Social Networks and Group Sex among Drug Users and Others: Mixing Patterns and the Limitations of Current HIV and Drug Use Interventions

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I would like to acknowledge

- NIDA projects:
  - R01 DA006723 Social Factors and HIV Risk
  - R01 DA13128 (Networks, norms & HIV risk among youth)
  - R01 DA DA019383-01A1 Staying Safe: Long-term IDUs who have avoided HIV & HCV
  - P30 DA11041 (Center for Drug Use and HIV Research; Sherry Deren PI)

- Hundreds of participants in these studies
- Colleagues and participants who have died of HIV/AIDS and hepatitis C
- Many collaborators and co-authors
Social and risk networks
Most HIV epidemiology, prevention, and policy has focused on individual knowledge, attitudes, personality and behaviors:
People also have social and behavioral ties of various types and strengths.
Risk (sex, IDU) network ties can carry infections:

Within relationships

To or from an individual

Throughout a community or small group
Social research insight 1:

risk networks carry infections via behaviors . . . And this can help us understand both why HIV can spread quickly in some circumstances and help us develop prevention strategies
HIV risk is a conditional probability: Risk behaviors with uninfected people do not lead to infection.

The probability is socially structured.

Unknown, but GC+ and HSV-2+

Negative

+, on HAART
What do real risk networks look like?

• I will show you one from a study of injection drug users in New York City; one from a study of sex workers in British Columbia (Canada), and then spend some time discussing a New York City mixed-group network.
SFHR slide of 30-day risk relationships among IDUs in Brooklyn in early 1990s
Microstructures of large components in SFHR:
more risk behavior, more HIV, but more health communication about condoms and bleach.
Canada: sex workers are pink circles, clusters of pink circles are brothels (massage parlours), blue squares are commercial clients, blue triangles are boyfriends or husbands, and pink triangles are wives/girlfriends. The 7 circles clusters represent massage parlours where recruitment took place, from 4 cities in the Vancouver area. Source: Valencia Remple.
HIV Positive by Gender/Sexuality (MSM=up triangle, WSW=down triangle, other female=circle, other male=square) by Hardest Drug Use Ever (from dark red to light pink: IDU, Crack, Non-injected Heroin or Cocaine; blue=other) by Link Type (sex=yellow line, IDU=red, sex and IDU=blue) (New York)

3-month links
HSV2 Positive by Gender/Sexuality (MSM=up triangle, WSW=down triangle, other female=circle, other male=square) by Hardest Drug Use Ever (from dark red to light pink: IDU, Crack, NI Heroin or Cocaine; blue=other) by Link Type (sex=yellow line, IDU=red, sex and IDU=blue)
HIV discordant couples are where much HIV transmission takes place: Which STIs are likely to be important in facilitating HIV spread?

- Of 30 HIV-discordant partnerships in the diagram:
  - 5 were same-sex male partnerships and 25 were opposite-sex partnerships.
  - HSV-2 was present in 83% of the HIV-discordant couples; CT in 7%; and syphilis & gonorrhea in none.
  - HSV-2 is probably more important for HIV transmission than bacterial STDs since it is more widespread in NYC—and some African studies.
  - This may be because of effective syphilis and gonorrhea control in NYC at least.
Hidden risk: Although very little research has been done on this, group sex activities are likely to increase risks.

<table>
<thead>
<tr>
<th>Drug Use</th>
<th>Attended group sex event</th>
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<tbody>
<tr>
<td>Use no drugs or only marijuana</td>
<td>25%</td>
</tr>
<tr>
<td>Use non-injected cocaine or heroin</td>
<td>47%</td>
</tr>
<tr>
<td>IDU</td>
<td>35%</td>
</tr>
<tr>
<td>Female</td>
<td>28%</td>
</tr>
<tr>
<td>Male</td>
<td>42%</td>
</tr>
<tr>
<td>Non-injecting drug users in rural North Carolina</td>
<td>46%</td>
</tr>
<tr>
<td>Lower East Side (New York) youth aged less than 25</td>
<td>34%</td>
</tr>
</tbody>
</table>
Attended Group Sex Party (Pluses) and Had Unsafe Sex at Group Sex Party (Circles) by Gender/Sexuality (MSM=up triangle, WSW=down triangle, other female=circle, other male=square) by Hardest Drug Use Ever (from dark red to light pink: IDU, Crack, NI Heroin or Cocaine; blue=other) by Link Type (sex=yellow line, IDU=red, sex and IDU=blue)
Two views of sexual networks, where lines represent partnerships between people (circles)

a. Several unconnected sexual networks

b. Several people attend a group sex event and some have sex with unknown strangers under the influence of drugs and the excitement of the event
Figure 2. Factors potentially affecting behaviors and partnerships at some GSEs. We anticipate that these processes may vary among GSEs of different types.

<table>
<thead>
<tr>
<th>Social interactions, needs and subcultures outside of GSEs while “hanging out” (or otherwise)</th>
<th>Alcohol or drug use by self or friends</th>
<th>Emergent “Pro-Risk” norms of the scene</th>
<th>Emerging atmosphere of sensuality and pleasure and defiance of inhibitions</th>
<th>Actual behaviors and partnerships</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial expectations, plans and norms about substance use, partnerships and behaviors at the event. These may vary with attendees’ characteristics.</td>
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<tr>
<td>Actions by self, friends and/or others to limit or reverse the impacts of substance use, emergent pro-risk norms and/or unanticipated pressures to engage in risks</td>
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</tbody>
</table>
Role of AHI in Sustaining an Epidemic

- Hollingsworth et al suggest that the relative infectiousness of AHI may vary during the history of a local epidemic:
  - Early in an epidemic: The number of infected individuals grows exponentially, most are in the early stages, most transmission is caused by individuals with AHI
  - Epidemic progresses: Proportion of transmission due to AHI decreases, while proportion due to asymptomatic or AIDS increases
  - Established epidemic: Transmissions due to AHI = 11%, Asymptomatic= 68%, AIDS = 21%

Modified from Hollingsworth, TD et al. Has the role of PHI being overstated? 13th CROI, Denver, Feb 06 as presented by Birkhead at Acute HIV Infection: A Multidisciplinary Symposium, NYC, June, 2006
Calculated probabilities of transmission per coital act

HIV infection chains

• The concepts below will be shown visually over the next few slides

• Infection chains show how transmission events move through injection or sexual networks over time, and provide cues for locating and recruiting people with highly-infectious acute HIV infection (AHI).

• Venues are locations where people take risks together (shooting galleries; group sex events; brothels) or meet new partners (bars, strolls)
Stages of HIV infection and CURRENT testing technologies

- At Risk for HIV Infection
- Acute HIV Infection (AHI)
- Recent HIV Infection (RHI)
- Chronic HIV Infection

- Negative on all tests
- VL positive, antibody negative; duration ~ 2 months
- Non-acute infection detected within about 6 months of HIV acquisition; duration ~ 4 months
- Duration ~ 10 years before AIDS
Infection Chains

Solid arrows are actual infection paths
Dotted lines are other IDU or sexual networks

**Original Infection**

- **Acute HIV Infection**
- **Chronic HIV Infection**
- **Recent HIV Infection**
- **At Risk for HIV Infection**
Infection Chains

Solid arrows are actual infection paths
Dotted lines are other IDU or sexual networks

- Source Infection
- Chronic HIV Infection
- Acute HIV Infection
- Recent HIV Infection
- At Risk for HIV Infection
Infection Chains

Solid arrows are actual infection paths
Dotted lines are other IDU or sexual networks

Original Infection

Chronic HIV Infection

Recent HIV Infection

At Risk for HIV Infection

Acute HIV Infection
Social network and venue tracing save time

Venues (shooting gallery, crack house, sex party, singles bar)
Social research insight 2:

Social influence networks carry messages, norms, and other influence that can shape risk behaviors, the extent to which people seek medical treatment or counseling, and the extent to which people adhere to medications.
This involves the activity of social network ties, which can carry influence:

Within relationships

To or from an individual

Throughout a community or small group
Drug users and others provide risk reduction and medical adherence education and persuasion to others

- We invented the word “intravention” to describe people in a community acting to help others to take actions that will protect them or improve their health.
- When they urge others to behave in safer ways, or to adhere to the rules on when to take their medicines, this is how norms are enacted and maintained.
Alters’ urging shapes Ego’s external normative environment
Community organization in relationship to networks: Even the most “rooted” CBO has the problem of trying to reach and influence non-members.
Schematic diagram of intravention as a context for intervention efforts (1)
(NOTE: Behaviors here are INTERACTIVE behaviors)
Schematic diagram of intravention as a context for intervention efforts that can diffuse through networks (2)
(Note: Behaviors here are INTERACTIVE behaviors)
Those who are at risk, whether sex workers, drug users, men who have sex with men, or other people, are those who REALLY do HIV prevention.
They do this as individuals, small groups, and formal organizations. This has been shown, for example, in:

- Gay men in many cities
- New York IDUs knew of the new disease long before CDC—and began to reduce risk behaviors
- International Network of People Who Use Drugs
- Sex workers in Calcutta
- Youth groups in many parts of Africa
Summary

- People are people, not just behaviors.
- Sexual and drug injection networks are key to HIV spread.
- Social networks (including often sexual or drug relationships) are key to adherence and prevention.
- The people are the ones whose action spreads or stops epidemics. They are often ahead of public health agencies in this.
- Community, medical and counseling agencies must work with the people in this—or be of little help.
Additional thoughts

1. Overlapping sexual (and injection, where relevant) networks of heterosexuals, MSM, and WSW; and the implications of this for transmission patterns.

2. Venues like massage parlours in Vancouver, shooting galleries in SFHR and group sex parties in NNAHRAKAY are important.

3. Infection chain logic is important: It provides the basis, together with what we know about high rates of HIV infection during the first weeks of infection, network recruitment and social intervention models, to develop new HIV prevention approaches.