

could be the most important explanation of the observed heterogeneity in HIV epidemic in sub-Saharan Africa. Biomedical and some behavioural evidence have not sufficiently explained the variation. This study aimed at comparing the rate of concurrent sexual partnerships among adolescents in Arusha, Tanzania and Polokwane, South Africa, two areas with contrasting level of HIV magnitude.

**Methods** A baseline cross-sectional study involving junior secondary school adolescents in Arusha, Tanzania and Polokwane South Africa was conducted in 2010 as part of the school-based Health Intervention project (LASH). Adolescents from 12 randomly selected schools from each country were interviewed regarding their socio-demographic characteristics, sexual behaviours and substance use. Data were entered and analysed using SPSS statistical package.

**Results** A total of 2408 adolescents from Arusha and 1649 from Polokwane participated in the study. Adolescent interviewed in Arusha were significantly older than their Polokwane counterpart (Mean age (SD) 19.3(0.5) and 15.5(0.7), respectively,  $p < 0.001$ ). The overall prevalence's of reported multiple concurrent sexual partnerships were 9.2% in Arusha and 25.2% in Polokwane (OR, 3.7, 95% CI 3.0 to 4.7. Both males and Females adolescents from Polokwane were significantly more likely to report concurrent sexual partnerships than those from Arusha ( $p < 0.001$ ). Moreover, adolescents from Polokwane reported practice of other HIV risk behaviours as compared to those in Arusha ( $p < 0.001$ ). History of sexual experience (vaginal, oral, anal), ever use of condom and substance use were independent predictors of multiple concurrent sexual partnerships in both sites.

**Conclusions** High practice of multiple concurrent sexual partnerships among adolescent living in high HIV prevalent area as compared to those in low prevalence area indicate that concurrent partnership could be the most important explanation of the observed heterogenic HIV transmission in sub-Saharan Africa. Being sexually active and substance use predict practice of concurrent sexual partnerships among adolescents. Delaying sexual debut and addressing substance use among adolescents may have a significant impact on HIV epidemic.

**P1-S5.36 CONCURRENCY AMONG WOMEN <25 YEARS OF AGE SCREENED IN FAMILY PLANNING AND REPRODUCTIVE HEALTH CLINICS IN US PUBLIC HEALTH SERVICE REGION X, JANUARY 2009–JUNE 2010**

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**Background** To better understand the dynamics of STIs and HIV, researchers are increasingly examining the determinants and consequences of sexual networks. In January 2009, the Infertility Prevention Project (IPP) in US Public Health Service Region X-one of 10 regional projects funded by the Centers for Disease Control and Prevention (CDC)-began collecting a new network sexual risk behaviour for IPP chlamydia (CT) tests. The Region X IPP decided to collect sex partner (SP) concurrency based on the literature, research conducted in California, CDC input and regional interest.

**Methods** CT positivity (CT+) was calculated by demographics, sexual risk behaviours, SP concurrency and clinical findings for 94,433 tests among women <25 years of age screened in Region X IPP family planning and reproductive health (FP/RH) clinics from January 2009 to June 2010. Univariate and multivariate analyses were conducted.

**Results** Of the 94 433 tests, 62% were age 20–24, and 72% were non-Hispanic white. 14% of clients reported their SPs definitely, 41% reported “possibly” and 38% reported it was “unlikely” their SPs had concurrent SPs in the last 12 months. CT+ ranged from 7.6% among clients reporting their SPs “definitely” had concurrent SPs to 5.2% among those reporting it was “unlikely.” Clients reporting their SPs “definitely” or “possibly” had concurrent SPs were more

likely to report other sexual risk behaviours and have clinical findings on examination. Significant ( $p < 0.001$ ) factors for CT+ included SP concurrency (definitely: AOR=1.20; possibly: AOR=1.25); age (15–19 years: AOR=1.34); race/ethnicity (Black: AOR=1.55; American Indian/Alaska Native: OR=1.60; Native Hawaiian/Other Pacific Islander: AOR=1.92); CT infection in the last 12 months (AOR=2.06); new SP (AOR=1.43), multiple SPs (AOR=1.48), symptomatic SP (AOR=4.07) in past 60 days; clinical findings (cervicitis or PID diagnoses; AOR=2.22).

**Conclusions** It is feasible to collect SP concurrency with female clients in the context of a clinic visit. SP concurrency was a significant predictor of CT+ beyond other risk factors. Results for clients who reported their SPs “possibly” had concurrent SPs may reflect clients being less knowledgeable about their SPs’ sexual behaviours. Findings confirm the importance of assessing network characteristics such as SP concurrency, the need to incorporate SP concurrency in risk reduction counselling, and the potential to use this measure in empirically based screening decisions.

**P1-S5.37 EVOLUTION OF SEXUAL NETWORKS OVER TIME IN MANITOBA, CANADA**

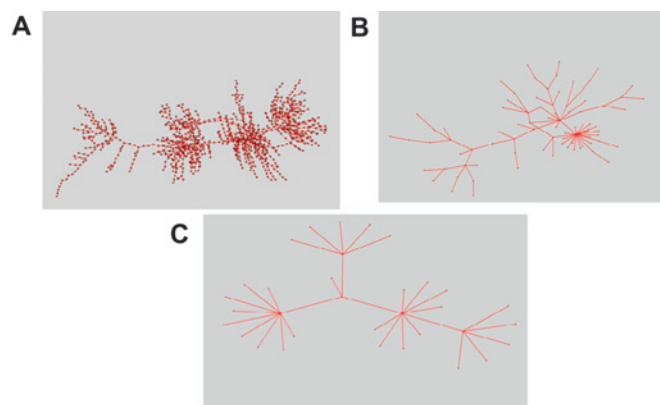
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**Background** Recent increases in bacterial STI in Canada and the resurgence of syphilis require further investigations into the transmission of STI. Specifically, adaptation of sexual networks and sexually transmitted pathogens to prevention efforts such as screening and partner notification have been proposed as a major factor in persistence of STI. We investigate the size and morphology of sexual networks generated by routinely collected contact tracing data for gonorrhoea, chlamydia and syphilis for the whole province of Manitoba, at three time points; 1990–1992; 1997–1998, and last, from 2002 to 2003.

**Methods** We compared the sizes of the components in which cases and contacts were connected by sexual intercourse at the three time points, and cross matched chart numbers of the cases from 1990–1992 with those from 1997–1998 in order to identify which individuals were active within specific networks 8–10 years later. We reviewed the changes in the networks along with the rates over time in order to assess the epidemic phases of the pathogen and their possible effects on the networks.

**Results** From 1990 to 1992, 20 223 cases were available for analysis; from a 6-month period in 1997–1998, 4544 cases and contacts were



**Abstract P1-S5.37 Figure 1** Evolution of sexual networks over time in Manitoba, Canada A) Pruned largest component,  $n=2,166$ , 1990–1992, B) Largest component  $n=82$ , 1997–1998 and C) largest component  $n=33$ , 2003–2004.

available, and last for 2002–2003; 8746 cases and contacts were available over 2 years. For the first 3-year period, components ranged from 1 to 2166; in 1997–1998; from 1 to 82 people, and from 1 to 33 people in 2002–2003. The giant component decreased by an order of magnitude over time as a proportion of all components, consisting of 9.4% of the population in the first time period, 1.8% in the second, and 0.4% (Abstract P1-S5.37 figure 1). Twenty people who had chlamydia or gonorrhoea in 1990–1992 had subsequent STIs every 2–3 years up to an including 1997–1998. They were significantly younger than other cases, (means 17.81, 23.27,  $p=0.0002$ ) and were more likely to be of North American Indian ancestry (OR14.22,  $p<0.0001$ ). They did not differ by area of residence or gender and the sizes of the components in which all cases and contacts were connected by sexual intercourse in 1997/98 were similar to those in which the 20 long term repeaters were active.

**Conclusions** The existence of 20 young, First Nations people who had STI at least every 2–3 years from 1990–1998 provides evidence that the STD core group likely consists of some of the same people over a 7–9-year period, who by virtue of their repeated infections contribute disproportionately to STI transmission. The decrease in size of the large components together with decreases in STI supports the hypothesis that eco-niches of STI adapt to control programs over time.

#### P1-S5.38 CONCURRENT SEXUAL PARTNERSHIPS AND GROUP SEX AS DETERMINANTS OF STI WITHIN SEXUAL NETWORKS OF SWINGERS

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**Background** Concurrent sexual partnerships create higher network connectivity and increase spread of STI through their sexual networks. Recently in our prospective cohort study SWAP (Swingers World Attitude and Practice) swingers were identified as a high transmission population for STI. Swingers, heterosexual couples together having sex with others, by definition are involved in concurrent sexual relationships. Objective of the present paper is to examine indicators for the level of concurrency in sexual relations among swingers predicting high potential of STI transmission.

**Methods** Participants of the SWAP cohort were followed using (network) questionnaires and STI consultations. Urogenital, oropharyngeal and anorectal samples were tested for *Chlamydia trachomatis* (CT) and *Neisseria gonorrhoeae* (NG) by NAAT. STI is defined as positive CT and/or NG diagnosis. We used epidemiological (SPSS) and social network methods for the analysis of the data. Different indicators for level of concurrency were measured: frequency of swinging; types and number of sex partners; and involvement in group sex (sexual intercourse at the same moment in time with multiple partners), all during the past 6 months.

**Results** Of the 106 respondents, median age 43 years, 13.2% were diagnosed positive for STI. Of the swingers 96% were in a steady relationship, 5% formed a swinging couple with a friend not being their steady partner, 9% also had casual sex partners outside swinging with median 4 sex partners. Median frequency of swinging was 10 times, with median 7 swing sex partners in 6 months. Median number of swing sex partners during an average swinging date was 2; 59% practiced group sex with median 3 sex partners. Median total number of sex partners was 9 in 6 months. Abstract P1-S5.38 table 1 shows frequency of swinging, participating in group sex and total number of sex partners were significantly correlated with having STI.

#### Abstract P1-S5.38 Table 1 Correlation between swingers characteristics, concurrency measures and STI diagnosis

Variable	No STI n (%)	STI n (%)	Total		**p≤0.05 ***p≤0.01
Sex					
Male	47 (90.4)	5 (9.6)	52 (49.1)		
Female	45 (83.3)	9 (16.7)	54 (50.9)	ns	
Age					
<45	55 (90.2)	6 (9.8)	61 (57.5)		
≥45	37 (82.2)	8 (17.8)	45 (42.5)	ns	
Frequency of swinging					
<5	25 (100)	0 (0)	25 (23.8)	**	
5–10	30 (88.2)	4 (11.8)	34 (32.4)		
11–15	19 (86.4)	3 (13.6)	22 (21.0)		
>15	17 (70.8)	7 (29.2)	24 (22.9)		
Number of sex partners during swinging					
<5	27 (90.0)	3 (10.0)	30 (28.3)	ns	
5–8	23 (92.0)	2 (8.0)	25 (23.6)		
9–12	20 (90.9)	2 (9.1)	22 (20.8)		
>12	22 (75.9)	7 (24.1)	29 (27.4)		
Group sex					
Yes without steady partner	16 (72.7)	6 (27.3)	22 (20.8)	**	
Yes with steady partner	39 (95.1)	2 (4.9)	41 (38.7)		
No	37 (86.0)	6 (14.0)	43 (40.6)		
Total number of sex partners					
1	4 (57.1)	3 (42.9)	7 (6.6)	***	
2–5	23 (100.0)	0 (0.0)	23 (21.7)		
6–10	25 (96.2)	1 (3.8)	26 (24.5)		
11–15	21 (84.0)	4 (16.0)	25 (23.6)		
>15	19 (76.0)	6 (24.0)	25 (23.6)		

**Conclusions** Swingers have concurrent sexual relations with a range of different types and numbers of sex partners and therefore transmission of STI through connected networks is highly plausible. Some of the presented indicators of level of concurrency are associated with STI infection. Further analysis of the concurrency measures, STI related risk behaviours, and the sexual networks of swingers, is necessary to examine how concurrent sexual partnerships form these networks and influence STI transmission through them.

#### P1-S5.39 TRIPLE JEOPARDY? SEXUAL NETWORKS OF SYPHILIS & HIV INFECTION AMONG HETEROSEXUALS, MSM, AND BISEXUAL MEN IN NORTH CAROLINA

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**Background** The velocity of STI spread depends in part on the formation of sexual partnerships and the structure of sexual networks. Dual outbreaks of HIV and syphilis have persisted in NC since 2001 among young black men who have sex with men (MSM). During 2007–2009, the incidence rate of early stage syphilis increased 600% in County X from 9/100 000 to 57/100 000; the outbreak involved MSM, bisexual men (MSMW), heterosexual men (MSW), and women. We sought to determine if bisexual men bridged MSMs and heterosexuals to facilitate syphilis and HIV spread in both populations.

**Methods** We abstracted public health department charts in County “X” for early stage syphilis cases and HIV for black men ages 15–30 during 2006–2009. We documented each sexual and social tie, permitting sociometric analysis.

**Results** Of the 532 cases with syphilis, HIV, or both infections, 69% were male. The per cent of males declined with age from 24% to