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## Risky business: health and safety in the sex industry over a 9 year period

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**Objectives:** To assess whether a previously established low sexually transmitted infection/HIV risk in prostitutes in London has been sustained, and to measure other occupational risks, including mortality.

**Design:** 9 year prospective study in west London.

**Subjects:** 402 prostitutes recruited from 1985 to 1991, 320 were followed up for 675 person years to 1994.

**Main outcome measures:** Condom use in commercial and non-commercial sex; viral and bacterial sexually transmitted infection at initial and follow up visits; death.

**Results:** Condom use increased significantly from 1986 to 1993 and protected the majority of commercial sexual contacts. Baseline prevalence: HIV 1.3%, hepatitis C 6.7%, hepatitis B 6.6%, syphilis 2.3%, HTLV-I/II 0.4%, gonorrhoea 3.0%, chlamydia 8.2%, genital herpes 16.8%. Incidence (per 100 person years): HIV 0.2, hepatitis C 0.3, gonorrhoea 5.6, chlamydia 12.6, genital herpes 6.5. Viral infections were associated with injecting drug use and non-British nationality; bacterial infections were associated with numbers of non-commercial partners but not with sexual contacts at work. Four women died during the course of the study; two had AIDS, two were murdered. This mortality of 5.93 per 1000 person years was 12 times the expected rate for women of a similar age.

**Conclusions:** This study shows that it is possible to have a large number of sexual partners and remain free from sexually transmitted infections provided that condoms are used consistently: there has been a sustained increase in condom use in the sex industry. None the less, prostitutes are at increased risk of sexually transmitted infections, primarily through non-commercial sexual partnerships. Infectious diseases are only one of the risks facing prostitutes, as illustrated by the mortality from violence as well as from HIV infection.

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Keywords: health and safety; sex industry; prostitution; condoms

## Introduction

It is generally accepted that people with a higher number of sexual partners are at increased risk of sexually transmitted infections, including HIV. Epidemiological models have explained the persistence of some bacterial infections, such as gonorrhoea, by the activity of core groups who contribute *disproportionately* to the transmission of infection.<sup>1-6</sup> Prostitutes are generally assumed to be part of this core group.<sup>7-8</sup> However, reported rates of infection in prostitute populations vary,<sup>9</sup> and prostitutes are most at risk of HIV in situations of widespread heterosexual transmission, where control of other sexually transmitted infection is poor.<sup>10-12</sup> In the United Kingdom, Western Europe, North America, and Australasia the prevalence of HIV has been lower in heterosexual men and women than in many developing countries,<sup>13-14</sup> although the pattern may be changing in some countries.<sup>15-16</sup> We have previously reported a relatively low prevalence of HIV in female prostitutes in London.<sup>17-18</sup> In this article, we analyse data from a cohort study to assess whether the low sexually transmitted infection/HIV risk is sustained over time.

## Subjects and methods

From 1985 to the end of 1991, women working as prostitutes were enrolled in a cohort study

based in an inner London genitourinary medicine department, where a special clinical and outreach service, the Praed Street Project, was developed for prostitutes.<sup>19</sup> Women were eligible for the study if they defined themselves as prostitutes and had worked within the past 3 months. Duration of follow up was calculated from the date of first visit to the most recent visit until the beginning of 1994, or date of death. While it was not possible to establish whether the study was strictly representative of the local sex industry, methods of recruitment were as inclusive as possible so that participants were drawn from all types of workplace in the area.

After consenting to the research, women were interviewed using a semistructured schedule covering social and demographic background, prostitution, sexual and medical histories. Participants were offered screening for sexually transmitted infection with informed consent, and a proportion consented to the storage of serum for future testing. Participants were asked to attend every 3 months for repeat interview and examination but, in reality, most women attended when they wanted a check up.

Screening was based on routine diagnostic methods for most infections. Gonorrhoea was detected using Gram stain with culture confirmation. Direct immunofluorescence was used to detect chlamydia from cervical specimens,

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Table 1 Description of prostitutes in the cohort (n=320) and those who made one visit only (n=82), (based on information from first visit)

	Cohort	One visit only	p Value*
Age			
Range	16–52	16–46	
Mean (SD)	26.4 (6.6)	23.7 (5.45)	0.001
Missing	14	3	
Nationality			
British	187 (77%)	36 (80%)	
Missing	78	37	
Prostitution sector			
Club/sauna	36 (13%)	2 (4%)	
Escort/madame	97 (35%)	23 (41%)	
Private	30 (11%)	6 (11%)	
Flat	58 (21%)	10 (18%)	
Street	51 (19%)	15 (27%)	
Missing	46	26	
Time in prostitution (months)			
Range	1–324	1–216	
Median	24	24	
Missing	57	30	
Non-commercial partner			p=0.018
Yes	194 (71%)	49 (86%)	
Missing	47	25	
Injecting drug use ever			
Yes	23 (8%)	6 (10%)	
Missing	37	23	

and trichomoniasis was diagnosed through direct microscopy of a wet mount from vaginal secretions. A diagnosis of new genital herpes was based on positive culture from a clinical lesion in someone with no previous history. Serum samples were tested for antibodies to HIV-1 and 2 using routine ELISA screening tests with confirmation; hepatitis B core antibody was used as evidence of past infection; syphilis was diagnosed using TPHA, VDRL, and FTA. The most recent stored serum sample from each individual was tested for HTLV-I and HTLV-II infection, first with a particle agglutination assay, and reactive sera were further investigated with an HTLV-I/II EIA.<sup>20</sup> Stored sera were also screened for hepatitis C infection, using second or third generation ELISA confirmed using a third generation RIBA.

Information on mortality was based on incidental reports from other prostitutes; routine mortality records could not be used for reasons of confidentiality. The estimated mortality was compared with routine statistics for women aged 15–44 in Greater London.<sup>21</sup>

Data were stored in a database and analysed using SPSS. Simple univariate analysis was carried out for most comparisons. Continuous variables were compared using *t* tests, or non-parametric tests (Mann-Whitney U test), variables were included in logistic regression models if they were associated in univariate analysis and retained if they were significant or had a major effect on the log likelihood ratio.

## Results

From 1985 to 1991, 402 women were recruited, 320 of whom completed 2921 visits (range 2–129) and are considered part of the cohort. By 1994, we had observed these 320 women for 675 years of follow up (median 18 months, range 1–100 months).

Table 1 compares women who became part of the cohort with those seen once. Women who remained in the cohort were older (mean

Table 2 Condom use for vaginal intercourse with clients and non-commercial partners

Year	Number of visits where 100% condom use reported			
	Clients*		Non-commercial partners†	
1986	72/107	67%	7/81	9%
1987	125/164	76%	12/149	8%
1988	100/116	86%	5/107	5%
1989	229/249	92%	22/200	11%
1990	322/343	94%	37/314	12%
1991	327/345	95%	36/341	11%
1992	243/265	92%	47/293	16%
1993	94/104	90%	16/99	16%

\* $\chi^2$  for linear trend = 63.5,  $p < 0.0001$ .

† $\chi^2$  for linear trend = 10.4,  $p < 0.001$ .

difference 2.6 years, 95% confidence interval (CI) for the difference 1.1, 4.2,  $t=3.28$ ) and less likely to have a non-commercial partner (odds ratio (OR) = 0.88, 95% CI 0.80, 0.97, likelihood ratio 5.63), but there were no other significant differences.

The total numbers of clients seen for all types of sex reported by participants in the week before 2311 visits (data were missing for 610 visits) was 23 621, mean 10.2, median 5. Most of these contacts were protected through the use of condoms, which increased significantly over time as shown in table 2. Condom breakages in the past month were reported at 492 (29%) of 1687 visits. This information was systematically collected from 1988 onwards, and there was no change in the proportion of visits where condom failures were reported over subsequent years. Women reporting condom failures had significantly more vaginal sex with clients (mean 9.5 per week compared with 6.8, mean difference 2.7, 95% CI for the difference 1.6, 3.9,  $t=4.53$ ,  $p < 0.001$ ).

Women reported sexual contact with one or more non-commercial male partners (boy-friends, husbands, or casual partners) in the previous month at 68% of visits (1640/2398). Table 2 shows that condom use with these partners doubled from 8% in 1986 to 16% in 1992.

Table 3 shows baseline prevalence and incidence rates for HIV, hepatitis B and C, HTLV-I/II, syphilis, and other sexually transmitted infections. Of the four women initially infected with HIV, three were probably infected through injecting drug use, and one from a non-commercial partner. There were no significant differences in the likelihood of having a test by history of injecting drug use, non-commercial partners, age, nationality, or prostitution sector. Repeat HIV tests were carried out for 162 women (range 2–13 tests) over a combined follow up period of 432 person years. One woman acquired HIV during the study; she reported one broken condom with a client 3 months before her first positive test, and unprotected sex with three non-commercial partners, including one from a country with a high prevalence of HIV.

Hepatitis C infection was associated with injecting drug use, which was reported by 12 of the 15 initially positive, and by the one woman who acquired the infection (OR for the association 134, 95% CI 25, 845). Two other women with hepatitis C had a history of blood transfu-

Table 3 Baseline prevalence and incidence of infections

	Baseline prevalence			Incidence		
	Number tested	Number positive	Prevalence	Person years follow up	Incident cases	Incidence (per 100 person years)
HIV	312	4	1.3%	432	1	0.23
Hepatitis C	225	15	6.7%	320	1	0.31
Hepatitis B	320	21	6.6%	NA*		
Syphilis	390	9	2.3%	530	0	0
HTLV-I/II	256	1	0.4%	274	0	0
Gonorrhoea	402	12	3.0%	675	38	5.6
Chlamydia	402	33	8.2%	675	85	12.6
Genital herpes	298	50†	16.8%	460‡	30	6.5

\*Women were offered vaccination for hepatitis B.

†Number reporting a past history of genital herpes.

‡Excludes those with past history of genital herpes.

sion; the third was from South America and had no specific risk factors. Hepatitis B infection was associated with a history of injecting drug use (OR 7.7, 95% CI 3.0, 21.2), and non-UK nationality (OR 3.57, 95% CI 1.4, 9.1).

There were 50 cases of gonorrhoea in 39 women, 118 cases of chlamydia in 86 women, and 31 cases of primary genital herpes. In a multivariate analysis gonorrhoea infection was associated with increasing numbers of non-commercial partners (RR 2.30, 95% CI 1.41, 3.76,  $p < 0.001$ ), and earlier years of the study. There was no association with condom use (with clients or non-commercial partners). Chlamydial infection was significantly associated with having a non-commercial partner.

Four women are known to have died during the course of the study, a mortality of 5.93 per 1000 person years. Compared with estimated mortality for women aged 15 to 44 in Greater London in 1992, this is a relative risk of 12.15 (95% CI 4.6, 32.4). Two were women with HIV infection who developed AIDS. The other two were murdered; one was killed by her boyfriend, no one has been convicted of the other murder. These women were at no obvious risk of violent death; both worked through referral and avoided public soliciting; neither injected drugs.

## Discussion

A relatively low prevalence of HIV infection has been established previously among female prostitutes working in the United Kingdom.<sup>14 18</sup> This study provides additional evidence that it is possible to work in the sex industry, and to have a high rate of partner change (over 250 clients per year), and remain uninfected with HIV. This study shows that high levels of condom use can be achieved in commercial sex and sustained over time. Condom use with non-commercial partners also increased, although to a much lower level. Condom failures were reported by women at almost 30% of visits. This may be an overestimate of failure rates, as the breakage may have prompted attendance at the clinic for a check up, and reported failure may also reflect difficulties in disclosing unprotected sex with clients.

Even though the risk of sexually transmitted infection in this group is relatively low compared with many groups of prostitutes, it is higher than the general population risks in the

United Kingdom, and represents a degree of avoidable morbidity and mortality. The rate of HIV, for example, is eight times higher than for women having babies in inner London from 1988 to 1993, and twice the rate in women attending genitourinary medicine clinics from 1990 to 1993.<sup>22</sup>

The increased infection risks that we have reported are associated only *indirectly* with sex work. For example, prostitutes are at risk of HIV, hepatitis B and C infection primarily from injecting drug use, not sex with clients. The criminal status of the sex industry strengthens links between prostitution and other criminal activities, such as the distribution and use of illicit drugs.<sup>23 24</sup> Similarly, prostitutes are at risk of HIV and other sexually transmitted infections through sex with their non-commercial partners.<sup>18</sup>

The high mortality observed in this study is striking; the four deaths illustrate that infectious diseases are only one of the occupational risks facing prostitutes. The two murders provide extreme examples of common experiences among prostitutes, who face high rates of violent assault in their personal and their professional lives not just because they are prostitutes, but also because they are women, and may be drug users, homeless, young, and poor.<sup>25</sup> The health risks of this occupation are both direct and indirect; occupational studies of, and services for, prostitutes cannot be confined to the risks posed directly by exchanges with customers.

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