27, 2003
Case Study

- 52 y.o., white male, engineer
- Ill since November 28, 2003 with cough, weight loss, oral ulcers and skin rash
- Seen by ENT
  - Oral ulcers – bx. Nonspecific
- Seen by dermatology
  - Diagnosis December – scabies
  - Diagnosis January – eczema
- Seen by pulmonology
  - 2/28 – working diagnosis – sarcoid
  - Bronch bx – negative
Case Study

Open lung bx = PCP
HIV+
CD4 - 2
VL > 750,000
**Late Access to Care Costs**

- **Patients with CD4 <200**
  - More likely to have a complication of AIDS
  - More likely to have side effects from treatment
  - Less likely to achieve an undetectable viral load

<table>
<thead>
<tr>
<th>CD4 Stratum (cells/ml$^3$)</th>
<th>Annual Cost ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;50</td>
<td>57,565</td>
</tr>
<tr>
<td>50-200</td>
<td>35,483</td>
</tr>
<tr>
<td>200-500</td>
<td>26,848</td>
</tr>
<tr>
<td>&gt;500</td>
<td>21,869</td>
</tr>
</tbody>
</table>

Source: Egger, Lancet, 2002; Phillips, AIDS, 2004; Gebo, 13th CROI, 2005
Routine one-time testing of everyone would cut new infections each year by just over 20%

Every HIV-infected patient identified would gain an average of 1 ½ years of life.

Source: study by researchers at Duke and Stanford Universities and the Veterans Affairs Palo Alto Health Care System
More is Better

- Earlier access to available medications resulting in increased length of life
- Those who know they are positive tend to take more precautions to protect others
- On a population wide basis, such screening could reduce spread because medications suppress viral load and reduce the chance of transmission
Revised Recommendations for HIV Screening in Health-Care Settings in the U.S.

September, 2006
New Guidelines for HIV Screening

- HIV screening is recommended in all health care settings, after notifying the patient that testing will be done.
- Separate written consent for HIV testing is not required.
- Prevention counseling is not recommended as part of routine HIV screening programs in health care settings.
- HIV screening should be included in the routine panel of prenatal screening tests for all pregnant women.
Awareness of Serostatus Among People with HIV and Estimates of Transmission

- ~25% Unaware of Infection
- ~75% Aware of Infection

People Living with HIV/AIDS: 1,039,000-1,185,000

New Sexual Infections Each Year: ~32,000

Accounting for:

- ~54% of New Infections
- ~46% of New Infections

Marks, et al
AIDS 2006;20:1447-50
<table>
<thead>
<tr>
<th>Age Group (yrs)</th>
<th>Total Tested</th>
<th>HIV Prevalence</th>
<th>Unrecognized HIV Infection</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>No.    %</td>
<td>No.    %</td>
</tr>
<tr>
<td>18-24</td>
<td>410</td>
<td>57 (14)</td>
<td>45 (79)</td>
</tr>
<tr>
<td>25-29</td>
<td>303</td>
<td>53 (17)</td>
<td>37 (70)</td>
</tr>
<tr>
<td>30-39</td>
<td>585</td>
<td>171 (29)</td>
<td>83 (49)</td>
</tr>
<tr>
<td>40-49</td>
<td>367</td>
<td>137 (37)</td>
<td>41 (30)</td>
</tr>
<tr>
<td>≥ 50</td>
<td>102</td>
<td>32 (31)</td>
<td>11 (34)</td>
</tr>
<tr>
<td>Race/Ethnicity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>616</td>
<td>127 (21)</td>
<td>23 (18)</td>
</tr>
<tr>
<td>Black</td>
<td>444</td>
<td>206 (46)</td>
<td>139 (67)</td>
</tr>
<tr>
<td>Hispanic</td>
<td>466</td>
<td>80 (17)</td>
<td>38 (48)</td>
</tr>
<tr>
<td>Multiracial</td>
<td>86</td>
<td>16 (19)</td>
<td>8 (50)</td>
</tr>
<tr>
<td>Other</td>
<td>139</td>
<td>18 (13)</td>
<td>9 (50)</td>
</tr>
<tr>
<td>Total</td>
<td>1,767</td>
<td>450 (25)</td>
<td>217 (48)</td>
</tr>
</tbody>
</table>
Current Testing
**Terminology - I**

- **Diagnostic testing**: performing an HIV test based on clinical signs or symptoms
- **Screening**: performing an HIV test for all persons in a defined population
- **Targeted testing**: performing an HIV test on subpopulations of persons at higher risk based on behavioral, clinical or demographic characteristics
- **Opt-out screening**: performing an HIV test after notifying the patient that the test will be done; consent is inferred unless the patient declines
**Informed consent:** process of communication between patient and provider through which the patient can participate in choosing whether or not to undergo HIV testing.

**HIV prevention counseling:** interactive process to assess risk, recognize risky behaviors, and develop a plan to take steps that will reduce risks.
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>

**Suppl. to HIV/AIDS surveillance, 2000-2003
*National Health Interview Survey, 2002*
CDC Recommendation for HIV Screening

Opt-out HIV screening and HIV diagnostic testing should be a part of routine clinical care in all health-care settings.

This information is based on: Centers for Disease Control and Prevention (CDC). (2006, September 22). Revised recommendations for HIV testing of adults, adolescents, and pregnant women in health-care settings. Information take from: http://www.cdc.gov/hiv/topics/testing/healthcare
Health-care settings include:

- emergency and urgent care sites
- primary care settings
- corrections health care
- substance use treatment services
- outpatient clinics
- inpatient services in all public and private sectors.

Recommendations are based on best practices and meant to comply with ethical principles of informed consent.

Recommendations do not take into account state, local, or institutional regulations.

Providers should be aware of HIV statues or other regulations in the states and facilities in which they work.
The CDC recommends that HIV screening be a routine part of health care for all:

- Individuals in the U.S. between the ages of 13 and 64
- Patients receiving care for tuberculosis (TB)
- Patients in care for other sexually transmitted diseases (STDs)
- Women who are considering conception and pregnancy
- Women who are pregnant
- Women in delivery who have undocumented HIV status at the onset of labor
- Infants born to mothers with undocumented HIV status.
The purpose of these revised guidelines is to increase routine HIV screening of patients in health care settings, including pregnant women.

- To foster the earlier detection of HIV infection.
- To identify and counsel persons with unrecognized HIV infection and link them to clinical and prevention services.
- To reduce perinatal transmission of HIV further in the United States.
Rapid HIV Testing:
The “Waive” of the Future
OraQuick: Oral fluid, serum, whole blood
How it Works… The Specimen

- Glove
- Use lancet to obtain specimen
- Fill loop
How it Works... The Test

- Stir loop in solution
- Insert paddle
- Begin timing
- Watch for control line to be sure test is functional
- Read test after 20 minutes
Read results

Positive HIV-1/2

Positive

Negative

Reactive Control

305

306
When Is A Rapid Test Indicated?

- Obstetric admissions
- Healthcare worker occupational exposures
- Urgent care clinics and Emergency departments
- Public health settings
- Developing countries
- The primary Care office
Prenatal HIV Screening

MMWR–(1) “opt-out” prenatal maternal screening and
(2) mandatory newborn screening = higher maternal screening rates than “opt-in” prenatal screening

CDC recommends that clinicians routinely screen all pregnant women for HIV infection using an “opt-out” approach
Estimated Number of Perinatally Acquired AIDS Cases, by Year of Diagnosis, 1985-2003—United States

Note: Data adjusted for reporting delays and for estimated proportional redistribution of cases in persons initially reported without an identified risk factor.
HIV Replication Cycle and Sites of Drug Activity

1. Attachment
2. Uncoating
3. Reverse Transcription
4. Integration
5. Transcription
6. Translation
7. Assembly and Release

Key Steps:
- Attachment: HIV virions bind to CD4 receptor and co-receptors (CCR5 or CXCR4).
- Uncoating: Uncoating of viral RNA.
- Reverse Transcription: Viral RNA is transcribed into unintegrated double stranded viral DNA.
- Integration: Viral DNA integrates into the host cell's genome.
- Transcription: Viral mRNA is transcribed from integrated viral DNA.
- Translation: Viral mRNA is translated into viral proteins.
- Assembly and Release: Gag-Pol polyprotein is assembled and released.

Sites of Drug Activity:
- NRTIs: Reverse Transcriptase
- NNRTIs: Integrase
- Protease Inhibitors: Protease

Course of HIV Disease Progression as it Relates to CD4 Lymphocyte Count

CD4 cell count / mm$^3$

- Thrombocytopenia
- Lymphadenopathy
- Bacterial skin infection
- Herpes simplex, zoster
- Oral, skin fungal infections
- Hairy leukoplakia
- Tuberculosis
- Kaposi’s sarcoma
- 50
- 0
- 400
- 300
- 200
- 100
- PCP
- Cryptococcosis
- Toxoplasmosis
- CMV
- MAC
- Lymphoma

Months

Years
## When to Start Treatment

**DHHS Guidelines: 10/10/2006**

<table>
<thead>
<tr>
<th>Clinical Category</th>
<th>CD4+ Cell Count</th>
<th>Plasma HIV-1 RNA</th>
<th>General Guidelines</th>
</tr>
</thead>
<tbody>
<tr>
<td>AIDS-defining illness or severe symptoms*</td>
<td>Any value</td>
<td>Any value</td>
<td>Treat</td>
</tr>
<tr>
<td>Asymptomatic</td>
<td>&lt; 200</td>
<td>Any value</td>
<td>Treat</td>
</tr>
<tr>
<td>Asymptomatic</td>
<td>200-350</td>
<td>Any value</td>
<td>Treatment should be offered following full discussion of pros and cons of treatment.</td>
</tr>
<tr>
<td>Asymptomatic</td>
<td>&gt; 350</td>
<td>≥ 100,000</td>
<td>Most clinicians recommend deferring therapy, but some clinicians will treat.</td>
</tr>
<tr>
<td>Asymptomatic</td>
<td>&gt; 350</td>
<td>&lt; 100,000</td>
<td>Defer therapy</td>
</tr>
</tbody>
</table>
Number of Approved Antiretroviral Agents by Year

Note: These were fixed dose combinations of existing drugs
Licensure of Antiretroviral Agents by Year

- 1987: zidovudine (Retrovir)
- 1988: 
- 1989: 
- 1990: 
- 1991: didanosine (Videx)
- 1992: zalcitabine (Hivid)
- 1993: 
- 1994: stavudine (Zerit)
- 1995: lamivudine (Epivir)
- 1996: saquinavir (Invirase)
- 1997: ritonavir (Norvir)
- 1997: indinavir (Crixivan)
- 1997: nevirapine (Viramune)
- 1997: nelfinavir (Viracept)
- 1998: delavirdine (Rescriptor)
- 1998: efavirenz (Sustiva)
- 1998: abacavir (Ziagen)
- 1999: amprenavir (Agenerase)
- 2000: lopinavir/ritonavir (Kaletra)
- 2001: tenofovir (Viread)
- 2003: enfuvirtide (Fuzeon)
- 6/03: atazanavir (Reyataz)
- 7/03: emtricitabine (Emtriva)
- *8/04: lamivudine/abacavir sulfate (Epzicom)
- 9/04: emtricitabine/tenofovir disoproxil fumarate (Truvada)
- 6/05: tipranavir (Aptivus)
- 6/06: darunavir (Prezista)
- *7/06: efavirenz/emtricitabine, tenofovir DF (Atripla)

* Fixed dose combinations of existing drugs
**Major Toxicities**

- **Metabolic disorders**
  - Lipodystrophy
  - Hyperlipidemia
  - Diabetes

- **Renal tubular dysfunction** (ADV)

- **Anemia** (ZDV)

- **Kidney stones** (IDV)

- **Peripheral neuropathy** (ddl, ddC, d4T)

- **Pancreatitis** (ddl)

- **Rashes/Stevens-Johnson syndrome** (NNRTIs)

- **Hypersensitivity** (ABC)

- **Hepatotoxicity** (RTV)
Co-Existing Problems to Consider

- Pregnancy (+/or potential)
- Lipid status
- Diabetic
- Hepatitis B / C
- Drug and Alcohol Use
Encourage Healthy Lifestyle Choices

- Quit smoking
- Regular exercise
- Balanced diet with lots of nuts, fruits, and vegetables
- Stress reduction
- Quit / avoid all drug use - especially crystal methamphetamine
- Eliminate / avoid excess alcohol use
At 40,000 new HIV infections per year, preventing 50-66%, at average lifetime cost of care of $200,000, more effective epidemic control would save between $4 billion and $5.4 billion per year.”

Survival Benefits of AIDS Treatment in the United States

- Chemotherapy, Non-small-cell lung cancer: 7 months
- Adjuvant chemotherapy, Node + breast cancer: 29 months
- Comprehensive post-MI care, Coronary artery disease: 50 months
- BMT, Relapsed non-Hodgkins lymphoma: 92 months
- OI proph, AIDS: 3 months
- ART: 160 months

Survival Benefits of AIDS Treatment, JID 2006:194 (July 1)
<table>
<thead>
<tr>
<th>Intervention</th>
<th>Cost per life-year saved</th>
</tr>
</thead>
<tbody>
<tr>
<td>ART</td>
<td>$10,000-$18,000</td>
</tr>
<tr>
<td>Lovastatin to prevent coronary artery disease</td>
<td>$21,000</td>
</tr>
<tr>
<td>Screening mammography</td>
<td>$30,000</td>
</tr>
<tr>
<td>Fecal blood with sigmoidoscopy</td>
<td>$43,000</td>
</tr>
<tr>
<td>Hemodialysis for end-stage renal disease</td>
<td>$50,000</td>
</tr>
<tr>
<td>Warfarin for nonvascular atrial fibrillation</td>
<td>$110,000</td>
</tr>
<tr>
<td>Prostate cancer screening</td>
<td>$113,000</td>
</tr>
<tr>
<td>Coronary artery bypass surgery</td>
<td>$113,000</td>
</tr>
</tbody>
</table>
At least 3 million years of life have been saved in the United States as a direct result of care of patients with AIDS, highlighting the significant advances made in HIV disease treatment.

Survival Benefits of AIDS Treatment, JID 2006:194 (July 1)
I HAVE AIDS
PLEASE hug me

I can't make you sick

AIDS HOT LINE FOR KIDS
CENTER FOR ATTITUDINAL HEALING
19 MAIN ST, TIBURON, CA 94920, (415) 435-5022