Patterns in Transitions From Injection Drug Use to Heterosexual HIV/AIDS Epidemics

Don C. Des Jarlais, Jonathan Feelemyer, Shilpa Modi, Kamyar Arasteh, Bradley Mathers, Louisa Degenhardt, Holly Hagan

The European and International Congress
THS 10: Addiction, Hepatitis and AIDS
Biarritz, France
Acknowledgements

- NIH Grant AI R01 083035

- No conflicts of interest
Background

- One of the potential consequences of high levels of HIV infection among injection drug users (IDU) is that it may lead to a self-sustaining heterosexual epidemic.
Methods

- Identification of locations with greater than 20% HIV prevalence among Injection Drug Users
  - Mathers et al. and Aceijas et al.

- Plotting of HIV/AIDS Cases by year according to risk group
  - Injection Drug Users, Heterosexuals
  - Utilization of UNGASS, UNAIDS and Country Health Department key contacts to obtain latest and complete figures on incidence of HIV/AIDS by year for each location
Results

1) No transition: Countries that still remain in an IDU concentrated HIV/AIDS epidemic and did not experience a transition to a heterosexually sustained HIV/AIDS epidemic

2) A rapid, high HIV/AIDS incident transition, occurring within two years of peak incidence of HIV/AIDS cases among the IDU population and at a level $\geq 80\%$ of the incidence peak among IDU

3) A long term, lower HIV/AIDS incident transition, occurring eight to ten years after peak incidence among IDUs and at $\leq 50\%$ of peak incidence for IDU
<table>
<thead>
<tr>
<th>No Transition</th>
<th>High Fast Transition</th>
<th>Low Slow Transition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estonia</td>
<td>Argentina</td>
<td>Italy</td>
</tr>
<tr>
<td>Russia</td>
<td>Brazil</td>
<td>New York City</td>
</tr>
<tr>
<td>Vietnam</td>
<td>China</td>
<td>Scotland</td>
</tr>
<tr>
<td>France</td>
<td></td>
<td>Spain</td>
</tr>
<tr>
<td>Indonesia</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Netherlands</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ukraine</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
No Transition Countries

Estonia

Annual Number of HIV Cases

- IDU
- Heterosexual
- Total HIV Cases
Vietnam

Annual Number of HIV Cases


Heterosexual  IDU  Total HIV Cases
2. Rapid, High HIV/AIDS Incidence Transitions:

Annual Number of AIDS Cases

Argentina

<table>
<thead>
<tr>
<th>Year</th>
<th>IDU</th>
<th>Heterosexual</th>
<th>Total AIDS Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>1985-1986</td>
<td>0</td>
<td>0</td>
<td>5000</td>
</tr>
<tr>
<td>1987-1988</td>
<td>0</td>
<td>0</td>
<td>4000</td>
</tr>
<tr>
<td>1989-1990</td>
<td>0</td>
<td>0</td>
<td>3000</td>
</tr>
<tr>
<td>1991-1992</td>
<td>0</td>
<td>0</td>
<td>2000</td>
</tr>
<tr>
<td>1993-1994</td>
<td>0</td>
<td>0</td>
<td>1000</td>
</tr>
<tr>
<td>1995-1996</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Note: The chart shows the annual number of AIDS cases in Argentina from 1985 to 2008, distinguishing between IDU, heterosexual transmission, and total AIDS cases.
Netherlands

Annual Number AIDS Cases

IDU  Heterosexual  Total AIDS Cases

3. Long-term, Low HIV/AIDS Incidence Transitions:

- Annual Number of AIDS Cases
- Italy

- IDU
- Heterosexual
- Total AIDS Cases
New York City

Annual Number of AIDS Cases

IDU, Heterosexual, Total AIDS Cases

1986 to 2008
Scotland

Annual Number of AIDS Cases

Heterosexual
IDU
Total HIV Cases

0  50  100  150  200  250  300  350  400  450  500

Heterosexual
IDU
Total HIV Cases
Spain

Annual Number of AIDS Cases

- IDU
- Heterosexual
- Total AIDS Cases

Data from 1982 to 2008
Methods

- Systematic literature search for data on factors that might facilitate transitions from IDU concentrated to sustained heterosexual epidemics

- Selection of median value for countries with multiple studies of potential facilitating factors

- Dichotomization of countries on values for potential facilitating factors
Facilitating Factors: IDU Transmission

- Rapid increase in spread of HIV among injection drug users
- Persistent high HIV incidence among injection drug users (instead of a rapid decline in incident cases)
- Risky injection behaviors including sharing of needles/syringes and other injection related equipment
Facilitating Factors: IDU Transmission to Heterosexuals

- High prevalence of syphilis, especially among injection drug users
- High HIV prevalence among female injection drug users
- Elevated HIV prevalence among commercial sex workers, including those sex workers who also inject drugs
- High levels of male IDU utilizing the services of female commercial sex workers
Facilitating Factors: Heterosexual Transmission in the General Population

- Elevated syphilis among commercial sex workers
- Elevated incidence of syphilis in the general population
## Facilitating Factors by Location

<table>
<thead>
<tr>
<th>Income</th>
<th>Argentina</th>
<th>Brazil</th>
<th>China</th>
<th>France</th>
<th>Indonesia</th>
<th>Netherlands</th>
<th>Ukraine</th>
<th>Italy</th>
<th>NYC</th>
<th>Scotland</th>
<th>Spain</th>
<th>Estonia</th>
<th>Russia</th>
<th>Vietnam</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low/middle</td>
<td>Low/middle</td>
<td>Low/middle</td>
<td>Low/middle</td>
<td>High</td>
<td>Low/middle</td>
<td>High</td>
<td>Low/middle</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>Low/middle</td>
<td>Low/middle</td>
</tr>
<tr>
<td>National Peak HIV Prevalence among IDU</td>
<td>Low</td>
<td>High</td>
<td>Low</td>
<td>Low</td>
<td>High</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>High</td>
<td>Low</td>
<td>High</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>Speed of HIV Spread</td>
<td>Moderate</td>
<td>Moderate</td>
<td>Moderate</td>
<td>Moderate</td>
<td>Rapid</td>
<td>Moderate</td>
<td>Rapid</td>
<td>Moderate</td>
<td>Moderate</td>
<td>Moderate</td>
<td>Rapid</td>
<td>Rapid</td>
<td>Moderate</td>
<td></td>
</tr>
<tr>
<td>Persistence of Incidence of HIV among IDU</td>
<td>Persistent</td>
<td>Persistent</td>
<td>Persistent</td>
<td>Rapid Decline</td>
<td>Persistent</td>
<td>Persistent</td>
<td>Persistent</td>
<td>Rapid decline</td>
<td>Rapid decline</td>
<td>Rapid decline</td>
<td>Rapid decline</td>
<td>Rapid decline</td>
<td>Rapid decline</td>
<td>Rapid decline</td>
</tr>
<tr>
<td>Female IDU Prevalence</td>
<td>High</td>
<td>Low</td>
<td>High</td>
<td>High</td>
<td>Low</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>Low</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>Female IDU who are CSWs</td>
<td>Low</td>
<td>High</td>
<td>High</td>
<td>Low</td>
<td>Low</td>
<td>High</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>High</td>
<td>Inconsistent</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>Male IDU utilizing female CSWs</td>
<td>No Data</td>
<td>High</td>
<td>High</td>
<td>No Data</td>
<td>High</td>
<td>No Data</td>
<td>Low</td>
<td>No Data</td>
<td>High</td>
<td>Low</td>
<td>No Data</td>
<td>High</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>Syphilis Prevalence (IDU)</td>
<td>Low</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>Low</td>
<td>High</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>Syphilis Prevalence (CSW)</td>
<td>High</td>
<td>High</td>
<td>Low</td>
<td>Low</td>
<td>High</td>
<td>Low</td>
<td>High</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>Syphilis Incidence (Gen. Population)</td>
<td>High</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>High</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>High</td>
<td>High</td>
</tr>
</tbody>
</table>
## Differentiating High Incidence, Rapid Transitions from Low Incidence, Delayed Transitions

<table>
<thead>
<tr>
<th></th>
<th>High, Rapid</th>
<th>Low, Delayed</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Low/Middle National Income</strong></td>
<td>5/7</td>
<td>0/4</td>
</tr>
<tr>
<td><strong>Persistence of High Incidence among IDU</strong></td>
<td>6/7</td>
<td>0/4</td>
</tr>
<tr>
<td><strong>High Syphilis among IDU</strong></td>
<td>5/6</td>
<td>0/3</td>
</tr>
</tbody>
</table>

* Missing data for two countries
In several of the low, slow transition countries, the transition to heterosexual transmission as the predominant mode of HIV acquisition was influenced by several changes among IDU including:

- Lowered levels of HIV acquisition due to harm reduction programs including NSEP (Needle/Syringe Exchange Programs) and voluntary counseling and testing
- Opiate substitution therapy (OST) for IDU to reduce initiation into and continued injection drug use
- Changes in route of administration for some drugs, including changes from injecting to smoking/inhaling cocaine and other drugs that were normally injected
Potential Interventions to Reduce High, Rapid Transitions

For Low/Middle National Income Countries

- Increased Resources (monetary and technical) from international donors
- Increased Political Will to address HIV among persons who inject drugs and other groups at increased risk for HIV
Potential Interventions to Reduce High, Rapid Transitions

For Persistent High Incidence among IDUs

- Rapid scale up of Needle/Syringe Programs. User-friendly, encourage secondary exchange, multiple services and voluntary counseling and testing
- Medication-Assisted Treatment (methadone and buprenorphine) to reduce frequency of injection. Low and high threshold programs
- Programs to Reduce Initiation into Drug Injecting (“Sniffer” Program, Break the Cycle)
Potential Interventions to Reduce High, Rapid Transitions

For High Rates of Syphilis and other STIs among IDUs

- Screening and Treatment for Syphilis and other STIs. Expedited Partner Treatment?
- Large Scale Condom Distribution

- HIV Counseling and Testing
- Anti-Retroviral Treatment (ART) at high CD4 Cell Counts?
  - HPTN 052
Factors influencing heterosexual transmission

Several factors influenced heterosexual HIV/AIDS cases among low, slow transition countries, including:

- Elevated level of migrants, especially among the commercial sex working population
- Infections acquired by individuals infected heterosexually in different countries
- High prevalence of syphilis, which can increase heterosexual HIV transmission
- Changes from injecting to less-risky routes of administration of drugs including inhaling or smoking
- Increased use of non-injectable drugs, including crack cocaine, that have been documented to increase risky sex practices
Limitations

- HIV Cases vs. AIDS cases plotted
- Country as Unit of Analysis—imprecision for incidence data, need to aggregate to country level
- Facilitating factors were aggregated to national level—there may be differences at the city level
- Several facilitating factors are not regularly coded in studies, such as male IDU utilizing sex workers
- Other HIV Transmission modes were not considered:
  - Men who have sex with men (MSM), though in most of these countries injecting drug use initial driver of the HIV epidemic
Conclusions

- First international study of transitions from IDU concentrated to sustained heterosexual epidemics.

- Transitions have occurred in 11 of 14 countries with high seroprevalence (< 20%) among IDUs.

- No “reverse” transitions back to higher incidence among IDUs than heterosexuals—sustained heterosexual transmission.
Conclusions

Two distinct patterns of transitions:

1. High incidence, rapid transitions at incidence <80% of IDU peak incidence, within 2 years of peak IDU incidence

2. Low incidence, transitions at incidence >50% of peak IDU incidence, typically 8 – 10 years after peak IDU incidence.
Conclusions

- Identification of Potential Facilitating Factors for High Incidence, Rapid Transitions:
  - Low/Middle income countries
  - Persistent high incidence among IDUs
  - High rates of syphilis among IDUs
  - Rapid scale up of Needle /Syringe Exchange Programs
  - Programs to reduce initiation into injecting
  - Screening and treatment for syphilis
References


- UNAIDS. (2010). *UNGASS Narrative Report*


