A Call to Action in Primary Care: Improving HIV Diagnosis and Co-Management
Faculty Disclosure

Jason Leider, MD, has no relevant financial relationships to disclose.
Learning Objectives

- Describe the rationale for implementing “opt-out” HIV testing, as recommended by the CDC
- Address issues and potential barriers to routine screening that may exist in their geographic area
  - Fear, stigma, risk perception, access to testing/care, confidentiality (patient)
  - Time, cost, referral resources/linkage (clinician)
- Identify the signs and symptoms of acute HIV infection
- Address issues pertinent to the co-management of patients with HIV, including considerations for those receiving antiretroviral therapy
Why Is Routine HIV Screening Recommended?
Estimated Number of AIDS Cases and Deaths Among US Adults and Adolescents (1985-2009)

Population Demographics and New HIV/AIDS Cases Diagnosed in 2009

Total US Population (n=307,007,000)
- White*: 72%
- Black*: 13%
- Hispanic: 16%
- Other: 6%

HIV Cases (n=36,525)
- Black*: 50.2%
- White*: 27.8%
- Hispanic: 19.1%

AIDS Cases (n=27,662)
- Black*: 47.7%
- White*: 27.5%
- Hispanic: 21.1%

“Late Testers” Account for Approximately 40% of HIV Diagnoses

Males

- MSM: 63% Early tester, 37% Late tester
- IDU: 50% Early tester, 50% Late tester
- MSM + IDU: 59% Early tester, 41% Late tester
- Heterosexual: 53% Early tester, 47% Late tester
- Other: 53% Early tester, 47% Late tester

Females

- IDU: 60% Early tester, 40% Late tester
- Heterosexual: 65% Early tester, 35% Late tester
- Other: 46% Early tester, 54% Late tester

Awareness of HIV Serostatus: Estimates of Transmission

- People Living With HIV: (1,039,000 - 1,185,000)
- New Sexual Infections/Year: (~32,000)
- ~25% Unaware of Infection
- ~75% Aware of Infection
- ~54% of New Infections
- ~46% of New Infections

Marks G. AIDS. 2006;20:1447-1450.
High-Risk Behaviors Decline After Seropositive Status Is Known

Reduction in Prevalence of Unprotected Intercourse Relative to HIV-Positive Persons Unaware of Serostatus

HIV-Positive Persons Aware of Their Own Serostatus

-53%

HIV-Positive Persons Aware of Their Own Serostatus and HIV-Negative Partner

-68%

**CDC Recommendations for HIV Testing in Healthcare Settings**

- Routine voluntary testing for patients ages 13 to 64 years in healthcare settings
  - Not based on patient risk
- Opt-out testing
  - No separate consent for HIV
  - Resulting in increases in HIV testing rates
  - Pretest counseling not required
  - Report HIV testing left to discretion of provider, based on risk
- State Testing Laws:
  - 15 states have updated laws since CDC issued revised recommendations (Arizona, California, Connecticut, Hawaii, New Hampshire, New Mexico, North Carolina, Maine, Maryland, Montana, Louisiana, Iowa, Illinois, Indiana, Virginia)
  - 8 states still requiring written informed consent: Alabama, Massachusetts, Michigan, Nebraska, New York, Pennsylvania, Rhode Island, Wisconsin

Opt-Out Versus Opt-In Screening

**Opt-Out Screening**
- Implies all patients are considered candidates for screening
- Testing is part of standard panel of tests
- Patients can decline test, but test is performed unless patient specifically refuses

**Opt-In Screening**
- Requires providers to specifically recommend HIV testing and for patients to specifically agree to testing
- May assume that clinicians assess which patient is at-risk for infection
- Greater reluctance on part of patient
- Requires more staff time

Changing HIV Testing Laws: Impact on Survival

- Comparison of diagnosis rates in states with opt-out (24.9%) vs. opt-in testing (19.9%)

- In states with opt-out testing, HIV is diagnosed at a higher CD4 cell count → better treatment outcomes

- Computer-based simulation model of HIV disease applied to these data

- If all remaining states switched to opt-out, potential national survival gain would be ~600,000 life years

HIV Testing Expansion: Earlier Diagnosis, Higher CD4 Counts

- Program to expand testing in medical and jail settings in Washington, DC, began in 2006
- Since program began, patients diagnosed with higher CD4 counts at initial testing
- During first 18 months of program, increase in median CD4+ count at diagnosis to 332 cells/mm$^3$

**Median CD4+ Count at Time of Testing**

<table>
<thead>
<tr>
<th>Year of HIV Diagnosis</th>
<th>Median CD4 Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001</td>
<td>215</td>
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<tr>
<td>2002</td>
<td>183</td>
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<td>187</td>
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<td>2004</td>
<td>198</td>
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<td>2005</td>
<td>220</td>
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<td>2006</td>
<td>262</td>
</tr>
<tr>
<td>2007</td>
<td>332</td>
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</tbody>
</table>

Castel A, et al. 17th CROI; 2010; San Francisco. Abstract 34.
Cost-Effectiveness of Screening the General Population for HIV

Dollars per Quality-Adjusted Life-Year Gained

- **1st Qtr**
  - Screening Once: $30,800
  - 1.0% HIV Prevalence

- **2nd Qtr**
  - Screening Every 5 Years: $32,300
  - 0.1% HIV Prevalence

- **3rd Qtr**
  - Screening Every 3 Years: $55,500
  - 0.1% HIV Prevalence

# Cost-Effectiveness of Screening for Other Chronic Diseases

<table>
<thead>
<tr>
<th>Screening program</th>
<th>C-E RATIO</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>HYPERTENSION</strong></td>
<td></td>
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<tr>
<td>Annual mammogram, women 50-69 y/o</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>HIV</strong></td>
<td>$50,000\textsuperscript{5}</td>
<td>Paltiel. <em>Ann Intern Med.</em> 2006</td>
</tr>
<tr>
<td>Routine, rapid testing in health settings</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>DIABETES MELLITUS</strong></td>
<td>$57,000\textsuperscript{2}</td>
<td>CDC C-E Study. <em>JAMA.</em> 1998.</td>
</tr>
<tr>
<td>Type 2 fasting plasma glucose, adults &gt;25 y/o</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>COLON CANCER</strong></td>
<td>$92,900\textsuperscript{3}</td>
<td>Frazier. <em>JAMA.</em> 2000.</td>
</tr>
<tr>
<td>FOBT + SIG q5y, Adults 50-85 y/o</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
HIV Pre-Test Discussion

- Informed consent
- Advantages/disadvantages
- Risk assessment
- 3-month window period
- Preparing for the result
- Getting the result
- Health promotion

Barriers to Expanded HIV Testing

- Differing state laws regarding signed consent and counseling requirements
- Variability in cost coverage for testing
- Stigma and discrimination concerns
- Concerns about lack of mandated prevention counseling
- Perception that cost-effectiveness of risk-based testing is superior

## Current Status of State Laws and HIV Testing

- 34 states and Washington, DC, had statutes consistent or neutral with CDC 2006 recommendations
- 15 states currently have legislation pending in regard to CDC recommendations:
  - Florida
  - Georgia
  - Hawaii
  - Illinois
  - Michigan
  - Mississippi
  - New Jersey
  - New York
  - Pennsylvania
  - South Carolina
  - Texas
  - Utah
  - Virginia
  - Washington
  - West Virginia


Alaska: HIV Testing Laws

- **Informed Consent**: No specific provisions.
- **Counseling**: Post-test counseling (regarding measures for preventing transmission and the need for treatment) is required for individuals who have been or may have been exposed.
- **Testing Provisions**
  - **Anonymous**: No specific provisions.
  - **Rapid**: No specific provisions
  - **Routine**: No specific provisions
- **Disclosure**: No specific provisions regarding notification of partners or contacts.
- **Minor/Adolescent**: Minors may consent to medical services, HIV not explicitly included.

http://www.nccc.ucsf.edu
Alaska Prenatal HIV Testing Laws

- No specific provisions regarding prenatal or labor & delivery testing
- No specific provisions regarding neonatal testing
Patient Barriers to HIV Testing: Kaiser Family Foundation Survey

Question: Is this a reason you haven’t been tested for HIV?

- Do Not Feel at Risk: 61%
- Provider Never Mentioned It: 21%
- Concerns About Confidentiality: 13%
- Do Not Know Where to Get Tested: 10%
- Do Not Like Needles/Giving Blood: 8%
- Afraid of Positive Result: 3%
Washington DC: ED Patients Who Decline HIV Testing Have Twice Higher HIV Rates

48,128 Patients Evaluated

7558 Individuals Offered Testing

4845 Accepted Testing
2713 Declined Testing

600 Samples Tested

35 Preliminary Positive
12 Preliminary Positive

0.7% Seropositivity
2% Seropositivity

33% Not at Risk
17% Recently Tested (4+ mo ago)
17% Declined to Give Reason
17% Unknown/Not Reported
8% Afraid to Find Out
8% Would Rather Test Elsewhere

Preliminary Positive
0.7% Seropositivity
2% Seropositivity
Why Clinicians Do Not Test for HIV Infection

Other Medical Settings
- Institutional costs
- Inadequate reimbursement
- Insufficient time
- Burdensome consent process
- Lack of knowledge/training
- Language
- Lack of patient acceptance
- Pre-test counseling requirements
- Competing priorities
- Low-risk patient population
- Fear/concern of offending patient
- Lack of trust/relationship with patient
- Gender differences between provider and patient
- Difference in sexual orientation/lack of knowledge regarding sexual orientation
- HIV/STDs not an issue amongst my patients/community
- HIV risk factors don’t relate to the care I provide
- Lack of institutional policies that encourage testing
- Lack of outreach to adolescents

Emergency Department
- Testing not available in emergency department
- Administrative barriers
- Rarely think about offering test
- Patient should request test
- Patient confidentiality concerns
- Post-test counseling requirements
- Cultural barriers
- Concern about patient follow-up
- Lack of HIV-related referral networks
- Not appropriate for provider to test
Strategies to Improve Linkage to Appropriate Care

- Ensure linkage to experienced HIV care providers is established prior to initiating routine HIV testing.

- Build relationships with service providers to address:
  - Patient needs
  - Barriers to engagement in care
  - Substance abuse: counselors, mental health providers, social workers, etc.

- Identify specific patient barriers to follow-up care and develop plans to overcome them (use of service providers).

- Assist patient with access to antiretroviral therapy programs if un- or underinsured.
Diagnosing Acute HIV Infection in the Primary Care Setting
Natural History of Untreated HIV Infection

Acute/Primary HIV Infection

- 40%-90% of patients have a seroconversion illness
- Abrupt onset
  - 2-4 weeks post exposure
  - Self limiting (1-2 weeks)
- Symptoms generally nonspecific
  - Differential diagnosis includes range of common conditions
- Serological tests may be negative or indeterminate
Primary HIV Infection: Clinical Presentation

Typical Rash in Primary HIV Infection
Reactivity of FDA-Approved Assays for HIV-1 Compared With Western Blot

Managing HIV Infection in the Primary Care Setting
Clinical Approach to the HIV-Positive Patient

- Positive rapid antibody tests are considered preliminary
- Confirmatory testing is needed to diagnose HIV infection
  - ELISA and Western blot test
- Communicate HIV-positive test results confidentially by provider
- Obtain baseline labs and comprehensive physical assessment
- Consult with HIV specialist for plan of care
- Reassure patient that with 100% adherence to therapy, life expectancy is much longer than when we had no or limited medications

### DHHS Guidelines: When to Start ART

<table>
<thead>
<tr>
<th>Clinical Circumstance</th>
<th>Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>History of AIDS-defining illness or CD4 count ≤350 cells/mm³</td>
<td>Initiate ART</td>
</tr>
<tr>
<td>Pregnant women</td>
<td></td>
</tr>
<tr>
<td>Persons with HIV-associated nephropathy</td>
<td></td>
</tr>
<tr>
<td>Persons co-infected with HBV, when HBV treatment is indicated</td>
<td></td>
</tr>
<tr>
<td>Patients with CD4 350 to 500 cells/mm³</td>
<td>Strong to moderate (55%:45%) recommendation to initiate ART</td>
</tr>
<tr>
<td>Patients with CD4 &gt;500 cells/mm³</td>
<td>50% of the panel recommended ART; 50% felt it was optional</td>
</tr>
<tr>
<td></td>
<td>Consider patient scenarios and comorbidities</td>
</tr>
</tbody>
</table>
## IAS-USA Guidelines 2010: When to Start ART

### Asymptomatic Infection

<table>
<thead>
<tr>
<th>Recommendation</th>
<th>CD4+ cell count &lt;500 cells/mm³</th>
</tr>
</thead>
<tbody>
<tr>
<td>Start HAART</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Recommendation</th>
<th>CD4+ cell count &gt;500 cells/mm³</th>
</tr>
</thead>
<tbody>
<tr>
<td>Should be considered*</td>
<td></td>
</tr>
</tbody>
</table>

### Clinical Conditions Favoring Initiation of Therapy Regardless of CD4+ Cell Count

- Symptomatic HIV disease
- Acute opportunistic infection
- Pregnant women
- Older than 60 yrs of age
- HIV-1 RNA >100,000 copies/mL
- Rapid decline in CD4+ cell count (> 100 cells/mm³/yr)
- Active HBV or HCV infection
- Active or high risk for CV disease
- Symptomatic primary HIV infection
- HIVAN
- Serodiscordant couples

*Unless patient is elite controller or has stable CD4+ cell count and low HIV-1 RNA in absence of antiretroviral therapy.

## Preferred Agents for First-line Therapy

### NRTIs
- Tenofovir/emtricitabine

### Plus a third agent

### NNRTI
- Efavirenz*  

### Boosted Protease Inhibitor
- Atazanavir/ritonavir*  
- Darunavir/ritonavir†

### Integrase Inhibitor
- Raltegravir†

*Based on extensive clinical experience.
†Based on data that indicate that this agent is comparable to key third agents but more limited experience in naive patients.

# NA-ACCORD: Deferred ART Increases Mortality Risk

## Table

<table>
<thead>
<tr>
<th>Variable</th>
<th>Relative Risk</th>
<th>P Value</th>
<th>Relative Risk</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deferral of ART</td>
<td>1.69</td>
<td>&lt;0.001</td>
<td>1.94</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Older age (per 10 years)</td>
<td>1.68</td>
<td>&lt;0.001</td>
<td>1.83</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Female sex</td>
<td>1.21</td>
<td>0.117</td>
<td>1.85</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Baseline CD4 count (per 100 cells/mm³)</td>
<td>1.13</td>
<td>0.696</td>
<td>0.93</td>
<td>0.03</td>
</tr>
</tbody>
</table>

**Baseline CD4 Count**

- **351 to 500 cells/mm³ (n = 8362)**
- **>500 cells/mm³ (n = 9155)**

---

NA-ACCORD, North American AIDS Cohort Collaboration
Once You Start, It Is Not SMART to STOP

**SMART study:**

<table>
<thead>
<tr>
<th>Endpoint</th>
<th>Viral Suppression Arm (n = 2752)</th>
<th>Treatment Interruption Arm (n = 2720)</th>
<th>HR (95% CI)*</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Major cardiovascular, renal, or hepatic disease</td>
<td>39</td>
<td>65</td>
<td>1.7 (1.1–2.5)</td>
<td>.009</td>
</tr>
<tr>
<td>Fatal/nonfatal cardiovascular disease</td>
<td>31</td>
<td>48</td>
<td>1.6 (1.0–2.5)</td>
<td>.05</td>
</tr>
<tr>
<td>Fatal/nonfatal renal disease</td>
<td>2</td>
<td>9</td>
<td>4.5 (1.0–20.9)</td>
<td>.05</td>
</tr>
<tr>
<td>Fatal/nonfatal liver disease</td>
<td>7</td>
<td>10</td>
<td>1.4 (0.6–3.8)</td>
<td>.46</td>
</tr>
<tr>
<td>Grade 4 event or death from any cause</td>
<td>164</td>
<td>205</td>
<td>1.3 (1.0–1.6)</td>
<td>.03</td>
</tr>
</tbody>
</table>

*Treatment interruption group vs viral suppression group.

Mean Annual Per-Patient Cost by CD4 Strata

Lifetime Per-Person Costs by Initial CD4 Count

## Antiretroviral Medications Approved for Use in the US*

<table>
<thead>
<tr>
<th>NRTIs</th>
<th>ABC</th>
<th>ddI</th>
<th>FTC</th>
<th>3TC</th>
<th>d4T</th>
<th>TDF</th>
<th>ZDV</th>
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<td>Abacavir</td>
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<td>Didanosine</td>
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<tr>
<td>Zidovudine</td>
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<table>
<thead>
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<th>NNRTIs</th>
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<th>ETR</th>
<th>RPV</th>
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<td>Delavirdine</td>
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<td>Efavirenz</td>
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<tr>
<td>Nevirapine</td>
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<td>Etravirine</td>
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<td>Rilpivirine</td>
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<thead>
<tr>
<th>Integrase Inhibitor</th>
<th>RAL</th>
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<tbody>
<tr>
<td>Raltegravir</td>
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<table>
<thead>
<tr>
<th>PIs</th>
<th>ATV</th>
<th>DRV</th>
<th>FPV</th>
<th>IDV</th>
<th>LPV/r</th>
<th>NFV</th>
<th>RTV</th>
<th>SQV</th>
<th>TPV</th>
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<tbody>
<tr>
<td>Atazanavir</td>
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<table>
<thead>
<tr>
<th>Fusion/Entry Inhibitors</th>
<th>ENF</th>
<th>MVC</th>
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<tr>
<td>Enfuvirtide</td>
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<tr>
<td>Maraviroc</td>
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</table>

*Some drugs available in fixed-dose combinations.

Available at: [http://www.aidsinfo.nih.gov/ContentFiles/AdultandAdolescentGL.pdf](http://www.aidsinfo.nih.gov/ContentFiles/AdultandAdolescentGL.pdf).
## Antiretroviral Medications Approved for Use in the US*

### NRTIs
- Abacavir (ABC)
- Didanosine (ddI)
- Emtricitabine (FTC)
- Lamivudine (3TC)
- Stavudine (d4T)
- Tenofovir (TDF)
- Zidovudine (ZDV)

### NNRTIs
- Delavirdine (DLV)
- Efavirenz (EFV)
- Nevirapine (NVP)
- Etravirine (ETR)
- Rilpivirine (RPV)

### Integrase Inhibitor
- Raltegravir (RAL)

### PIs
- Atazanavir (ATV)
- Darunavir (DRV)
- Fosamprenavir (FPV)
- Indinavir (IDV)
- Lopinavir/ritonavir (LPV/r)
- Nelfinavir (NFV)
- Ritonavir (RTV)
- Saquinavir (SQV)
- Tipranavir (TPV)

### Fusion/Entry Inhibitors
- Enfuvirtide (ENF)
- Maraviroc (MVC)

*Some drugs available in fixed-dose combinations.

Available at: [http://www.aidsinfo.nih.gov/ContentFiles/AdultandAdolescentGL.pdf](http://www.aidsinfo.nih.gov/ContentFiles/AdultandAdolescentGL.pdf).
## Antiretroviral Therapy (ART)

### Goals of Therapy
- Decrease morbidity
- Increase survival
- Restore and preserve immune function
- Prevent transmission

### Guiding Principles
- Achieve maximal viral suppression
- Continuous suppression for maximum benefit
- Change treatment regimen for emerging drug resistance
- ART alone may not restore immune function
Adherence: Critical for Treatment Success

- Major determinant of degree and duration of viral suppression
- Optimal suppression requires excellent adherence
- Suboptimal adherence is common
  - Poor adherence is associated with virologic failure
- Indicators of adherence
  - Relationship with provider
  - Attendance at medical appointments
Preferred regimens: those with optimal and durable efficacy, favorable tolerability and toxicity profile, and ease of use

<table>
<thead>
<tr>
<th>Type</th>
<th>Regimen</th>
</tr>
</thead>
<tbody>
<tr>
<td>NNRTI based</td>
<td>EFV + TDF/FTC</td>
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<tr>
<td>Boosted PI</td>
<td>ATV/RTV + TDF/FTC</td>
</tr>
<tr>
<td></td>
<td>DRV/RTV + TDF/FTC</td>
</tr>
<tr>
<td>INSTI based</td>
<td>RAL + TDF/FTC</td>
</tr>
</tbody>
</table>
**DHHS Guidelines: Alternative Regimens for ART-Naïve Patients January 2011**

<table>
<thead>
<tr>
<th>Alternative Regimens</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>(Effective and tolerable but have potential disadvantages vs. preferred regimens)</td>
<td></td>
</tr>
</tbody>
</table>
| **NNRTI-based** | EFV + (ABC or ZDV)/3TC*  
NVP+ ZDV + 3TC* |
| **PI-based** | ATV/r + (ABC or ZDV)/3TC*  
FPV/r (qD or BID) + either (ABC or ZDV)/3TC or TDF/FTC*  
LPV/r (qD or BID) + either (ABC or ZDV)/3TC or TDF/FTC* |
Issues in the Primary Care Management of HIV Infection
Antiretroviral Drug Interactions: PIs and NNRTIs

- Can be substrates, inhibitors, or inducers of CYP450 metabolism (especially CYP 3A4)
  - Ritonavir: the most potent CYP 3A4 inhibitor
  - Used at low doses to inhibit metabolism of other PIs
  - Increases active PI drug exposure, prolongs half-life

- PIs interact with each other and with NNRTIs
  - Usually requires dose adjustment of PIs

CYP, cytochrome P.

Potential Interactions Between Antiretrovirals and Other Drugs:
Partial List

- **Rifamycins:** Decrease PI and NNRTI levels
  - Rifampin contraindicated with all PIs and NNRTIs except efavirenz
  - Rifabutin can be used in some cases with appropriate dose adjustments

- **PPIs:**
  - Avoid using with atazanavir
  - Use H₂ blockers with caution with atazanavir

- **Statins:** PIs increase some statin levels: start low, go slow
  - Avoid lovastatin, simvastatin
  - Use atorvastatin at low doses (10-40 mg/d) or rosuvastatin
  - Avoid pravastatin with darunavir
  - Warn patients about symptoms of rhabdomyolysis

Potential Interactions Between Antiretrovirals and Other Drugs: 
Partial List (cont’d)

- Methadone: Decreased levels with efavirenz, nevirapine, lopinavir/ritonavir, and nelfinavir; may precipitate withdrawal
- Oral contraceptives: May lower efficacy
- Benzodiazepines: PIs may increase levels
  - Midazolam and triazolam contraindicated with PIs
- Anticonvulsants: Monitor levels

HAART Adverse Events

- All ARVs are hepatotoxic
- Most can cause GI upset
  - Nausea and vomiting
  - Diarrhea
- Anemia/pancytopenia/abnormal LFTs
- Insomnia
- Rash
- Lipodystrophy
- Pancreatitis, peripheral neuropathy, lactic acidosis, renal stones

Remember:

**AZT:** anemia

**ABC:** hypersensitivity reaction

**NNRTI:** rash

**PI:** metabolic syndrome (lipids, glucose)

HAART: Long-Term Complications

Dyslipidemia/CHD

Hepatotoxicity

Abnormalities of Body Composition
Most AIDS-defining conditions are **opportunistic infections**, which rarely cause harm in healthy individuals. In people with AIDS, these infections are often severe.

**Bacteria:**
- Mycobacterium avium complex
- Mycobacterium tuberculosis

**Viruses:**
- Varicella-Zoster Virus
- Herpes Simplex Virus
- Cytomegalovirus

**Protozoa:**
- Coccidiosis (Cryptosporidiosis, Cyclosporiasis, and Isosporiasis)
- Toxoplasmosis
- Leishmaniasis (not in the US, but in southern Europe and in many other parts of the world)
- Chagas
- Malaria

**Fungi:**
- Pneumocystis jiroveci pneumonia
- Candidiasis
- Aspergillosis
- Cryptococcosis
- Histoplasmosis
- Coccidioidomycosis
- Microsporidiosis
## Prevention and Prophylaxis of Opportunistic Infections

<table>
<thead>
<tr>
<th>CD4 Cell Count</th>
<th>Prevention and Prophylaxis Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any CD4</td>
<td>Vaccines</td>
</tr>
<tr>
<td></td>
<td>Influenza, Pneumococcus, Hepatitis A and B, tetanus</td>
</tr>
<tr>
<td></td>
<td>Herpes suppression (recurrent outbreaks)</td>
</tr>
<tr>
<td></td>
<td>Tuberculosis</td>
</tr>
<tr>
<td>&lt;200 cells/µL</td>
<td>PCP prophylaxis</td>
</tr>
<tr>
<td>&lt;100 cells/µL</td>
<td>Toxoplasmosis prophylaxis (if Toxo IgG+)</td>
</tr>
<tr>
<td>&lt;50 cells/µL</td>
<td>MAC prophylaxis</td>
</tr>
</tbody>
</table>
TB Screening and Treatment

- Patients with HIV more susceptible to TB at all stages of disease

- Screening
  - PPD q 6-12 mo
  - >5 mm = positive
  - Anergy possible with very low CD4 counts

- HIV is an indication for treatment of latent TB
  - INH 300 mg/d x 9 mo
  - Pyridoxine 50 mg/d
Prevention
Management of Possible Nonoccupational HIV Exposures

Substantial exposure risk

≤72 hours since exposure

Source patient known to be HIV positive

nPEP recommended

Source patient of unknown HIV status

Case-by-case determination

>72 hours since exposure

nPEP not recommended

Negligible exposure risk

Substantial Risk for HIV Exposure

Exposure of
vagina, rectum, eye, mouth, or other mucous membrane, nonintact skin, or percutaneous contact

With
blood, semen, vaginal secretions, rectal secretions, breast milk, or any body fluid that is visibly contaminated with blood

When
the source is known to be HIV-infected

Negligible Risk for HIV Exposure

Exposure of
vagina, rectum, eye, mouth, or other mucous membrane, intact or nonintact skin, or percutaneous contact

With
urine, nasal secretions, saliva, sweat, or tears if not visibly contaminated with blood

Regardless
of the known or suspected HIV status of the source

### Considerations for nPEP as a Prevention Strategy

<table>
<thead>
<tr>
<th>Possible Risks of nPEP</th>
<th>Evidence to Support nPEP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decrease in risk-reduction behaviors</td>
<td>High-risk behaviors unlikely to decrease, but increases not documented</td>
</tr>
<tr>
<td>Serious adverse effects of ART in healthy people</td>
<td>Few serious/severe effects with occupational PEP</td>
</tr>
<tr>
<td></td>
<td>Avoid NVP-containing regimens</td>
</tr>
<tr>
<td>Development of HIV resistance</td>
<td>Probably a rare occurrence</td>
</tr>
<tr>
<td></td>
<td>Resistance testing recommended for patients who seroconvert despite nPEP</td>
</tr>
<tr>
<td>Cost-effectiveness</td>
<td>Few reports available</td>
</tr>
<tr>
<td></td>
<td>Behavioral interventions more cost-effective</td>
</tr>
</tbody>
</table>

nPEP = nonoccupational postexposure prophylaxis; ART = antiretroviral therapy; NVP = nevirapine

Antiviral Prevention of HIV in Women

TDF prevents incident HSV infections

- HSV infection rate: 29/202 vs. 48/224
- IRR 0.49 $P=0.003$

iPrEx: TDF/FTC Prep Effective in Reducing HIV Infection

Kaplan-Meier Estimates of Time to HIV Infection (mITT)

Overall Efficacy = 44% (P=0.005)

“Test and Treat”: Lowering Community Viral Load to Reduce HIV Transmission

Take-Home Points

- Per the CDC, all patients aged 13-64 should be screened for HIV
- PAs are integral in the co-management of the HIV-infected patient
- Antiretroviral therapy decreases HIV morbidity, increases survival, restores and preserves immune function, and prevents transmission
Q&A