Changes in sexual behaviour of patients attending an HIV testing centre: a prospective study 1988–1994.

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Objective: To evaluate the sexual behaviour changes in patients attending HIV testing during the period July 1988 to June 1994.

Design: In a prospective study, 6824 face-to-face interviews were carried out before the HIV test was performed. The frequency of condom use and the number of sexual partners during the 6 previous months were recorded annually from July to June. The data were analysed according to gender, age class and sexual orientation.

Setting: Strasbourg, Bas-Rhin, France

Subjects: Patients attending the HIV testing centre of Strasbourg

Results: There was a striking increase in the number of attenders of this centre from 358 patients in 1988/89 to 2421 in 1993/94. We observed a significant decrease of homosexuals having more than five partners ($p < 0.05$) whereas multipartner sex remained unchanged in heterosexuals. There was no change in the proportion of patients having only one partner, except a slight raise in patients under 20 years. All groups showed a very significant increase in condom use, which was especially marked in young heterosexuals aged under 30 years. Nevertheless, condom use remained higher in homosexuals than in heterosexuals in 1993/94. In addition, there was a striking fall of past sexually transmitted disease in heterosexual patients under 20 years during the study period, and a fall in the HIV positivity rate from 1·96% to 0·42%.

Conclusions: A major increase was noted in condom use in all groups and a reduction of multipartner sex in some patients. These data are encouraging in the younger patients, but prevention efforts should also be concentrated on middle aged patients who did not show major sexual changes, although having important risk factors for HIV infection.

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Keywords: HIV; sexual behaviour; testing

Introduction

Since the recognition of the AIDS pandemic, many efforts have been concentrated on the prevention of HIV transmission. Information campaigns have been mounted in France directed mainly toward teenagers. To contribute to the prevention of HIV transmission, medical centres specialised in HIV testing were opened in 1988 in each French département.[1] These centres provide anonymous HIV testing free of charge and counselling about HIV infection. The HIV testing centre of Bas-Rhin is located in Strasbourg, and the general population of this geographical area is approximately 1 million people. The aim of the present study was to report the activity of the Strasbourg centre and to evaluate simply the risk factors for HIV infection of people attending for HIV testing. We therefore arranged prospective epidemiological study by filling a questionnaire for each patient between the period July 1988 to June 1994. The data of the 6 year period were analysed globally and they were then examined annually in order to observe the changes during this period of time.

Methods

Detection of HIV antibodies

Sera were tested by using two different commercial enzyme linked immunosorbent assays. When there was a positive result of one or both assays a new blood sample was collected and tested by Western blotting. The HIV seropositivity was established on the basis of a positive Western blot result.

Data collection

Strasbourg HIV centre was opened in April 1988. The present epidemiological data were collected between 1 July 1988 and 30 June 1994. The data were analysed annually during this 6 year period (July 1988 to June 1989, July 1989 to June 1990, July 1991 to June 1992, July 1992 to June 1993, and July 1993 to June 1994). When attending the HIV testing centre, patients were interviewed by a medical doctor before the blood was obtained. Standardised questions were asked of each patient and a questionnaire was filled by the physician. Demographic data were limited to the age class, sex and country of origin. The age classes were: less than 20 years, 20 to 29 years, 30 to 39 years and more than 40 years. Patients were questioned about their sexual orientation (heterosexual, homosexual or bisexual). The number of sexual partners during the 6 previous months was recorded into five classes: 0, 1, 2, 3 to 5 and more than 5 sexual partners. The frequency of condom use during the 6 previous months was addressed since 1 July 1989 by asking patients if they use condoms never, sometimes, most often or all the time. Risk factors for HIV transmission were also searched for: intravenous drug use, prostitution and sexual contacts with an HIV

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Table 1   Demographic characteristic of the patients A: gender and sexual orientation B: age ranges

A

Year	Men (n)	Women (n)	Total (n)	Homosexuals (%)	Bisexuals (%)	Heterosexuals (%)
1988/89	245	113	358	15·1	6·1	78·8
1989/90	235	143	378	14	8·8	77·2
1990/91	435	225	659	14·1	7·3	78·6
1991/92	670	444	1114	13·4	4·5	82·4
1992/93	1086	808	1894	10	4·6	85·4
1993/94	1360	1061	2421	8·3	3·7	88

B

	< 20 years (%)	20–29 years (%)	30–39 years (%)	>40 years (%)
1988/89	17·6	50·7	21·9	9·8
1989/90	20·5	48·7	21·8	9·8
1990/91	21	48·5	20·6	9·9
1991/92	27·7	49·1	13·9	9·3
1992/93	16·7	64·4	12·5	6·5
1993/94	18·8	64·6	10·4	6·2

positive partner. The patients were also asked if they had already had a previous HIV test, and if they had a past history of sexually transmitted disease (STD) during their life time.

Statistical analysis

Comparison of proportions in the different groups was made by the use of the chi square test. Linear regression test was used to analyse the trends in sexual behaviour data.

Results

Demographic analysis

During the study period, 6824 patients were recorded at the Strasbourg HIV testing centre. There was a striking increase in the number of patients between 1988 and 1994. Only 358 patients were tested in 1988/89, whereas 2421 were in 1993/94. We have observed a major increase in the number of patients in 1990/91 (+ 74%), in 1991/92 (+ 69%) and 1992/93 (+ 70%). Male patients were preeminent and the global sex ratio was 1·41. With regard to their sexual orientation, 84·4% of all patients declared themselves to be heterosexual, 10·8% homosexual and 4·8% bisexual. The demographic data are shown in table 1.

HIV positivity

The HIV positivity rate was low in the

Strasbourg centre and it regularly decreased during the study period. During that period, 46 patients were found to be HIV positive (0·66% of all patients). The positivity rate fell from 1·96% in 1993/94 to 0·42% in 1993/94. Among seropositive patients, there were 40 men and 6 women and 70% were 20 to 29 years of age, 24% were 30 to 39, 3% were less than 20 and 3% were more than 40. With regard to their sexual orientation, 50% were heterosexual, 39% were homosexual and 11% were bisexual. Among heterosexuals, 7 out of 23 originated from Africa (Tanzania, Zambia, Zaira, Burkina Faso). Only 8·7% of HIV + patients said they were intravenous drug users and all of them were heterosexuals. Three homosexual patients and 1 heterosexual patient had had a sexual partner who was seropositive for HIV. A past STD was noted in 14 of the 46 patients (30·5%).

Sexual behaviour data

a. number of sexual partners The number of sexual partners in the 6 months before the interview was very different according to the sexual orientation (table 2). Whereas only 24% of heterosexuals had 3 or more sexual partners, 64·5% and 60·3% of bisexuals and homosexuals respectively had (chi square, p < 10^{-4}). A regular decrease in the proportion of patients with more than 5 partners was observed in homosexuals (fig 1A): in 1988/89, 38·4% of homosexuals had more than 5 partners, and only 24·1% had in 1993/94 (linear regression, p = 0·005). In the heterosexual group, there was no significant change in the proportion of patients with more than 5 partners (p = ns). The evolution of patients with a high number of partners did not significantly vary in the bisexual group (p = ns). The rates of patients with only 1 sexual partner were remarkably constant during the period 1988–1994, independantly of the sexual orientation (fig 1B).

The number of sexual partners was also different in men and women (table 2). The distribution of partner numbers according to gender did not significantly vary between 1988

Table 2   The number of sexual partners during the 6 previous months according to gender (A), to the age range (B) and to sexual orientation (C). (mean percentage over the period 1988–1994) In parentheses: change from the year 1988/89 to the year 1993/94

| Number of Partners	0	1	2	3 to 5	> 5
A					
Males	7% (7·9–5·3)	34% (32·2–34·4)	23% (20·8–24·5)	24% (22·9–26·9)	12% (15·2–8·9)
Females	7% (8·5–7·7)	46% (42·7–46·3)	29% (30·6–28·3)	16% (14·7–16·4)	2% (3·5–1·3)
B					
≤ 20 years	6% (3·8–6·1)	43% (39·4–45·8)	28% (29·1–29·6)	17% (16·2–16·7)	6% (11·5–1·8)
20 to 29 years	6% (9·7–6·2)	38% (34·7–39·4)	25% (22·2–25·2)	24% (21·6–23·8)	7% (11·8–5·4)
30 to 39 years	5% (5·2–5·2)	37·5% (30·5–36)	24·5% (27·5–24·8)	22·5% (22·3–24·4)	11% (14·5–9·6)
≥ 40 years	11% (14·7–10·7)	36% (47·1–30·9)	23% (14·7–28·2)	19% (20·6–18·1)	11% (2·9–12·1)
C					
Heterosexuals	6% (8·5–6·3)	43% (39·9–42·6)	27% (27·1–27·5)	20% (18·6–20·3)	4% (5·9–3·3)
Bisexuals	3% (4·7–1·1)	11% (4·7–13·6)	21% (28·7–23·6)	39% (42·9–43·8)	26% (19–17·9)
Homosexuals	2% (3·8–1)	22% (21·2–21·8)	16% (9·7–18·4)	32% (26·9–34·7)	28% (38·4–24·1)

Figure 1 Number of sexual partners during the 6 previous months according to sexual orientation. A: Proportion of patients with more than 5 partners. B: proportion of patients with only one partner.
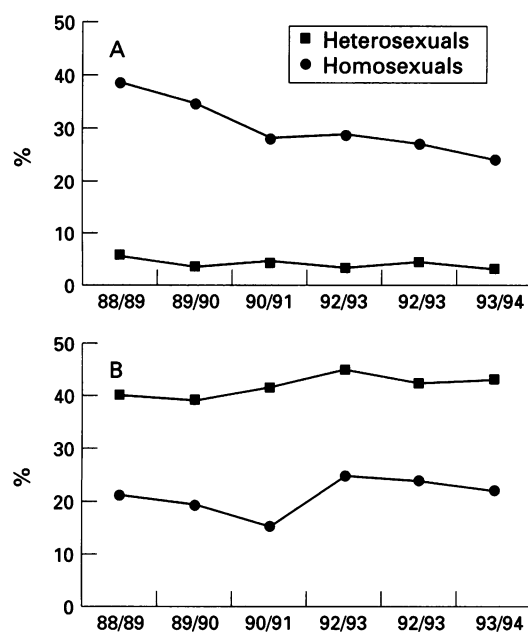
and 1994, except for men with more than 5 partners who were 15·2% in 1988/89 and only 8·9% in 1993/94 (linear regression, p = 0·037), but this decrease was predominantly due to changes in the homosexual group.

We have also observed variations of the distribution of partner number with the age (table 2). There was a small increase in the proportion of patients with 1 sexual partner in the younger age ranges (< 20 years and 20–30 years), but it was not significant (linear regression, p = ns). The proportion of patients with more than 5 partners decreased in the younger groups (linear regression: < 20 years: p = 0·039; 20–29 years: p = 0·01; 30–39 years: p = ns), but this proportion increased in patients over 40 years (p = 0·0319). In 1988/89 the proportion of patients having more than 5 partners was not significantly different among patients under 30 years and patients of more than 30 years of age (11·8% versus 10·9%, chi square: p = ns) whereas in
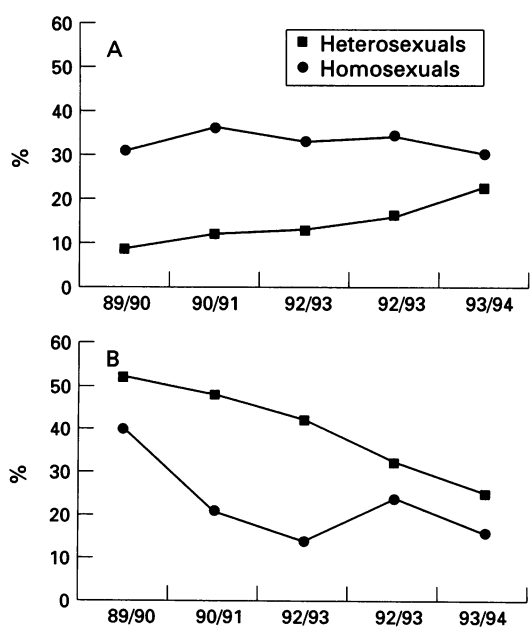
1993/94, it became significantly lower in younger patients (4·7% versus 10·5%, chi square: p < 10⁻⁴).

b. Condom use The use of condoms was different according to the sexual orientation of patients (table 2). Significant variations were observed during the reference period (fig 2A): there was a dramatic increase of patients always using condoms in the heterosexual group, from 9% in 1989/90 to 22·5% in 1993/94 (linear regression: p = 0·0013), whereas the proportion of homosexual and bisexual patients always using condoms did not significantly vary (p = ns). These data correlate well with the 50% decrease of patients who declared they never used condoms (fig 2B); this decrease was especially dramatic among heterosexuals in whom 52% never used condoms in 1989/90 versus 25% in 1993/94 (p = 0·0014).

Men used condoms more often than women (chi square, p < 10⁻⁴) (table 2). Between 1989 and 1994, the proportion of male patients never using condoms fell from 38·3% to 20·9% (linear regression: p = 0·002), and this phenomenon was even more pronounced in women in whom the proportion fell from 59·7% to 29% (p = 0·0014). There was also a regular increase in male patients always using condoms from 16% to 26·5% (p = 0·0036), and a parallel change among women in whom this proportion was 9·2% only in 1989/90 and 18·9% in 1993/94, but this was not significant (p = ns).

There were marked differences in the evolution of condom use according to the age range. The proportion of patients never using condoms decreased in all age classes, but in patients under 20 years there was a fall from 58·1% in 1989/90 to 20·2% in 1993/94 (linear regression: p = 0·0012). The proportion of patients always using condoms did not significantly vary in both 30–39y (p = ns) and ⩾40y groups (p = ns) during the study period, whereas this parameter regularly increased in younger patients (< 20 years: p = 0·049; 20–29 years: p = 0·0276). The major change was observed in patients under 20 years: in 1989/90 9·3% of patients of this group always used condoms, versus 26·5% in 1993/94 (p = 0·049).

Condom use was much more frequent in patients with multiple partners than in patients with only one sexual partner. Condom use regularly increased mainly in patients with more than 5 partners, but also in patients with 1 partner. In 1993/94 it remained only 4% of patients with more than 5 partners who declared never to use condoms, whereas they were 27% in 1989/90 (linear regression: p = 0·012). In patients with 1 partner, this proportion fell from 67·4% in 1989/90 to 37% in 1993/94 (p = 0·002).

Past STD

To the question "did you ever have a sexually transmitted disease?" 10·3% of heterosexuals answered yes, whereas 20·7% of homosexuals and 19% of bisexuals did. The global rate of past STD in our study was 12·3%. STDs were

Figure 2 Frequency of condom use. A: proportion of patients using all the time condoms. B: proportion of patients never using condoms.

Table 3 Frequency of condom use during the 6 previous months according to gender (A), to the age range (B) and to sexual orientation (C). (Mean percentage over the period 1989–1994.) In parentheses: change between the year 1989/90 and the year 1993/94

Frequency of condom use	Never	Sometimes	Most often	Always
A				
Males	27%	25%	25%	23%
	(38·4–20·9)	(23·6–23·7)	(22–28·9)	(16–26·5)
Females	37%	26%	22%	15%
	(59·7–29)	(18·4–24·4)	(12·7–27·7)	(9·2–18·9)
B				
< 20 years	30%	28%	24%	18%
	(56·8–20·2)	(18·2–22·3)	(15·9–31)	(9·1–26·5)
20 to 29 years	29%	26%	25%	20%
	(45–23·2)	(21·1–24·9)	(19·2–29·3)	(14·7–22·6)
30 to 39 years	35%	25%	21%	19%
	(36·4–27·9)	(29·5–25·9)	(15·9–23·1)	(18·2–23·1)
≥ 40 years	42%	18%	16%	24%
	(62·5–37·1)	(8·3–23·8)	(16·7–19·2)	(12·5–19·9)
C				
Heterosexuals	33%	26·5%	23%	17·5%
	(51·8–25·2)	(22·9–25·1)	(16·3–27·2)	(9–22·5)
Bisexuals	20%	25%	32%	23%
	(30–14·6)	(15–26·9)	(35–39·4)	(25–19·1)
Homosexuals	20%	20%	27%	33%
	(40–16·4)	(17·1–19·9)	(11·5–33·3)	(31·4–30·4)

much more frequent in homosexuals and bisexuals than in heterosexuals (chi square, p < 10⁻⁴), but there was no significant difference between homosexuals and bisexuals (p = ns). We observed a marked difference between males and females: 14·3% of men had a past STD versus 9·4% of women (chi square: p < 10⁻⁴). The STD rate was also different according to the number of sexual partners: 12·3% of patients without recent partner had a past STD, versus 8·1% of patients with 1 partner, 10·4% of patients with 2 partners, 15·1% of patients with 3 to 5 partners and 25·6% of patients with more than 5 partners. In the group of patients under 20 years, there was a major decrease in the STD rate (fig 3) from 1988/89 to 1993/94 (linear regression analysis, p = 0·0025). This decrease was predominantly due to heterosexuals, since the proportion of heterosexual patients having a past STD fell from 25·8% in 1988/89 to 8·4% in 1993/94 (linear regression, p = 0·018), whereas this proportion did not significantly vary during the reference period in homosexuals (p = ns). Despite the fact that the number of bisexuals was small, the fall in past STD from 47·6% to 12·4% was significant (p = 0·017). Decrease in past STD was observed in males (26·6% to 10·9%, p = 0·002) and in females (30·1% to 7·8%, p = 0·031). It is interesting to note that the rate of past STD significantly decreased only in patients with 3 or more partners (p = 0·011), and not in patients with 0, 1 or 2 partners (p = ns).

Previous HIV testing
After July 1990, all patients were also ques-

tioned about a previous HIV test. The proportion of patients who were previously tested for HIV antibodies was 38·5% in 1990/91, 38% in 1991/92, 36·2% in 1992/93 and 38·6% in 1993/94. The patients who had already had a HIV test used condoms more frequently than those who were tested for the first time (chi square, p < 10⁻⁴). On the other hand, patients who had had a previous HIV test had more sexual partners than those tested for the first time, since the proportion of patients with more than 5 partners was 12·6% versus 4·1% (p < 10⁻⁴).

Discussion
During the period 1988–1994 we have observed a very significant increase in condom use among patients attending our HIV testing centre, and a relative decrease of multiple partners, mainly in homosexuals. All changes were more pronounced in people under 20 years of age.

Methodological limitations
This study deserves two methodological considerations. First, the patients attending the HIV testing centre are obviously not representative of the general population and we have no control group. On the other hand, it cannot be excluded that trends may be due in part to the changes in the population of patients attending the centre, that is, the increase in heterosexual patients with less risky behaviour. These data cannot therefore be extrapolated, but they suggest interesting trends in sexual risk in the understudied population. The differences between the present data and a massive telephone survey in France in 1991/92[2] show that the studied population is not strictly comparable to the general population, since the number of sexual partners was higher in the present study. The second point is the method of face-to-face interview, which was shown to generate a greater diversity in answers than telephone interviews.[3] Nevertheless, a comparison between these methods has demonstrated that the answers relative to the number of sexual partners and the use of condoms were not different according to the method used for the interview.[3] Another limitation of such a questionnaire could be the "social pressure" to use condoms which could influence the answers by a so-called "social desirability".[4] Nevertheless, alternatives to obtaining absolute data are probably not feasible.

HIV testing
We have observed a striking increase in the attendance at our centre from 1988 to 1994, as was the case in all other French centres.[1 5] This is due in great part to local information campaigns directed mainly toward students and young people. Posters were distributed in high schools, universities, hospitals, pharmacies and in many other public places. National information campaigns also contributed to the increased attendance, especially by TV programmes. This increase in the demands for

Figure 3 Past STD rate among patients aged less then 20 years.
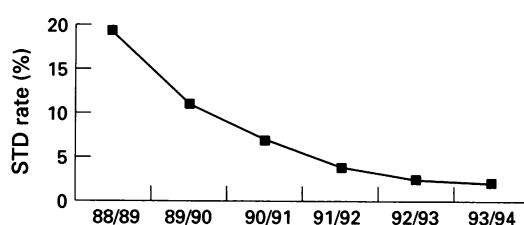
HIV tests in Strasbourg is mainly due to heterosexuals, as previously noted in Denmark.[6] Nevertheless, a national survey in the USA has shown that in 1989/90, the rate of testing remained low (34%) among heterosexual men and women engaged in unprotected sexual intercourse with multiple partners, whereas the test frequency was 60% in male homosexuals.[7] Such a difference between homosexuals and heterosexuals in the frequency of HIV testing was also observed in England.[8]

The relatively low rates of HIV positive individuals in Strasbourg centre are correlated with the low prevalence of AIDS in the Eastern part of France. In March 1994, the cumulative rate of AIDS was 220/million in this area, whereas it was 3479/million in Paris.[9] Although the number of patients rose during the study period, the seropositivity rate fell from 1988 to 1994, as noted in other HIV testing centres between 1988 and 1993,[1] in the Strasbourg STD clinic[10] and in blood samples from the French transfusion centres between 1985 and 1990.[11]

Increasing rates of condom use

In many epidemiological reports, sexual behaviour changes were noted after the recognition of the AIDS pandemic. Other European studies have shown an increase in condom use during the late 1980s, namely in Scotland[12] and in Switzerland.[4] These data are in accordance with the increase in condom sales in Europe. In France, this increase was + 186% during the period 1986–1992, and the number of condoms sold in 1992 was 110 million units (Agence Française de Lutte contre le SIDA), but the basic level of condom use before the AIDS period was much lower than in other European countries or in the USA. Between 1987 and 1991, the sales of condoms increased from 8 billion to 14 billion units in Switzerland.[4] Despite the fact that there is an undoubted rise in the frequency of condom use, there remain many people at high risk for HIV infection who never use condoms as shown in multiple recent studies in US homosexual men,[13] in US drug users[14] and in the general French population.[2] The study of Catania *et al* has also shown that condom use remains relatively low in the general US population in 1990/91.[15]

These data also vary with the sexual orientation. We have observed that the proportion of heterosexuals using condoms over time increased strikingly, but condom use remained higher in homosexuals. A higher proportion of people who never used condoms was also found in the heterosexual group in the general French population.[2]

Reduction of multipartner sex

The reduction in multipartner sex was noted only in homosexuals in the present study. These data suggest that the changes in sexual behaviour interact with the sexual orientation. It was shown in other studies that heterosexuals were still less likely to reduce their sexual risk for HIV infection than were homosexuals.[14] During the late 1980s, there was a well documented dramatic decrease in unsafe sexual behaviour among homosexual and bisexual men.[16] Young US homosexual men entering a cohort study in 1988/92 reported fewer partners than those who entered in 1984[13] even though there was evidence of some relapse to riskier behaviour in subgroups of homosexuals.[17] Changes were less pronounced in heterosexuals, and multiple partnered heterosexual practicing unsafe sex were only slightly more likely to have been tested for HIV than subjects without risk factors.[7] Surveys in 1990/91 in the USA do not suggest a dramatic reduction of multipartners among heterosexuals.[16] It is also of interest to note that behavioural changes were different according to the cultural level in Scotland: better educated people increased their use of condoms while less educated people showed a decrease in the proportion of multiple partners.[12]

Behavioural changes and age range

We have observed that all changes were more pronounced in people aged under 30 years, and this was especially the case for patients under 20 years. This could be due in part to AIDS information campaigns which are mainly directed towards the younger population. On the other hand, young people are more likely to accept behavioural changes than patients over 40 years, especially for condom use.[2] These data are strengthened by the very significant decrease of past STD in patients under 20 years and by the dramatic fall in gonorrhoea and syphilis observed during the same period of time in the Strasbourg STD clinic.[10] An increasing rate of condom use during the first sexual contact from 58% in 1989 to 85% in 1993 was also shown in French teenagers (Agence Nationale de Recherche sur le SIDA). These results are encouraging, because theoretical estimates of HIV risk have shown that the younger the individual, the greater the risk,[18] mainly because of multipartner sex.[8] Our study and massive surveys in France,[2] Britain[8] and USA[15] have shown a highly contrasting behaviour between age groups and generations. If it is true that many of those at high risk have perceived the risk,[8] prevention efforts have not reached sexually active middle-aged and elderly adults with an HIV risk factor to the same extent as in young adults.[15] Our study showed that this is so even in patients who have undergone HIV testing. There are also variations of condom use with racial and geographical factors, which lead to very contrasting findings, since the follow up data from the National Surveys of Young US men between 1988 and 1991 indicated no significant increase in condom use.[19] This is probably linked to cultural factors. In contrast, the most recent study in 18–25 year olds in Scotland showed increasing number of people using condoms between 1988 and 1995, whereas there was no evidence of reduction of multiple partners.[20]

The analysis of our data suggests that condom use is significantly increasing, but these changes were observed in patients who volunteered for HIV testing. On the other hand it is

possible that more people with less risky behaviour start attending HIV testing centres. This is probably encouraging since we noted that in patients who had already undergone HIV testing, the level of condom use was higher than in patients tested for the first time. On the other hand, HIV testing was probably repeated because a high HIV risk was perceived by these subjects who were more likely to have multiple partners than those who had never been tested. These results suggest that behavioural changes are probably more pronounced in those who undergo HIV testing.

In conclusion, this study confirms that the HIV risk has been perceived by homosexuals and by the younger heterosexuals since some sexual behaviour changes were noted in these groups, who were people attending for HIV testing. Efforts should also be extended to middle aged adults, especially heterosexuals. It remains to be determined whether these changes are also effective in the general population.

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