HIV and Public Health: An Epidemic in Transition
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- Epidemiology
- Spectrum of HIV Infection
- CD4 & Viral Load
- Principles of HIV Therapy
- Related Infections and Co-Morbidities
- HIV Testing and Prevention
- Resources

A global view of HIV infection
38.6 million people [33.4–46.0 million] living with HIV, 2005

A global view of HIV infection

Estimated AIDS Cases in the United States and Puerto Rico
Cumulative through 2005  N = 975,350

Each Dot Represents 50 Cases

Estimated AIDS Cases in the United States and Puerto Rico
Cumulative through 2007  N = 1,049,714

Each Dot Represents 50 Cases

Note: Data have been adjusted using the following factors:
Deaths prior to 1987, AIDS cases reported before 1987, and cases reported before 2001.
HIV - U.S. Trends

- August 2006 CDC revised new HIV infection rate to 56,300 annually
- Decreasing pediatric infections
- Decreasing AIDS deaths = increasing prevalence
- Minority populations disproportionately affected
- Increasing heterosexual transmission, increasing women especially in southeast US
- Diagnosis LATE in spectrum of infection persists
- September 2006 CDC recommended change in testing approach
HIV SPECTRUM OF INFECTION

Acute Asymptomatic Early Sx AIDS
4-6 wks 10-12 years months-yrs
______/___________/________/______

AIDS-Defining Illnesses and Conditions
- Opportunistic Infections and Cancers
- Wasting
- AIDS-Related Dementia
- T4 (CD4) count < 200

Association between virologic, immunologic, and clinical events and time course of HIV infection

CD4 Count
- CD4+ T-Lymphocytes
- “Conductor” of the Immune System “Orchestra”
- Normally 600-1200
- Can be lower due to illness, stress, pregnancy
- Gradually decrease over the course of HIV Infection
- Can increase with ARV therapy
- Usually checked every 3 months outpatient

HIV Viral Load
- Indirect Measure of Viral Replication in the body - lymph nodes, CNS, GI tract
- Higher with acute illness, immunization, also seroconversion or reinfection
- Higher viral load - increased risk of disease progression (>100,000)
- Lower viral load - decreased risk of disease progression (<100,000)
- Undetectable viral load - means ARV medications are working, NOT that virus is gone

Principles of HIV Therapy
- Combination therapy is better than monotherapy.
- HAART - Highly Active Antiretroviral Therapy - 3 or 4 drugs, usually from 2 or 3 classes of antiretrovirals.
- When to start therapy depends on CD4 count, HIV viral load, patient symptoms, and patient ability to be adherent to medication regimen.
- When resistance develops drugs should be changed or added based on HIV genotype resistance profile.
- Antiviral therapy ideally begun outpatient.
- Once started, can therapy be safely interrupted?
  SMART Study data: Not recommended
STD Epidemiology

- Each year, there are approximately 19 million new STD infections, and almost half of them are among youth aged 15 to 24.
- In 2006, an estimated 8,445 young people aged 13-24 in the 33 states reporting to CDC were diagnosed with HIV/AIDS, representing about 15% of the persons diagnosed that year.
**HIV Antibody Testing**

- Tests for presence of ANTIBODY, NOT directly for virus.
- Many of those infected produce detectable antibody by 28 days after infection.
- 95% have detectable antibody in 3 months.
- CDC: By 6 months after infection, it would be rare for anyone infected not to have detectable antibody.

**HIV Antibody Testing Technology**

- Blood Tests - “Gold Standard”
- “Home Access” Home Test Kit
- Orasure - Tests Oral Transmucosal Exudate
- Urine Tests - expensive
- Rapid Test Kits: **ELISA only, positive test needs confirmation**
  - Oraquick- approved for blood and oral testing
  - Reveal - requires whole blood sample
  - Clearview – requires blood fingerstick
HIV Testing and Other Routine Tests: Cost-Effectiveness Compared

<table>
<thead>
<tr>
<th>Test</th>
<th>Cost-Effectiveness Compared</th>
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<tbody>
<tr>
<td>HIV test: All inpatients†</td>
<td>38,600</td>
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<tr>
<td>HIV test every 5 years: People at high risk (3% prevalence)†</td>
<td>50,000</td>
</tr>
<tr>
<td>HIV test one time (7% prevalence); Individual benefit only</td>
<td>41,736</td>
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<tr>
<td>Including benefit to others</td>
<td>15,078</td>
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<tr>
<td>HIV test one time: U.S. general population (0.1% prevalence)‡</td>
<td>113,000</td>
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<tr>
<td>Breast cancer test: Annual mammogram, age 50-69§</td>
<td>57,500</td>
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<tr>
<td>Colon cancer test: FOBT + SIG every 5 years, age 50-65§</td>
<td>57,700</td>
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<tr>
<td>Type 2 diabetes test: Fasting blood glucose, age ≥65§</td>
<td>70,000</td>
</tr>
<tr>
<td>Hypertension testing§</td>
<td>48,000</td>
</tr>
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*In quality-adjusted life years (QALYs), which account for both longevity and health-related quality of life.
†Paltiel et al. (2005); ‡Sanders et al. (2005); §Adapted from personal communication, Sanders and Paltiel, 2005.

HIV Risk Reduction - Perinatal

◆ ACTG 076 (1993) demonstrated giving zidovudine to pregnant HIV+ women decreased vertical transmission to 8% (control group had 25% vertical transmission rate).
◆ Ongoing research of combination therapies for further decreased perinatal prevention.
◆ HIV testing should be OFFERED to all women seeking prenatal care.

Results of ACTG 076 (1993)

- This represents a 66% reduction in risk for transmission (P < 0.001)

Pregnant Women

Since 2001:
- Routine, voluntary HIV testing as a part of prenatal care, as early as possible, for all pregnant women
- Simplified pretest counseling
- Flexible consent process

Since 9/26/2006:
- Standard prenatal screening
- Opt OUT testing
- Repeat screening 3rd trimester in high HIV prevalence jurisdictions
HIV PREVENTION COUNSELING

- CDC Guidelines recommend that counseling around HIV focus on PREVENTION of new HIV infections (Primary Prevention) or
- PREVENTION of reinfections or transmission of HIV from someone known to be HIV infected (Secondary Prevention)
- through behavior change.

HIV Risk Reduction Counseling

Broadly covers:
- Knowledge of Risk
- Personal Perception of Risk
- Readiness to Change
- Self-Efficacy
- Skill Development
- Reinforcements of Behavior Change
- Identification of Barriers for Risk Reduction behavior

John Kelly, 1992

Causes of death for HIV+ patients

- Cardiovascular Malignancies
- Liver Disease
- Lower CD4 count = increased death rate from all causes, increased chance of AIDS-related cause
- “AIDS-related events are no longer the major causes of death of HIV-infected patients in the era of HAART.”
  - Bonnet F, et al., Causes of death among HIV-infected patients in the era of highly active antiretroviral therapy. HIV Medicine
  - “While AIDS-defining events have been steadily decreasing as a cause of death, there has been an increase in deaths from non-AIDS-related infections and liver-related diseases.”

Smoking Cessation should be priority in HIV care

- “Cigarette smoking is the most important modifiable cardiovascular risk factor among HIV-infected patients.”
- “Cessation of smoking is more likely to reduce cardiovascular risk than either the choice of antiretroviral therapy or the use of any lipid-lowering therapy.”
Increased Risk of Some Malignancies

- "The incidence of many non-ADM were significantly higher ... suggesting that HIV-infected persons are at higher risk of developing certain cancers
- In addition to encouraging tobacco cessation, health care providers should consider enhanced monitoring for these malignancies in their HIV-infected patients."

AIDS-Defining Malignancies

- Kaposi’s Sarcoma
- Burkitt’s Lymphoma
- B-Cell Lymphoma
- Primary Lymphoma of Brain
- Invasive Cervical Carcinoma
- Cancer Diagnosis may be initial AIDS-defining illness, or may lead to HIV diagnosis in unsuspecting patient

Non-AIDS Defining Malignancies

- Lung Cancer – 3 times increased risk
- Leukemia – 3 times increased risk
- Anal Cancer
- Hodgkin’s Disease
- Liver Cancer
- Testicular Cancer
- Melanoma
- Oropharyngeal Cancer
- No increased incidence rate for colorectal or renal cancers
- Decreased incidence rate breast and prostate cancer

Online Web Resources

- www.cdc.gov/hiv/ Centers for Disease Control
- www.unaids.org United Nations Programme on HIV/AIDS
- www.aidsinfo.nih.gov Treatment Guidelines, Drug and Clinical Trials Information from US Public Health Service and National Institutes of Health

Resources

- Virginia Department of Health HIV/STD/Viral Hepatitis Hotline
  800-533-4148
- VDH AIDS Drug Assistance Program
- http://www.vdh.state.va.us/epidemiology/DiseasePrevention/Programs/ADAP/index.htm
- VCU HIV/AIDS Center
  804-828-2210
  jzeh@vcu.edu