Individual and partner characteristics associated with sex partner concurrency among high-risk heterosexuals

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Background

- In 2007, 24% of NYC new HIV diagnoses (3,787) were attributable to heterosexual transmission
- Disproportionately affects women - 70% of new HIV diagnoses among women
- Especially affects Black and Hispanic women
- Individual risk behaviors (unprotected sex) and sexually transmitted infection (STI) cofactors do not sufficiently explain the heterosexual spread of HIV
- Sexual network factors, i.e., the pattern of sexual contacts, may increase our understanding of heterosexual transmission

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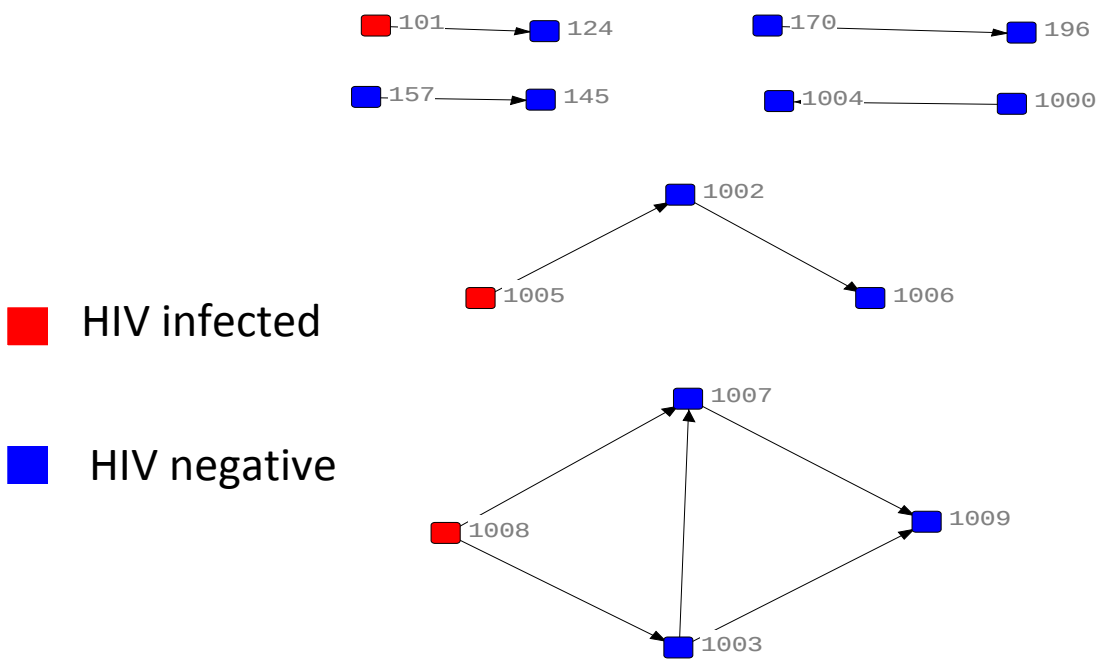
Sex Partner Concurrency

- Overlapping sex partnerships within the same time frame
- Sex partner concurrency increases the potential for connections among large numbers of sex partners
- Infectious pathogens have many more paths through which they can be transmitted
- Sex partner concurrency increases the extent and rapidity of HIV spread (in simulation studies)
- Sex partner concurrency may be driving the HIV epidemic in sub-Saharan Africa, and among heterosexuals in the US (e.g., Washington DC)
- Less is known about the prevalence and correlates of sex-partner concurrency among heterosexuals in high-risk urban areas in the US

Sociometric Example of Sex Partner Concurrency



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Objectives

- To describe
  - The prevalence of sex partner concurrency (for the most recent opposite-sex sex partner) among those engaging in heterosexual sex in high-risk areas of NYC
  - The association of sex partner concurrency with HIV, sexually transmitted infection diagnosis (STI dx), and unprotected sex with the last sex partner
  - Individual and sex partner characteristics associated with having concurrent sexual partnerships

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Methods

National HIV Behavioral Surveillance (NHBS)

- CDC cooperative agreement in 25 US cities
- Ongoing, cyclical study of MSM, IDU, and high-risk heterosexuals (HET)
- Cross-sectional, repeats each at-risk group every 3 years
- Estimates HIV prevalence, risk behaviors, testing patterns, prevention services utilization
- NHBS-HET data collection in 2006-7

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Eligibility Criteria

- Participant resides in a high-risk area (HRA), or is recruited by someone who lives in HRA
  - HRAs are 30 NYC zip codes with highest rates of heterosexual HIV and poverty
- A man or woman between 18-50 years old
- Vaginal or anal sex with opposite-sex partner in the past year
- Resident of NYC
- Speaks English or Spanish

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Sampling and Recruitment

- Respondent Driven Sampling (RDS)
  - Seed recruitment by ethnographer (2 seeds each in Harlem, Brooklyn and the South Bronx)
  - Seeds reside in the area, and are otherwise eligible
  - Seed recruits up to 3 other participants
  - Participants recruit up to 3 others
  - Continues until desired sample size is reached (N = 850)

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Measurement and Variables

- Computer based structured interviews (QDS), conducted in private by trained interviewers
- Sex partner concurrency
  - The participant reports that he / she had sex with other people when in a sexual relationship with the last opposite-sex sex partner
- HIV test result (serum)
- Independent variables
  - Individual: sociodemographics, any same-gender sex (last 12m), ever injected drugs, non-injection drug use, binge alcohol use
  - Partner: known HIV positive, ever injected drugs, ever used crack, ever in jail, younger, casual partner, has concurrent sex partners, sexual relationship > 6m

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Statistical Analysis

- Logistic regression used for bivariate and multivariate analyses to estimate the odds ratios (OR) and adjusted odds ratios (AOR)
- Interactions between gender and drug use / binge alcohol use variables examined
- Variables $p < 0.10$ eligible for multivariate analysis
- Backwards elimination method with confirmatory forwards selection for final multivariate model
- Statistical significance in final model $p < 0.05$ and 95% confidence intervals (95% CI)

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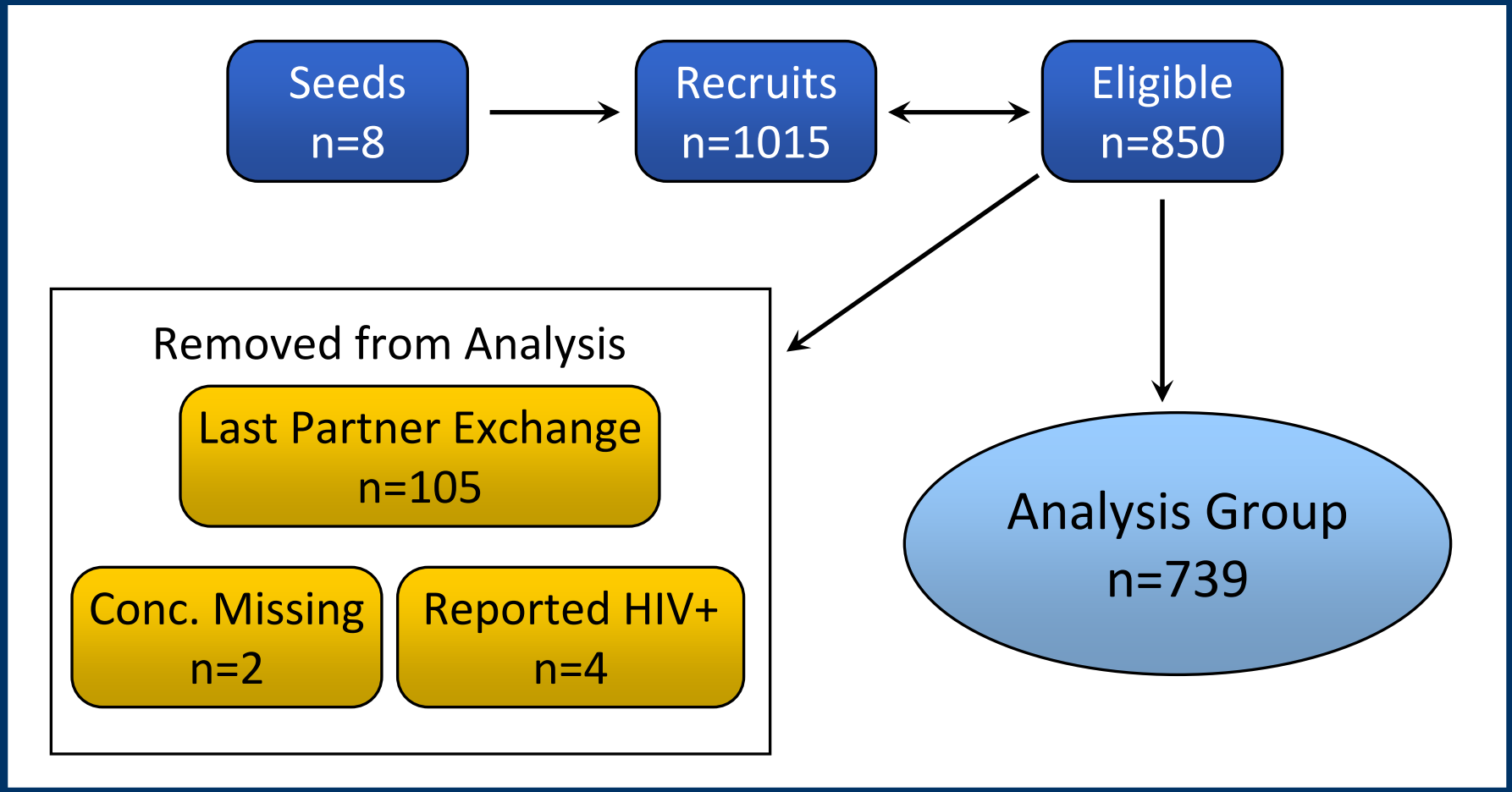
Study Sample



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Sociodemographics

NYC NHBS-HET, 2006-7, n=739

Gender

Male	49%
Female	51%

Race/Ethnicity

Black	74%
Hispanic	19%
White	5%
Other	2%

Age

18-29	32%
30-39	17%
40-50	51%

Sexual Identity

Heterosexual	83%
Homosexual or Bisexual	17%

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Sociodemographics (cont.)

NYC NHBS-HET, 2006-7, n=739

Homeless	
Ever	46%
Currently	36%
Arrest/ Incarceration	
Arrested *past year*	29%
> 3 months in jail *ever*	36%
Inj. Drug Use	
Ever	20%
Past year	8%

Income	
<10k per year	66%
>10k per year	34%
Employment	
Employed	20%
Unemployed	80%

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Sex Partner Concurrency, HIV Prevalence, STI Diagnoses and Unprotected Sex

Sex partner concurrency during last opposite-sex sex partnership	67.5%
HIV seropositive (of 718 tested)	7.8%
STI diagnoses	23.6%
Engaged in unprotected sex with the last opposite-sex sex partner	79.3%

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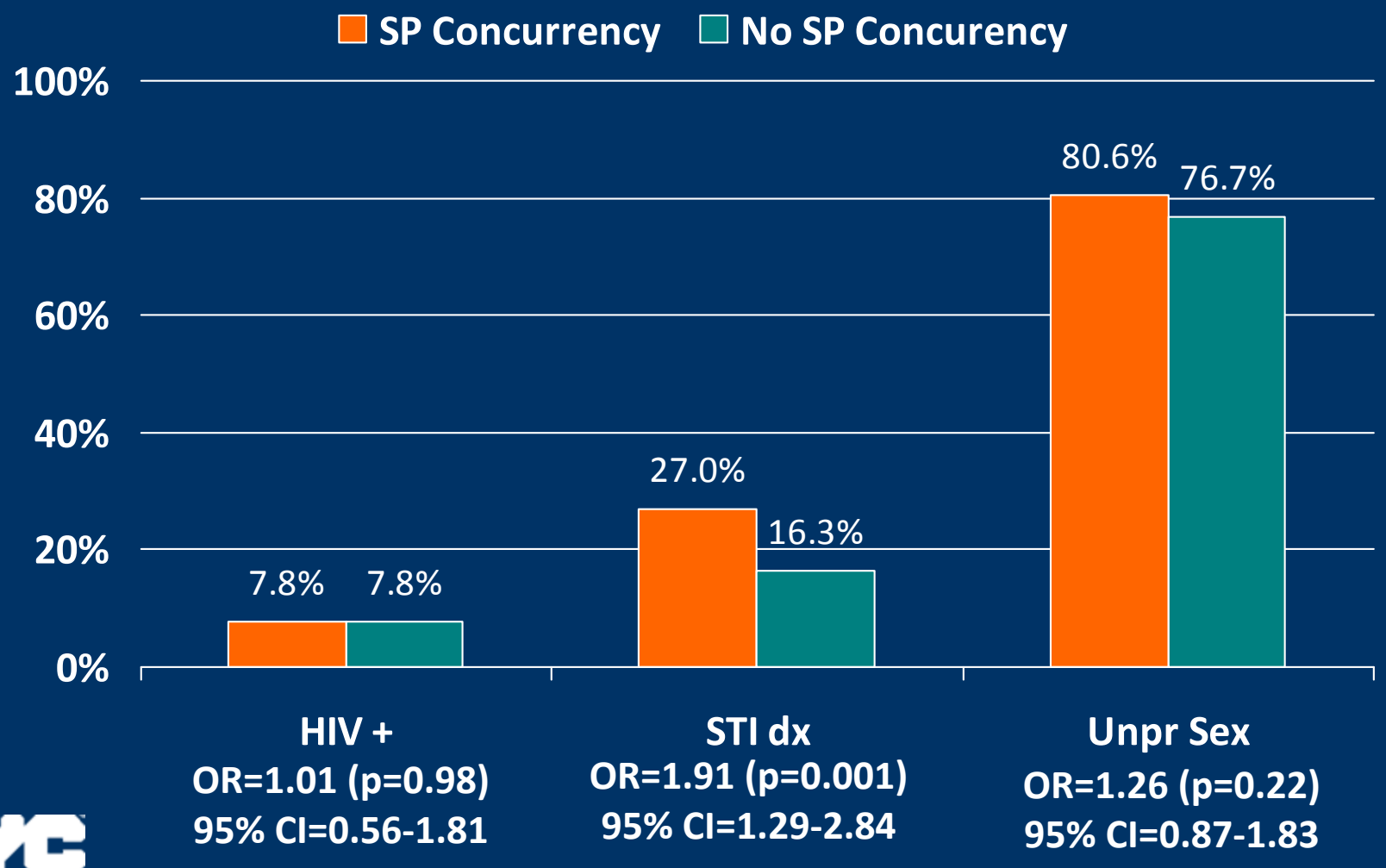
HIV Prevalence, STIs and Unprotected Sex by Sex Partner Concurrency



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Individual Characteristics Associated with Sex Partner Concurrency

Variables		Total %	Conc. %	OR	95% CI
Gender	Female	50.1	63.6	1.00	
	Male	49.1	71.6	1.45	1.06-1.97
Same gender sex	No	83.2	63.7	1.00	
	Yes	16.9	86.3	3.58	2.09-6.13
Crack use	No	68.9	64.1	1.00	
	Yes	31.1	75.2	1.70	1.20-2.42
Cocaine use	No	77.5	64.9	1.00	
	Yes	22.5	76.5	1.76	1.18-2.62

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Individual Characteristics Associated with Sex Partner Concurrency (cont.)

Variables		Total %	Conc. %	OR	95% CI
Marijuana use	No	51.3	60.6	1.00	
	Yes	48.7	74.1	1.87	1.37-2.55
Binge alcohol use (30d)	No	42.4	60.6	1.00	
	Yes	57.7	77.0	2.18	1.57-3.02
Ecstasy use	No	95.7	66.9	1.00	
	Yes	4.3	81.3	2.14	0.87-5.28
Arrested	No	71.5	65.5	1.00	
	Yes	28.6	72.5	1.39	0.98-1.97

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Partner Characteristics Associated with Sex Partner Concurrency

Variables		Total %	Conc. %	OR	95% CI
Casual partner	No	71.6	62.6	1.00	
	Yes	28.4	80.0	2.39	1.63-3.50
Has concurrent partners	No	48.3	53.8	1.00	
	Yes	51.7	80.4	3.52	2.54-4.88
Relationship > 6m.	No	21.7	55.6	1.00	
	Yes	78.4	70.8	1.94	1.35-2.77
Known HIV +	Neg.	48.7	61.9	1.00	
	Pos.	1.2	55.6	0.77	0.20-2.91
	Dk.	50.1	73.2	1.68	1.23-2.30

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Drug or Binge Alcohol Use and Sex Partner Concurrency, by Gender

	Female		Male	
	OR	95% CI	OR	95% CI
Crack use	2.37	1.45-3.90	1.18	0.72-1.94
Cocaine use	1.99	1.13-3.51	1.50	0.86-2.63
Marijuana use	1.95	1.27-2.99	1.72	1.08-2.72
Binge alcohol use	2.38	1.51-3.76	1.91	1.19-3.08

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Multivariate Analysis of Sex Partner Concurrency

Variables	AOR	95% CI	P <
Individual Characteristics			
Same gender sex	4.10	2.22-7.56	0.001
Female crack user (ref=non-user)	2.63	1.50-4.60	0.001
Male (vs. female)	2.54	1.65-3.89	0.001
Binge alcohol use (30d)	1.53	1.06-2.22	0.05
Marijuana use	1.44	1.01-2.05	0.05
Partner Characteristics			
Relationship > 6m.	3.78	2.40-5.95	0.001
Has concurrent partners	3.23	2.21-4.70	0.001
Casual partner	2.16	1.33-3.50	0.01

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Summary

- Sex partner concurrency was widespread (over two-thirds) in this sample
  - Significantly more prevalent among men
- HIV prevalence and STI dx overall were high
  - Those with concurrent sex partners were almost twice as likely to report a STI dx
- Sex partner concurrency and unprotected sex with the last sex partner were highly prevalent

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Summary (cont.)

- Sex partner concurrency was associated with:
  - Non-injection drug use and binge alcohol use
    - Women crack users at greater risk
  - Having sex partners who also had concurrent sex partners
    - Concurrent sex partnerships may be embedded in larger socio-sexual networks
  - Engaging in same-gender sex
    - Increases the probability of sexual mixing between heterosexuals, MSM and WSW
  - Having both stable and dynamic sex partnerships
    - Possible differences in the rate of HIV spread

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Limitations

- Sex partner concurrency may be underestimated
- HIV infection is from past exposure and may not reflect recent sexual risk
- STI diagnosis is self-reported and may underestimate STIs
- Causal relationships cannot be determined
- Those with larger social networks may have been more likely to be recruited
- The results cannot be generalized to all who engage in heterosexual sex in HRAs or in NYC
- Responses may have been influenced by social desirability

Prevention Recommendations

- Interventions to prevent/control the heterosexual spread of HIV and STIs in HRAs should focus on sex partner concurrency as well as unprotected sex :
  - Disseminate messages that promote “one partner at one time”
  - Promote consistent condom use among those with concurrent sexual partners or who know or suspect that their partners have additional sexual partners
- Target users of stimulant and other drugs, and binge alcohol users
- Use RDS and similar network recruiting methods to reach high-risk heterosexuals
- Adapt social network recruiting methods for social network interventions to reduce sex partner concurrency and HIV risk

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