HIV Screening: A Guide for Primary Care Providers

April 11, 2012
Anaheim, California

This track is supported by the Department of Health and Human Services and Centers for Disease Control and Prevention’s HIV Screening. Standard Care. program.

Education Partner:
RTI International
Session 1: HIV Screening: A Guide for Primary Care Providers

Learning Objectives

1. Analyze the rationale for HIV screening recommendations.
2. Assess the clinical benefits of routine HIV screening.
3. Formulate application and approaches for simplifying routine HIV screening in practice.
4. Evaluate and select appropriate HIV testing.

Faculty

**Donna E. Sweet, MD, AAHIVS, MACP**
Professor of Internal Medicine
The University of Kansas School of Medicine
Wichita, Kansas

Dr Donna Sweet is a credentialed HIV specialist with the American Academy of HIV Medicine (AAHIVM). Leading a national effort with HealthHIV to address the US HIV medical workforce shortage, Dr Sweet has cared for HIV patients in her clinic for over 25 years. She, along with an experienced team, care for the approximately 1200 patients living with HIV in Wichita and three outreach clinics in rural Kansas.

Dr Sweet is the HIV Program Director for Ryan White Parts B, C, and D grant funding and is also principal investigator and director of the Kansas AIDS Education and Training Center as well as Kansas Care Through Housing, a Housing for People With AIDS (HOPWA) grant-funded project. In addition to providing clinical care, she has traveled extensively nationally and internationally, educating physicians about HIV care and treatment.

Dr Sweet currently serves as board chair of the AAHIVM. She is the immediate past co-chair of the CDC Health Resources and Services Administration (HRSA) AIDS Advisory Committee on HIV & STD Prevention & Treatment (CHAC) and is the current national vice chair of the Health HIV Board. She is also a past chair of the American College of Physicians’ (ACP) Board of Regents.

**Wilbert C. Jordan, MD, MPH**
Director, OASIS Clinic
Associate Professor
Charles R. Drew University of Medicine and Science
Los Angeles, California

Dr Wilbert Jordan founded the AIDS Clinic at King-Drew Medical Center, now the OASIS Clinic, in 1984. Dr Jordan has committed himself to HIV/AIDS research and prevention since the early 1980s, and has seen and treated over 3000 patients. With HIV outreach being a primary interest, he created the focused intervention approach in 1987, in which HIV-infected clients identified persons they felt to be at high risk. This proved to have a much greater response rate, averaging 32% to 45%, and GlaxoSmithKline adapted the program, using it as a model for its national Act4Life Program.

Dr Jordan has chaired the Los Angeles County Commission on HIV and AIDS, and served on the Los Angeles County HIV Planning Council and Prevention and Planning Committee. For his HIV work, he was honored with the Surgeon General’s Award in 2000, and has been named “Doctor of the Year” three times by the Drew Medical Society and “Man of the Year” by the Los Angeles Sentinel.
Dr Margaret Hoffman-Terry is Clinical Associate Professor of Medicine at the Milton S. Hershey Medical Center of the Pennsylvania State University College of Medicine. Since 1995, she has been caring for patients at the AIDS Activities Office of Lehigh Valley Hospital in Allentown, Pennsylvania, a Ryan White–funded clinic serving over 700 adults living with HIV. Active in research ethics, she chairs both of her hospital’s Institutional Review Boards. In addition, she is secretary of the National Board of the American Academy of HIV Medicine and chair of the organization’s public policy committee.

After earning her Bachelor of Science with high honors from Lehigh University in 1985, Dr Hoffman-Terry completed her medical education at Temple University School of Medicine, her internal medicine residency at Lehigh Valley Hospital, and an infectious diseases fellowship at Thomas Jefferson University Hospital. She is a credentialed HIV specialist with the American Academy of HIV Medicine, a fellow of the American College of Physicians, and an American Board of Internal Medicine diplomate in the specialties of internal medicine and infectious diseases. She is an active researcher and speaker in the areas of HIV and HIV/HCV coinfection.

Dr Bernard Branson is the Associate Director for Laboratory Diagnostics in the Division of HIV/AIDS Prevention at the National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention at the Centers for Disease Control and Prevention (CDC). Dr Branson has been the chief architect for the CDC’s activities, evaluating new technologies for HIV testing, including rapid HIV tests, testing strategies, and tests for HIV incidence.

In 2006, Dr Branson was the lead author of the CDC’s “Revised Recommendations for HIV Testing of Adults, Adolescents, and Pregnant Women in Health Care Settings.” More recently, he has worked with the Association of Public Health Laboratories and the Clinical and Laboratory Standards Institute (CLSI) on the development of laboratory guidelines for establishing the diagnosis of HIV infection.

Dr Branson has been involved in HIV testing for more than 25 years, with more than 50 peer-reviewed articles to his name on HIV diagnostics, HIV screening, and cost-effectiveness. Before joining the CDC in 1990, Dr Branson was in private practice and part of the clinical faculty at Johns Hopkins.

Faculty Financial Disclosure Statements
The presenting faculty report the following:
Drs Branson, Hoffman-Terry, and Jordan have no financial relationships to disclose.
Dr Sweet discloses receiving speaking honoraria from Abbott, BMS, Gilead, Tibotec, and Boehringer Ingelheim, and research honoraria from Pfizer and BMS.

Education Partner Financial Disclosure Statement
The content collaborator for RTI International reports the following:
Dr David Spach has no financial relationships to disclose.
Suggested Reading List


According to Department of Health and Human Services, antiretroviral therapy:

1. Should be considered when the CD4 count is ≤1000
2. Is recommended when the CD4 count is ≤ 750
3. Is recommended when the CD4 count is ≤ 500
4. 1 and 3
5. None of the above

Early antiretroviral treatment in serodiscordant couples can decrease risk of transmission to partner by nearly:

1. 33%
2. 50%
3. 75%
4. 100%

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Professor of Internal Medicine
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Wichita, KS

Learning Objectives

- Analyze the rationale for HIV screening recommendations
- Assess clinical benefits of routine HIV screening
- Formulate application and approaches for simplifying routine HIV screening in practice
- Evaluate and select appropriate HIV tests
**CASE STUDY**

**Case Study: MH**
- 51-year-old, African American female, recently engaged
- Identified as HIV+ at the American Red Cross when she went to donate blood
- She received a phone call from the Red Cross telling her she was HIV+ and should go to her doctor
- She and her fiancé presented for rapid testing

MH: Laboratory
- CD4: 716
- HIV-1 RNA by PCR: 1,480/mL
- Quantiferon – Neg
- HCVAb: <0.1
- HBsAb: <0.1
- HBsAg: Negative
- Hep A Ab: Negative
- RPR: Non-reactive

Donna Sweet MD, AAHIVS, MACP, Professor of Medicine, The University of Kansas School of Medicine – Wichita

**Case Study: WG**
- 52-year-old, African American male
- Fiancé of MH who presented with her for HIV testing
- Found to be HIV+

Case Study: WG
- CD4: 147/uL
- HIV-1 RNA by PCR: 155,790 copies/mL
- HCVAb: Positive
- HBsAb: <0.1
- HBsAg: Negative
- Hep A Ab: Negative
- RPR: Non-reactive

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**Estimated Numbers of AIDS Cases, Deaths, and Persons Living with AIDS, 1985-2007 – United States and Dependent Areas**

Estimated Number of Persons Living HIV Among Persons Aged ≥ 13 — United States 1981-2008


HIV Prevalence in Adults from Selected Countries

In Sub-Saharan Africa and Subpopulations in the United States


Discussion

Do you routinely offer (opt-out) HIV testing in your clinical setting?

1. Yes
2. No

A 64-Year-Old Male...

- Long-term patient in for 6-month check-up...
- In need of prescription renewals including his sildenafil script

Would you offer an HIV test?

1. Yes
2. No

A 23-Year-Old, Single Male...

- Presents for a pre-employment physical
- Upon physical exam, you find that he
  - does not smoke
  - drinks weekly (2-6 beers)
  - does not use illegal substances
  - has an exam otherwise unremarkable
  - is sexually active and occasionally uses condoms, but not always

Would you offer an HIV test?

1. Yes
2. No
A 33-Year-Old Female...

- Presents for her annual well-woman physical and birth control
- Is married, 2 living children
- Has no other significant history

Would you offer an HIV test?
1. Yes
2. No

Wilbert Jordan, MD, MPH
Director, Oasis Clinic
Associate Professor, Charles R. Drew
University School of Medicine and Science
Los Angeles, CA

Estimated HIV Prevalence in California, June 30, 2011

Total Cases: 43,501

TOP 4 HIV Counties

<table>
<thead>
<tr>
<th>Name</th>
<th>Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Los Angeles</td>
<td>17,212</td>
</tr>
<tr>
<td>San Francisco</td>
<td>6,915</td>
</tr>
<tr>
<td>San Diego</td>
<td>4,715</td>
</tr>
<tr>
<td>Orange</td>
<td>2,918</td>
</tr>
</tbody>
</table>

Source: California Department of Public Health, Office of AIDS HIV/AIDS Surveillance Section

Estimated AIDS Prevalence in California, June 30, 2011

Total Cases: 160,760

TOP 4 HIV Counties

<table>
<thead>
<tr>
<th>Name</th>
<th>Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Los Angeles</td>
<td>57,411</td>
</tr>
<tr>
<td>San Francisco</td>
<td>29,935</td>
</tr>
<tr>
<td>San Diego</td>
<td>14,446</td>
</tr>
<tr>
<td>Alameda</td>
<td>5,015</td>
</tr>
</tbody>
</table>

Source: California Department of Public Health, Office of AIDS HIV/AIDS Surveillance Section

HIV SCREENING RECOMMENDATIONS

Criteria that Justify Routine Screening

1. Serious health disorder that can be detected before symptoms develop
2. Treatment more beneficial when begun before symptoms develop
3. Reliable, inexpensive, acceptable screening test
4. Costs of screening reasonable in relation to anticipated benefits

2006 Revised Recommendations

CDC’s Recommendations

- HIV screening for all patients aged 13 to 64 years
  - Opt-out screening: patients should be told screening will be performed but may decline testing
  - Written consent and prevention counseling not required
- Annual HIV screening for those at high risk for HIV
- Prompt clinical care for HIV-infected persons

Screening Recommendations of the American College of Physicians

- Clinicians adopt routine screening for HIV and encourage patients to be tested.
- Clinicians determine the need for repeat screening on an individual basis.

HIV Prevention Project of the National Medical Association (NMA)

- The NMA HIV Prevention project
  - Goal: Have 2,000 black primary care physicians incorporate HIV testing as part of routine care to all patients.
  - Encourage these same providers to include prevention messages to individuals who are HIV-positive.
  - The project will take place in 6 cities including Oakland, California.

Role of the Awareness of HIV Status in the Sexual Transmission of HIV in the United States

- Approximately 20% of people with HIV are unaware of their HIV status.¹
- Among those with HIV:
  - Persons unaware are 3.5 times as likely to transmit.²
  - Those aware, change behaviors that transmit.²

Sources:

Sources:

Source: National Medical Association website
**Why Routine Screening?**

- Risk-based screening has not been successful.
- Risk assessment and prevention counseling are resource intensive.
- The HIV/AIDS epidemic affects all populations, and risk-based testing can fail to identify HIV in some patients.

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**Why Routine Screening?**

- Patients do not always disclose or may not be aware of their risk.
  - 39% of men who had sex with a man within the past year did not disclose to their health care provider.
  - 51% of rapid test positive patients identified in Emergency Department (ED) screening had no identified risk.

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**Where Patients Underwent Testing for HIV Infection in 2006**

<table>
<thead>
<tr>
<th>Setting</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Private doctor/health maintenance organization</td>
<td>53.2</td>
</tr>
<tr>
<td>Hospital, emergency department, outpatient</td>
<td>17.6</td>
</tr>
<tr>
<td>Nonclinical site (public health/testing, military, etc)</td>
<td>17.4</td>
</tr>
<tr>
<td>Public health department or community clinic</td>
<td>7.1</td>
</tr>
<tr>
<td>Family planning or prenatal clinic</td>
<td>2.2</td>
</tr>
<tr>
<td>Other clinic</td>
<td>1.8</td>
</tr>
<tr>
<td>Correctional facility</td>
<td>0.4</td>
</tr>
<tr>
<td>Drug treatment clinic</td>
<td>0.4</td>
</tr>
<tr>
<td>Sexually transmitted disease clinic</td>
<td>0.0</td>
</tr>
</tbody>
</table>

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**In Summary**

- HIV meets the criteria for screening, and effective treatment is available.
- Many patients with HIV visit health care providers but their infection goes undetected.
- People decrease their risk behaviors when they find out they are infected with HIV.
- HIV screening in health care settings is cost effective.
- Opt-out screening increases testing rates.
Discussion

What is opt-out screening?

1. Patients may be screened without notification or consent.
2. Patients should be told screening will be performed, but they may decline testing.
3. Patients must request an HIV test.

Discussion

Which of the following are parts of the CDC screening recommendations?

1. HIV screening for all patients aged 13 to 64 years
2. Written consent and prevention counseling
3. Annual HIV screening for those at high risk for HIV
4. Prompt clinical care for HIV-infected persons
5. 1, 3, & 4
6. All of the above

Discussion

In 2006, what percentage of those persons who reported being tested for HIV in the preceding 12 months reported being tested in a private doctor/health maintenance organization (HMO) setting?

1. 7.1%
2. 17.4%
3. 17.6%
4. 53.2%

Margaret Hoffman-Terry, MD, FACP, AAHIVS

Clinical Associate Professor of Medicine
Penn State University College of Medicine
Lehigh Valley Hospital Campus
Allentown, PA

HIV Screening and Antiretroviral Therapy (ARV)
Help Reduce Perinatally Acquired AIDS Cases

SUCCESES IN HIV SCREENING AND TREATMENT
IMPORTANCE OF SCREENING, EARLY DIAGNOSIS, AND TREATMENT

Uncontrolled HIV Replication May Have Implications in Other Clinical Conditions

<table>
<thead>
<tr>
<th>Clinical Condition</th>
<th>Implications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cardiovascular disease</td>
<td>Increased risk of MI(^1) and early carotid atherosclerosis(^2)</td>
</tr>
<tr>
<td>Hepatic disease</td>
<td>Faster progression of fibrosis and increased risk of cirrhosis, end-stage liver disease, and hepatocellular cancer in patients with hepatitis (B) or (C) coinfection(^3)</td>
</tr>
<tr>
<td>Renal disease</td>
<td>Increased risk of HIV-associated nephropathy, especially among African Americans and older patients and those with diabetes, hypertension, or a low CD4 count(^4)</td>
</tr>
<tr>
<td>Non-AIDS cancer</td>
<td>Possible role in non-AIDS cancers. The direct inflammatory effects of HIV infection can also raise the risk of some non-AIDS cancers(^5)</td>
</tr>
</tbody>
</table>

\(^4\) Phillips et al. AIDS. 2009;23(18):2409-2418.

Baseline Factors Associated with Cardiovascular Disease Events: HIV Out Patient Study (HOPS)


ART, Serodiscordant Couples, and HIV Transmission: Study Results

- ART initiation substantially protected HIV-negative sexual partners from acquiring HIV infection
  - **Group 1**: Early treatment group—only 1 partner infected by the HIV-infected participant, with a 96% reduction in risk of HIV infection
  - **Group 2**: Late treatment group—27 partners infected by the HIV-positive partner
- The difference was statistically significant \((P<0.0001)\)

**Prevention of HIV with Early Antiretroviral Therapy**

HIV Prevention Trials Network (HPTN) Study 052


**Late Diagnosis of HIV in United States**

- "Late diagnosis of HIV infection is common. Among persons with newly diagnosed HIV in 2008, 33% developed AIDS within 1 year of initial HIV diagnosis. These persons likely were infected an average of 10 years before diagnosis. During this period, they missed opportunities to obtain medical care and to prevent unwitting transmission of HIV to others."

**Survival Gains Due to Antiretroviral Treatment**


- MI, myocardial infarction; BMT, bone marrow transplant; OI, opportunistic infection; ART, antiretroviral therapy.

- Reproduced with permission from University of Chicago Press.

**Probability Curve of Survival According to Baseline CD4 Cell Count**

- **Source:** May M, et al. AIDS 2007;21:1385-97-CC.

**Discussion**

What are the benefits of universal screening for HIV?

1. Earlier diagnosis of HIV
2. Decreased transmission of HIV
3. Improved survival
4. Cost-effective strategy
5. All of the above

**Discussion**

Which of the following statements is false?

1. One-third of people with HIV are diagnosed with AIDS within a year of their HIV diagnosis.
2. People who are aware of their HIV diagnosis will reduce their HIV high-risk behavior by an average of 68%.
3. Unrecognized and untreated HIV can contribute to cardiovascular, renal, liver disease, and non-AIDS associated cancers.
4. The average CD4 count at time of HIV diagnosis in the United States is currently 635 cells/mm³.
Discussion

What is responsible for the decline in perinatally acquired AIDS?

1. Widespread HIV screening of all pregnant women
2. Antiretroviral use during the antenatal, perinatal, and newborn periods
3. Overall reduction in cases of HIV
4. 1 & 2

Discussion

Which of the following conditions may be affected by uncontrolled HIV replication?

1. Cardiovascular disease
2. Diabetes
3. Arthritis
4. Obesity

Discussion

In 2007, approximately how many HIV-positive patients in the United States were “late testers” or diagnosed with AIDS within a year of receiving HIV diagnosis?

1. 2%
2. 5%
3. 21%
4. 32%
5. 57%

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The University of Kansas School of Medicine – Wichita
Wichita, KS

IMPLEMENTATION: SCREENING IN THE PRIMARY CARE SETTING

Establishing HIV Screening as Standard Care

• Offer routine HIV screening in conjunction with other standard preventive screenings
  – Cholesterol
  – Blood glucose
  – Prostate-specific antigen

• Regardless of a patient's
  – Race/ethnicity
  – Sex
  – Socioeconomic status
  – Sexual orientation
  – Relationship status
Implementing HIV Screening

**Integrating HIV Screening into Practice**
- Train staff to perform HIV opt-out screening
- Instruct nurses and physician assistants to review the wellness visit checklist
- Provide easily understood patient informational materials
- Include testing reminders in patient’s electronic medical record

**Address Patients’ Misperceptions**
- Your patients may not know the basic facts about HIV
- Many patients believe they were previously tested for HIV, particularly if blood was drawn
- Many patients assume an HIV test was performed and if they didn’t receive a call from the doctor, that they do not have HIV

Commonly Asked Questions From Patients
- Why should I have an HIV test?
- How do you test for HIV?
- How is HIV infection diagnosed?
- Who will pay for my HIV test?

Address Patients’ Misperceptions

- Your patients may not know the basic facts about HIV.
- Many patients believe they were previously tested for HIV, particularly if blood was drawn.
- Many patients assume an HIV test was performed and if they didn’t receive a call from the doctor, that they do not have HIV.

If a Patient Has Concerns About Undergoing an HIV Test
- Provide informational materials.
- Listen and respond to the patient’s questions and concerns.
- Emphasize that the HIV screening test is routine for all patients; suspicion of risk or disease is not the reason it is being performed.
- Explain to the patient that he or she may never have been screened for HIV infection, even if other physicians have performed other types of blood tests.

Communicating the Negative HIV Test Result
- Does not require direct personal contact.
- Discuss how high-risk negative patients can remain HIV-negative:
  - Periodic retesting for persons at high risk.
  - Prevention measures.

Communicating Positive HIV Test Result
- Provide result by direct personal contact.
- Provide result confidentially.
- Ensure patient understands test result.
- Connect to services.

Connecting to Services
- Initiate or refer patients to appropriate treatment.
- Help identify support services, if needed.
- Refer patients to partner services:
  - Free services to persons infected with HIV, including partner notification, testing, counseling, and referral.
- Report an HIV-positive case per local or state laws.
- Reference the National HIV/AIDS Clinicians’ Consultation Center for any questions you have (www.nccc.ucsf.edu).
RESOURCES

HIV Screening. Standard Care.

• A program developed to help physicians establish HIV screening as a routine part of medical care

HIV Screening. Standard Care.

• Free materials for providers
  – Annotated Guide to CDC Recommendations
  – Resource Guide
  – AMA/AAHIVM CPT Coding Guide
  – ACP Guidance Statements
  – National HIV/AIDS Clinicians Consultation Center Flyer

• Free patient materials
  (available in English and Spanish)
  – Brochure
  – Poster

  Download at www.cdc.gov/HIVStandardCare

Linkage to Care
Find HIV Providers in Your Area

• AAHIVM - “Find a Provider”

• HIVMA Provider Directory
  – https://www.hivma.org/cvweb/cgin/hivma_member_search.htm

• HealthFinder.gov
  – http://www.healthfinder.gov/

Discussion

Opt-in testing – require pre-test counseling and explicit written consent
Opt-out testing – patients should be informed orally or in writing that HIV testing will be performed unless they decline

California state laws currently require which?

1. Opt-in testing
2. Opt-out testing

Discussion

When discussing HIV testing with a patient, what would be their most common question?

1. Why should I have an HIV test?
2. How do you test for HIV?
3. How is HIV infection diagnosed?
4. Who will pay for my HIV test?
5. Other
Discussion

What factors should you consider when deciding whether to offer an HIV test?

1. Race/ethnicity
2. Sexual orientation
3. Relationship status
4. All of the above
5. None of the above

Discussion

The number of persons living with HIV infection in the United States (prevalence) has steadily ______ since the mid-1990s.

1. Increased
2. Decreased
3. Neither - remained the same


Bernard M. Branson, MD
Associate Director for Laboratory Diagnostics
Division of HIV/AIDS Prevention
National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention

Outline

- Evolution of enzyme immunoassays (EIAs)
- Window period and HIV infection
- Advances in HIV testing technology
- New HIV diagnostic testing algorithm

1st and 2nd Generation EIA

Detects HIV IgG
**3rd Generation “Sandwich” EIA**

- Plasma/serum
- HIV antibody
- IgG
- IgM
- Enzyme-detection
- HIV antigen
- Detects HIV
- IgM or IgG
- Color reagent

**4th Generation Combo EIA**

- Plasma/serum
- HIV antibodies
- p24 antigen
- Enzyme-detection
- HIV antigen
- Detects IgM or IgG antibody or p24 antigen
- Color reagent

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**Window Period and HIV Infection**

- HIV RNA (plasma)
- HIV p24 Ag
- HIV Antibody
- 3rd gen
- 2nd gen
- 1st gen

**Detecting Acute HIV Infection**

- HIV RNA (plasma)
- HIV p24 Ag
- HIV Antibody
- 3rd gen
- 2nd gen
- 1st gen

**We Cannot Close the Window**

- HIV RNA (plasmas)
- HIV p24 Ag
- HIV Antibody
- Infection
- Undetectable
Current Assays with Seroconverter Panels

183 specimens from 26 seroconverters


Sequence of Test Positivity Relative to WB

166 specimens, 17 Seroconverters - 50% Positive Cumulative Frequency

Modified from Masciotra et al, J Clin Virol. 2011;52 (Suppl 2) S17-S22

Diagnostic Assays
Recently Approved by the US FDA

Rapid Results without Rapid Test Kits

Random Access Multiplatform analyzers for HIV testing

On-board Refrigeration of Multiple Different Assays

Random Access Multiplatform analyzers for HIV testing

STAT sample requests without pausing
Results in <60 minutes

ADVIA® Centaur™ HIV 1/O/2 Enhanced (EHIV)

- Chemiluminescent immunoassay
- 2nd generation format
  - HIV-1: gp41, p24
  - HIV-2: gp36
  - group O
- Time to result <1 hour
- FDA-approved July 2006
Ortho VITROS ECI/ECiQ
- Chemiluminescent immunoassay
- 3rd generation format
  - HIV-1: gp41, gp120, p24
  - HIV-2: gp36
  - Group O
- Time to result <1 hour
- Repeat only borderline results
- FDA-approved March 2008

Abbott Architect 4th Generation Ag/Ab Combo Assay
- Chemiluminescent immunoassay
- Detects p24 antigen and HIV antibody
- Time to result: 29 minutes
- FDA-approved June 2010

APTIMA Qualitative HIV-1 RNA Assay
- Aid to HIV-1 diagnosis
- Diagnosis of acute HIV-1 infection in antibody-negative persons
- Confirmation of HIV-1 infection in antibody-positive persons when it is reactive
- FDA-approved July 2006

Avioq HIV-1 Microelisa
- Whole viral lysate (1st generation) HIV-1 EIA
- Indications for oral fluid, dried blood spots
- HIV-1 only indication
- FDA-approved August 2009

Bio-Rad GS HIV Combo Ag/Ab EIA
- Microwell plate EIA
- 3rd generation format:
  - HIV-1: gp160
  - HIV-2: gp36
  - Group O
- p24 antigen
- FDA-approved July 2011

Clinical Syndrome of Acute HIV
- 40-90% develop symptoms of Acute HIV1
- 50-90% with symptoms seek medical care
- Of those diagnosed with Acute HIV, 50% of patients seen at least 3 times before diagnosis2

References:
Clinical Manifestations
101 seroconverters, HIVNET cohort 1995-98

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Percent</th>
<th>Median Duration Days (IQR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any symptom</td>
<td>85%</td>
<td></td>
</tr>
<tr>
<td>Fatigue</td>
<td>56%</td>
<td>9 (5-29)</td>
</tr>
<tr>
<td>Fever</td>
<td>55%</td>
<td>5 (4-10)</td>
</tr>
<tr>
<td>Pharyngitis</td>
<td>43%</td>
<td>7 (5-10)</td>
</tr>
<tr>
<td>Lymphadenopathy</td>
<td>36%</td>
<td>7 (4-14)</td>
</tr>
<tr>
<td>Rash</td>
<td>16%</td>
<td>8 (6-14)</td>
</tr>
</tbody>
</table>


Acute HIV Screening: 99,111 Tested

| Test Type | EIA-RR/WB+ 1,136 (1.1%) | EIA-RR/WB-ind 30 (0.03%) | RNA+ 1,094 (96.3%) | RNA- 42 (3.7%) | RNA+ 3 (10.0%) | RNA- 27 (90.0%) | EIA-neg/RNA+ 52 (0.05%) | Acute HIV 52 (0.55%) | False-pos RNA 4 (8%) |


HIV-1 Transmission, by Stage of Infection and Behavior Pattern

<table>
<thead>
<tr>
<th>Stage</th>
<th>Transmission Hazard per Person-year</th>
<th>Mean Duration, Years (%)</th>
<th>No. (%) New Transmissions, by Sexual Behavior</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute</td>
<td>2.76</td>
<td>0.24 (2%)</td>
<td>Serial Monogamy 0.10 (9%) Random Mixing 0.67 (31%)</td>
</tr>
<tr>
<td>Asymptomatic</td>
<td>0.106</td>
<td>3.83 (82%)</td>
<td></td>
</tr>
<tr>
<td>AIDS</td>
<td>0.760</td>
<td>0.75 (16%)</td>
<td></td>
</tr>
</tbody>
</table>


Acute Infections in MSM detected by RNA only
- 0.3% of 14,005 frequently tested MSM in Seattle STD clinic; 20% of all HIV infections detected
- 26 (74%) of 35 AHI cases detected in LA at MSM clinic; 25% of all HIV infections detected
- 0.08% of 21,425 STD clinic patients in New York City; 9% of all HIV infections detected; 94% were MSM

4th Generation Ag/Ab Assay vs. RNA

- RNA+/3rd gen-negative specimens detected by 4th generation EIA:
  - 38 of 46 (83%) – Australia
  - 10 of 14 (71%) – CDC AHI study
  - 51 of 61 (84%) – CDC panel
  - 4 days after RNA – 9 seroconversion panels

New Testing Algorithms

Limitations of the Current Algorithm

- Western blot is less sensitive during early infection than most screening tests in current use.
- Antigen/antibody combo tests now FDA-approved that can detect most antibody-negative persons during highly infectious acute infection stage.
- Because of cross-reactivity, >60% of persons with HIV-2 infection have positive HIV-1 Western blot.

“Cryptic” HIV-2 Infection

- Routine clinical specimens tested with:
  - Bio-Rad HIV-1/HIV-2 Plus O EIA (EIA)
  - Bio-Rad Multispot HIV-1/HIV-2 (MS)
  - Bio-Rad HIV-1 Western blot (WB)
  - HIV-1 RNA PCR (in-house; Abbott RealTime HIV-1)
  - HIV-2 WB (Focus) and HIV-2 RNA (in-house)

Test Results

- 203 EIA+/HIV-1 WB+
  - 201/203 were MS HIV-1 POS
  - 2/203 were MS HIV-1 NEG/HIV-2 POS
    - WB #1 [gp160, p55, p31, p24] and WB #2 [gp160, p31, p24] both of which were initially signed-off as “HIV-1 infection confirmed” before the MS was done; HIV-1 RNA negative
    - Confirmed with HIV-2 WB and HIV-2 RNA

HIV Diagnostic Testing Algorithm
Summary

- New HIV immunoassays are more sensitive during early infection; results are available more quickly.
- Increasingly important to identify highly infectious stage of acute HIV infection.
- Algorithms for HIV diagnostic testing are being updated to keep pace with technology.

Additional Information

- 2011 Journal of Clinical Virology Supplement
- Criteria for Laboratory Testing and Diagnosis of HIV Infection; Approved Guideline

The findings and conclusions in this presentation are those of the author and do not necessarily represent the views of the Centers for Disease Control and Prevention.

Discussion

What proportion of patients with Acute HIV Infection develops symptoms?

1. <20%
2. 20–30%
3. 31–40%
4. >40%
According to Department of Health and Human Services, antiretroviral therapy:

1. Should be considered when the CD4 count is ≤1000
2. Is recommended when the CD4 count is ≤ 750
3. Is recommended when the CD4 count is ≤ 500
4. 1 and 3
5. None of the above

Early antiretroviral treatment in serodiscordant couples can decrease risk of transmission to partner by nearly:

1. 33%
2. 50%
3. 75%
4. 100%

Which of the following is true regarding the acute phase of HIV infection?

1. Most patients are asymptomatic
2. Few patients seek medical care during this phase
3. Risk of sexual transmission is highest during this phase
4. All of the above