HIV in Primary Care – Screening, Diagnosis & Recognizing Acute Infection

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Iowa MATEC
AIDS = CD4+ T Cells <200 OR AIDS Indicator Disease

Untreated HIV

<table>
<thead>
<tr>
<th>HIV RNA Amount (copies/ml)</th>
<th>CD4 Cell Count (cells/mm³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10^3</td>
<td>1,000</td>
</tr>
<tr>
<td>10^6</td>
<td>500</td>
</tr>
</tbody>
</table>

Viral Load

CD4 Cell Count

4-8 Weeks  Up to 12 Years  1-3 Years
AIDS Diseases by CD4 T Cell Count

- >750 Normal
- 400
- 200
- 100
- 50

- Kaposi’s sarcoma & lymphoma
- Dementia
- Pneumocystis
- Wasting
- Toxoplasmosis, Cryptococcosis
- CMV, Mycobacterium avium complex

Time
Non-AIDS Problems

- Bacterial pneumonia
- Pulmonary TB
- Zoster
- Thrush
- Oral hairy leukoplakia
- HPV-related disease
- Anemia
- Immune thrombocytopenia
- Neuropathy
- Lymphadenopathy
USA: More Persons Living with HIV & New Infections Continue

- New HIV Infections
- People Living With HIV/AIDS

No.  
1,200,000
1,100,000
1,000,000
900,000
800,000
700,000
600,000
500,000
400,000
300,000
200,000
100,000
0

Year

Era of Combination Antiretroviral Treatment (cART)

New
All

MMWR. 2008;57:1073-1075
Hall, HI, et al. 2008;300:520-529
USA: Percentage of New HIV Diagnoses by Risk Group

- Male-to-male sex (MSM)
- Heterosexual contact
- Injection drug use (IDU)

Percentage (%): 20, 40, 60, 80

www.CDC.gov/
Proportional Distribution of HIV Diagnoses by Age at Diagnosis

USA 2012

- 13-24 years: 22%
- 25-34 years: 29%
- 35-44 years: 19%
- 45-54 years: 21%
- ≥55 years: 9%

www.CDC.gov/
Minorities Disproportionately Affected

New HIV Diagnoses, 2010

Blacks 46%

29% Whites

Hispanics Latinos 20%

http://www.cdc.gov/hiv/surveillance/
Late HIV Diagnosis

- USA, ~33% have AIDS diagnosis within year of HIV diagnosis
- Iowa, ~42% have AIDS diagnosis
- Life-expectancy decreases with decreasing CD4 counts (AIDS results in 10-30 years of life-lost)

MMWR. Dec 3, 2010/59(47);1550-1555
Multinational cohort study in high-income countries. The Antiretroviral Therapy Cohort Collaboration. Lancet 2008; 372:293
Case 1

45 yo WM presents with recent diagnosis of ITP (treated with prednisone), 30 pound weight loss over past ~6 m, and mild anemia and generalized lymphadenopathy.

Married. 2 sons. Wife works. No injection drug use. No sex outside marriage.

Seen by consultants in 3 different subspecialty areas. Hospitalized in 2015.
Case 1

WHICH OF THE FOLLOWING IS A MANIFESTATION OF HIV INFECTION?

A. Wasting  
B. Immune thrombocytopenia  
C. Anemia  
D. Lymphadenopathy  
D. All of the above
Case 1

Screening Test

HIV-1/HIV-2 Ab/HIV-1 antigen test positive

Confirmation Test

HIV-1 and HIV-2 differentiation assay positive for HIV-1 antibody
HIV Infection

Acute Infection

Established Infection

Viral RNA Detection

Viral Antigen Detection

Viral Antibody Detection

HIV RNA (plasma)

HIV-1 p24 Antigen

HIV Antibody
Testing for HIV Antibody

Screening Tests

• ELISA - gold standard
  – Sensitivity, >99.7%; Specificity, 99.9%
  – In low risk population, false positive rate is 1/1000-2000

• Rapid point-of-care tests (whole blood or saliva)
  – Sensitivity 99.6-100%, Specificity 99.7-100%*
  – Results in <30 min

*Specificity lower for testing on saliva
Rapid Point-of-Care HIV Tests

INSTI™ HIV-1 Antibody Test  
Reveal™ Rapid HIV -1 Antibody Test  
Uni-Gold™ Recombigen® HIV-1/2  
OraQuick ADVANCE Rapid HIV-1/2 Antibody Test  
Chembio HIV 1/2 STAT-PAK™ Assay  
Chembio SURE CHECK HIV 1/2 Assay  
Chembio DPP® HIV 1/2 Assay  
Alere Determine™ HIV-1/2 Ag/Ab Combo*  

*Fourth-generation test
Rapid Home-Use HIV Test

The OraQuick In-Home HIV Test will be available in stores and online (final packaging may be different).

FDA Consumer Health Information / U.S. Food and Drug Administration
New Testing Algorithm

HIV-1/2 antigen/antibody combination immunoassay

(+)

HIV-1/HIV-2 antibody differentiation immunoassay

(-)

Negative for HIV-1 and HIV-2 antibodies and p24 Ag

HIV-1/(-) or indeterminate

HIV-2 (+)

HIV-2 antibodies detected

HIV-1 antibodies detected

HIV-1 (+)

HIV-2 (-)

HIV-1 (-)

HIV-2 (+)

HIV antibodies detected

HIV-1 NAT

(+)

HIV-1 NAT (+)

Acute HIV-1 infection

(-)

HIV-1 NAT (-)

Negative for HIV-1

(+ indicates reactive test result
(-) indicates nonreactive test result

NAT: nucleic acid test
Fourth Generation Screen: HIV-1/2 Antibody and HIV-1 Antigen Combo Assays

ARCHITECT HIV Ag/Ab Combo
Alere Determine™ HIV-1/2 Ag/Ab Combo
GS HIV Ag/Ab Combo EIA

http://www.fda.gov/BiologicsBloodVaccines/BloodBloodProducts/ApprovedProducts/LicensedProductsBLAs/BloodDonorScreening/InfectiousDisease/default.htm
HIV-1/HIV-2 Discriminatory Assay

Multispot HIV-1/HIV-2 Rapid Test

Results in 10 min

Use as confirmatory test

http://stacks.cdc.gov/view/cdc/23447

http://www.fda.gov/downloads/BiologicsBloodVaccines/BloodBloodProducts/ApprovedProducts/
Case 2

19 yo WM presents with 3 days of fever, sore throat, headache, malaise, & myalgias

Sex with men

WBC 3.6; lymhs 576 (low), & reactive lymhs 360 (high); platelets 60 (low)

Monospot negative; HIV 1/2 antibody negative
Case 2

Plasma HIV viral load >750,000 cpm
Testing of HIV-1 Viral Load in Diagnosis of Acute Infection

- Nucleic acid amplification test (e.g., PCR)
- HIV-1 RNA detected ~1-3 wks before HIV antibody test
- Typically high viral load (>50,000-100,000 copies/mL)

Requires confirmatory testing if positive
Acute Retroviral Syndrome

- Flu or mono syndrome in ~75%
- Pharyngitis, rash, &/or headache in ~50%

Vanhems P et al. AIDS 2000; 14:0375
Acute Retroviral Syndrome

- Aseptic meningitis, 24%

- Oral ulcers, 15%; genital ulcers, 10%
Routine HIV Testing

Opt-out testing

- Routine voluntary testing for all patients ages 13-64 in healthcare settings, UNLESS rates of undiagnosed HIV <1/1000 (<0.1%)
- Repeat testing based on risk
- All pregnant women*

*It is the law in Iowa

2007 - Iowa Code 141A

Endorsed by American College of Obstetricians and Gynecologists & American College of Physicians in 2008
Cost-Effectiveness

- 1-time HIV screening of low-risk persons and annual screening of high-risk persons
- <$23,000 per QALY gained
- Comparable to screening for type 2 diabetes and breast cancer mammography

(QALY, quality-adjusted life-years)

Treatment is Prevention  
More effective than condoms
U.S. Preventive Services Task Force: Grade A Recommendation

- Screen persons ages 15 to 65 for HIV
- "If no HIV-infected patients are found after screening of approximately 4000 patients… routine screening may be discontinued and replaced with risk-based screening”

http://www.uspreventiveservicestaskforce.org/uspstf13/hiv/hivdraftrec.htm
Diagnosed in & Living with HIV in Iowa

Three Counties with Prevalence >0.1%

Statewide average: 68 HIV+ Iowans per 100,000 population (~1/5 of the national prevalence)

Living in 93 of 99 counties
### HIV Testing Ever

**Ages 18-65**

2011

<table>
<thead>
<tr>
<th>State</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>New Jersey</td>
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<tr>
<td>California</td>
<td>43.6</td>
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<tr>
<td>Mississippi</td>
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<td>Arizona</td>
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<tr>
<td>Pennsylvania</td>
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<tr>
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</tr>
<tr>
<td>Utah</td>
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</table>

**Goal**

National Percentage (42.5)

**National 42.5%**

#46

**Iowa 31.3%**

CDC Report
Persons Retained in HIV Care

- Iowa: 58.8%
- California: 58.3%
- New York: 58.3%
- Nebraska: 57.3%
- South Carolina: 56.5%
- Indiana: 52.8%
- Michigan: 51.2%
- Wyoming: 49.8%
- Louisiana: 49.7%
- New Hampshire: 48.2%
- Missouri: 47.4%
- District of Columbia: 44.3%
- Georgia: 43.6%
- North Dakota: 42.0%
- Hawaii: 34.6%
- West Virginia: 33.3%
- Minnesota: 30.0%
- Delaware: 28.0%
- Illinois: 24.6%

National 2015 Goal: 56.0%
Average Percentage: 50.9%
What to do with a confirmed HIV positive test

- Link to care
- Report to state
  - State handles partner notification & testing*
- Counseling
  - Law mandates, OK to refer

*Iowa Department of Public Health: telephone 515-242-5150
CONCLUSIONS

- Epidemic continues
- Testing made easier, better, faster
- Have low threshold to test, consider routine testing

NIH, CDC, HIVMA/IDSA Guidelines: http://www.aidsinfo.nih.gov/