THE EPIDEMIOLOGY OF HIV/AIDS
Human Retroviruses
Adults and children estimated to be living with HIV | 2011

- North America: 1.4 million [1.1 million – 2.0 million]
- Caribbean: 230,000 [200,000 – 250,000]
- Latin America: 1.4 million [1.1 million – 1.7 million]
- Western & Central Europe: 860,000 [780,000 – 960,000]
- Middle East & North Africa: 330,000 [250,000 – 450,000]
- Sub-Saharan Africa: 23.5 million [22.2 million – 24.7 million]
- Eastern Europe & Central Asia: 1.5 million [1.3 million – 1.8 million]
- East Asia: 830,000 [590,000 – 1.2 million]
- South & South-East Asia: 4.2 million [3.1 million – 4.7 million]
- Oceania: 53,000 [47,000 – 60,000]

Total: 34.2 million [31.8 million – 35.9 million]
Estimated number of adults and children newly infected with HIV | 2011

Total: 2.5 million [2.2 million – 2.8 million]
### Global summary of the AIDS epidemic | 2011

#### Number of people living with HIV

<table>
<thead>
<tr>
<th>Category</th>
<th>Total</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>34.2 million</td>
<td>[31.8 million–35.9 million]</td>
</tr>
<tr>
<td>Adults</td>
<td>30.7 million</td>
<td>[28.6 million–32.2 million]</td>
</tr>
<tr>
<td>Women</td>
<td>16.7 million</td>
<td>[15.7 million–17.8 million]</td>
</tr>
<tr>
<td>Children (&lt;15 years)</td>
<td>3.4 million</td>
<td>[3.1 million–3.9 million]</td>
</tr>
</tbody>
</table>

#### People newly infected with HIV in 2011

<table>
<thead>
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<th>Category</th>
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<tr>
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</tr>
<tr>
<td>Adults</td>
<td>2.2 million</td>
<td>[2.0 million–2.4 million]</td>
</tr>
<tr>
<td>Children (&lt;15 years)</td>
<td>330 000</td>
<td>[280 000–380 000]</td>
</tr>
</tbody>
</table>

#### AIDS deaths in 2011

<table>
<thead>
<tr>
<th>Category</th>
<th>Total</th>
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<tr>
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<tr>
<td>Adults</td>
<td>1.5 million</td>
<td>[1.3 million–1.7 million]</td>
</tr>
<tr>
<td>Children (&lt;15 years)</td>
<td>230 000</td>
<td>[200 000–270 000]</td>
</tr>
</tbody>
</table>
Over 7000 new HIV infections a day in 2011

- About 97% are in low and middle income countries
- About 900 are in children under 15 years of age
- About 6000 are in adults aged 15 years and older, of whom:
  - almost 47% are among women
  - about 41% are among young people (15-24)
HIV/AIDS – USA 2009

Living with HIV/AIDS = 1.2 million
Incidence = 56,000/year

- MSM = 53%
- Heterosexuals = 31%
- IDUs = 12%

Ethnicity
- African-American = 45%
- African-American women vs European/Caucasian women = 15:1
- Hispanic-Americans vs European-Americans = 3:1

Percent unaware and potentially transmitting = 20%
Cost per lifetime treatment = $355,000
MODES OF TRANSMISSION

- Blood
- Semen/genital secretions
- Vertical
RISK ACTIVITIES THAT PROMOTE TRANSMISSION OF HIV (1)

- Receiving blood contaminated with HIV
- Being born to an HIV-infected mother
- Engaging in anal intercourse with an HIV-infected partner
- Engaging in vaginal intercourse with an HIV-infected partner
RISK ACTIVITIES THAT PROMOTE TRANSMISSION OF HIV (2)

- Engaging in oral-genital intercourse with an HIV-infected partner
- Sharing needles with an HIV-infected individual
- Being exposed to HIV-infected material; e.g., health or laboratory worker
RISK GROUPS

- Homosexual/bisexual
- Intravenous drug users
- Promiscuous heterosexuals
- Spouses of promiscuous persons
- Blood product and organ recipients
- Children of infected individuals
- Health/laboratory workers
<table>
<thead>
<tr>
<th>Event</th>
<th>Risk Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transfusion of 1 unit of blood</td>
<td>90-95%</td>
</tr>
<tr>
<td>From mother to fetus/infant</td>
<td>7-39%</td>
</tr>
<tr>
<td>During birth</td>
<td>10-20%</td>
</tr>
<tr>
<td>During breastfeeding</td>
<td>5-15%</td>
</tr>
<tr>
<td><em>In utero</em></td>
<td>5-10%</td>
</tr>
<tr>
<td>ART at delivery</td>
<td>6-8%</td>
</tr>
<tr>
<td>With HAART 4th-9th months</td>
<td>&lt;1%</td>
</tr>
</tbody>
</table>
## Risk of HIV Transmission (2)

### Sexual intercourse*

<table>
<thead>
<tr>
<th>Type</th>
<th>Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Receptive anal intercourse</td>
<td>1-30%</td>
</tr>
<tr>
<td>Insertive anal intercourse</td>
<td>0.1-10%</td>
</tr>
<tr>
<td>Vaginal intercourse – female</td>
<td>0.1-10%</td>
</tr>
<tr>
<td>Vaginal intercourse – male</td>
<td>0.1-1%</td>
</tr>
<tr>
<td>Oral-genital</td>
<td>&lt;1%</td>
</tr>
</tbody>
</table>

*STDs multiply risk*

### Other

<table>
<thead>
<tr>
<th>Type</th>
<th>Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accidental exposure (laboratory or clinical worker) per exposure</td>
<td>0.09%</td>
</tr>
<tr>
<td>Injection drug use (per sharing episode)</td>
<td>0.67%</td>
</tr>
</tbody>
</table>
The major force maintaining the epidemic is persons who do not know they are infected.
Impact of the HIV/AIDS Epidemic On the Individual

- Uncertain future
- Contemplating painful death
- Stigmatization and social isolation
- Loss of employment
- Limited access to health care
- Loss of self-esteem
Impact of the HIV/AIDS Epidemic

On the Family

- Potential infection of spouse and children
- Loss of economic support of family
- Ostracism and social isolation
- Children become orphans
Impact of the HIV/AIDS Epidemic

On Society

- Loss of productive segment of society
- Increased number of dependents
- Breakdown of family structure
- Sense of fear and distrust
Impact of the HIV/AIDS Epidemic on Developing Countries

Increased Health Care Costs

- Diversion of funds from other urgent health problems
- Issues and costs of care and hospitalization
Impact of the HIV/AIDS Epidemic in Developing Countries

Alteration of the Producer:Dependent Ratio

- Decreased productivity due to illness
- Removal of producers by death
- Increased number of dependents:
  - Sick babies
  - Increased number of orphans
Impact of the HIV/AIDS Epidemic

On the Economic and Political Well-Being of the Nation

- Alteration of the producer:dependent ratio
- Increased health care costs
- Social impact
- Political impact
Impact of the HIV/AIDS Epidemic in Developing Countries

Political impact

- Political instability
- Increased dependency on rich nations
Key Elements for Successful Intervention (1)

- Mobilization of political will and commitment
- Good surveillance
- Learn and adapt from past experiences
- Unified national planning
- Multisectoral response
- Rapid implementation
Key Elements for Successful Intervention (2)

- Focused intervention; e.g., involve marginalized and high-risk groups
- Assure access to intervention tools; e.g. condoms, testing, drugs
- Early education
- Community involvement
- Combining of interventional strategies
Key Elements for Successful Intervention (3)

- Reduce barriers to intervention
  - Address restrictive cultural norms (e.g. refusal to acknowledge sexuality)
  - Stigmatization
  - Promote testing (opt out)
- Treatment
  - Adults
  - Pregnant women
- Development of effective vaccine
Key Elements for Successful Intervention (4)

- Development of an effective microbicide
  - Issues of testing i.e. mandatory condom use
  - Recognition of risk by participants
  - Adherence
  - Drug resistance for anti-HIV microbicides
  - Irritation of vaginal mucosa
    - Same microbicide for low- and high-risk women?
  - Efficacy of tenofovir – 43%
HIV/AIDS PREVENTIONS THAT WORK (CDC) (1)

- Surveillance for HIV
- HIV testing
- Counseling of persons living with HIV/AIDS
- Condom promotion and availability
- Partner services/notification
- Reaching populations in need; e.g., pregnant women
HIV/AIDS PREVENTIONS THAT WORK (CDC) (2)

- Harm reduction for IDUs
  - Needle exchange
  - Methadone maintenance
- Antiretroviral therapy
- Circumcision
- Screening and treatment of STDs
- Tenofovir prophylaxis for MTCT
- Treatment (as prevention)
  - Prep
  - Pep
FORECASTING THE EPIDEMIC (1)

A. Increase in homosexual transmission
B. Decrease in pediatric cases (depends on screening efforts and treatment)
C. Improved, cheaper treatments increase survival
D. Increased costs to society as survival increases
E. Increasing incidence of HIV-related cancers
F. Aging is accelerated
G. Conversion to an endemic disease
H. Greater impact on poor countries
I. Countries capable of social, cultural and economic change survive
J. Dependence of developing countries on “rich” countries (economic colonialism)
K. Development of vaccine will impact primarily developing countries
L. Treatment issues in developing countries:
   1. Need for greater acceptance of testing
   2. Need for infrastructure for clinical management
   3. Need for inexpensive low-tech markers of disease progression/remission
   4. Finding HIV+ persons
   5. Assuring continuum of care

M. Need to plan for sustaining programs when foreign support is withdrawn
GO FORTH WITH PROTECTION