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EVIDENCE FOR RECENT CHANGES IN SEXUAL BEHAVIOUR IN HOMOSEXUAL MEN IN ENGLAND AND WALES

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Over 80 % of cases of Acquired Immune Deficiency Syndrome (AIDS) in England and Wales have occurred in homosexual men. Changes in sexual behaviour in this group may have a substantial influence on the incidence of Human Immunodeficiency Virus (HIV) infection and will therefore be crucial in determining future cases of AIDS.

This paper critically weighs the indirect and direct evidence for changes in behaviour in homosexual men since the advent of the AIDS epidemic. The paper reports on falling incidence of gonorrhoea, hepatitis B and syphilis in homosexual men, the changes being most marked from 1985 onwards. Data on temporal trends in HIV prevalence and incidence in homosexual men are reviewed. These suggest that the maximum incidence of HIV infection occurred in 1982–84 and may have fallen since then.

Evidence for a concomitant change in sexual behaviour is reported from several sources. This points towards a recent change in sexual behaviour characterized by reduction in the numbers of partners and adoption of safer sexual practices. In some places change may have occurred as early as 1983. A change became apparent generally in 1985 and this appears to have been sustained in 1986–87. Nevertheless, a substantial proportion of homosexual men studied continue to practice high risk sexual practices, such as anal intercourse, including relationships with casual partners.

1. INTRODUCTION

(a) *General*

Because of the long incubation period from HIV infection to AIDS, predictions of future cases of AIDS are determined by past and current incidence of HIV infection. Incidence of infection in an entirely susceptible population with sufficiently high rates of partner change will initially be high, but will tend to slow as the pool of susceptibles is exhausted. However, incidence may also be reduced by changes in behaviour among both infected and susceptible individuals. Change in sexual behaviour occurring at an early stage of the epidemic when the prevalence of infection is low, may have a more marked effect on incidence than change occurring later in the epidemic when high prevalence of infection makes the probability of exposure to an infected individual high, even with low rates of partner change.

In England and Wales, the majority of cases of AIDS and HIV infection have occurred among homosexual men. Studies of the risk factors for HIV infection among homosexual men have identified receptive anal intercourse as the sexual act that has the strongest independent risk for infection (Johnson 1988; Winkelstein *et al.* 1987a; Moss *et al.* 1987; Kingsley *et al.* 1987).

These studies have also shown a markedly increased risk of infection with increasing numbers of sexual partners. A common feature of studies has been the significant minority reporting large numbers of sexual partners (more than 500). The proportion in the population who have any homosexual experience, and those who are exclusively homosexual, is unknown. It is therefore impossible to draw a random sample of homosexual men for study. Virtually all studies of homosexual behaviour suffer from selection biases inherent in drawing samples from volunteers at homosexual meeting places etc., or from clinic samples. Despite these shortcomings, taken together, studies from clinic and non-clinic samples in the United States (U.S.A.) and the United Kingdom (U.K.) suggest that homosexual men have higher numbers of sexual partners than heterosexual men and women (Anderson & Johnson 1989); that homosexual men attending sexually transmitted disease (STD) clinics suffer higher rates of STDs than heterosexual clinic attenders, (Belsey & Adler 1981) and that numbers of sexual partners are closely correlated with the incidence of sexually transmitted diseases (Darrow *et al.* 1981). These patterns of behaviour among homosexual men appear to have preceded the AIDS epidemic by several decades (Darrow *et al.* 1981; Gebhard & Johnson 1979). These behavioural characteristics have largely determined the pattern of the AIDS epidemic in the U.K. and U.S.A. As the risk factors for AIDS emerged, the homosexual community mounted an impressive education campaign with three main messages for risk reduction: avoid unprotected, penetrative anal intercourse; reduce numbers of partners; and use condoms.

This paper examines the available evidence for changing sexual behaviour among homosexual men in England and Wales in response to the HIV epidemic. We have examined indirect and direct evidence from trends in rates of sexually transmitted diseases (STDs), HIV prevalence and incidence, and studies of sexual behaviour.

(b) *United States of America*

Evidence from eight cohort studies in the U.S.A. indicates that HIV was present in the homosexual population at least from the late 1970s. The maximum incidence of HIV infection in homosexual men (i.e. the percentage of uninfected men becoming infected) occurred in the years 1980–84 and fell from 1984 onwards (Centers for Disease Control (CDC) 1987). For example, in the only cohort study based on a random sample of homosexual men in San Francisco, annual infection rates fell from an estimated 18.4% per year from 1982–84 to 4.2% in the first half of 1986 (Winkelstein *et al.* 1987*b*). From 1983 onwards, and possibly earlier, there was evidence of changing sexual behaviour among homosexual men in the U.S.A. with reduction in partner numbers; reduction in the practice of anal intercourse; and an increase in the use of condoms (Centers for Disease Control 1987*b*; Johnson 1988; McCusick *et al.* 1985; Martin 1987; Winkelstein *et al.* 1987*b*).

There is evidence from the San Francisco Men's Health Study that the falling incidence coincided with behaviour changes (Winkelstein *et al.* 1987*b*). However, behavioural change has not always led to a fall in incidence of HIV in heavily infected groups. In a cohort of 378 homosexual men, Stevens *et al.* (1986) recorded an annual seroconversion rate ranging from 5.5% to 10.6% between 1979 and 1983, the highest incidence occurring in the later years despite an observed reduction in sexual activity. This reflects the increasing risk of infection from one sexual partner as the prevalence of infection in the population increases. Thus behavioural risk reduction will only reduce the incidence of infection if it is of a magnitude sufficient to outweigh increased risk inherent in the rising prevalence, or occurs at an earlier stage in the epidemic, when infection rates are low.

In the city clinic cohort in San Francisco, prevalence of infection continued to increase at a virtually linear rate between 1978 and 1984, reaching over 70% in 1985 despite observed behaviour changes over the same time period (Centers for Disease Control 1985*a*). In cohorts where prevalence was already very high at the time of behaviour change, subsequent falling incidence may partly be a result of depletion of susceptibles.

(c) *England and Wales*

An estimated 10% of cases of sexually transmitted disease in men in England and Wales occur in homosexual men (Belsey & Adler 1981). Information on sexuality is not recorded in statutory returns from STD clinics so trends in incidence of STDs in homosexual men can only be derived from trends for all men or by special studies.

(i) *Gonorrhoea*

Rates of post-pubertal gonorrhoea in men and women in England showed a slow decline in the years 1976–84. In the years 1985–86 there was a more marked reduction in rates in men from 201 per 100 000 in 1985 to 170 per 100 000 in 1986 (figure 1; Chief Medical Officer 1987).

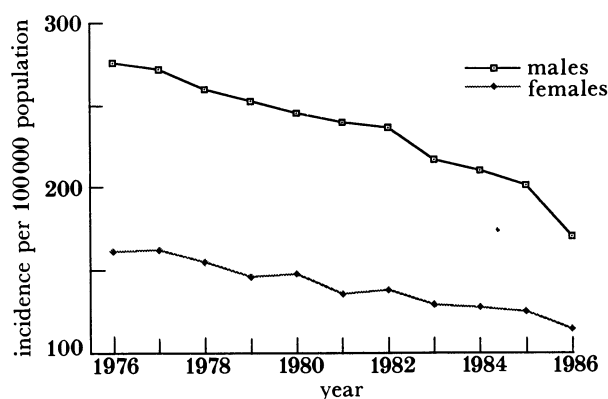


FIGURE 1. Incidence rate of post pubertal gonorrhoea per 100 000 population. New cases at NHS genito-urinary medicine clinics, 1976–86. The denominator for rates is the population aged 15–59. (Source: Statistical Bulletin DHSS 2 July 1988.)

In some genito-urinary medicine clinics in London there has been a marked decline, beginning in 1981, in the proportion of homosexual male attenders with gonorrhoea; at The Middlesex Hospital the rate fell from 19% in 1981 to only 2.3% in 1987 (Loveday *et al.* 1989; Weller *et al.* 1984). At St Mary's Hospital male rectal gonorrhoea isolates, which occurred only in homosexual men, fell by 53% between 1983–84 and 1986 (Gellan & Ison 1986). At the same time, the number of urethral isolates from homosexual men fell by 70% and among heterosexual men by 30%. In 1986 and 1987 there was a marked decline in laboratory reports of rectal gonorrhoea in males in England and Wales (PHLS Communicable Disease Surveillance Centre, unpublished data); the number of reports received annually from consistently reporting laboratories fell from an average of 505 in the years 1983–85 to 158 in 1987.

(ii) *Syphilis*

Primary and secondary syphilis in males in England is generally homosexually acquired. Between 1976 and 1984 annual age-specific rates for new cases in males were declining slowly (figure 2; Chief Medical Officer 1987). In 1985 and 1986 this decline was markedly accelerated particularly in the age groups 20–24, 25–34 and 35–44 years.

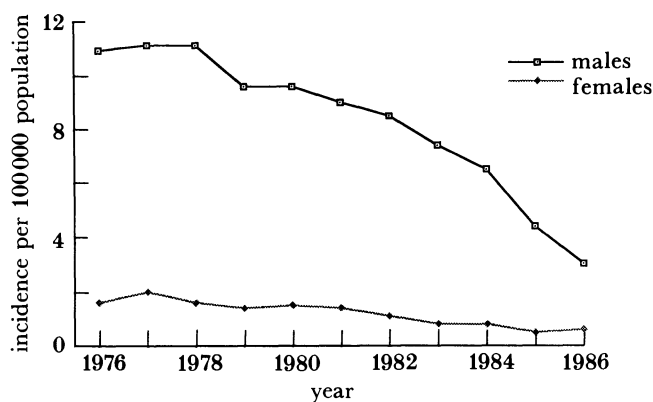


FIGURE 2. Incidence of primary and secondary syphilis per 100 000 population. New cases at NHS genito-urinary medicine clinics, England 1976–86. The denominator for rates is the population aged 15–59. (Source: Statistical Bulletin DHSS 2 July 1988.)

(iii) *Acute hepatitis B*

Infection with hepatitis B is common among homosexual men. In many cases infection may be acquired asymptotically. Carne *et al.* (1987) reported a prevalence of 40–50% in unselected homosexual STD clinic attenders tested between 1982 and 1986.

Between 1980 and 1984, 8% (520) of reported cases of acute viral hepatitis B in England, Wales and Ireland occurred among homosexual men (Polakoff 1986). The number of homosexually acquired cases increased annually between 1980 and 1984. Subsequently the number of reports fell from 150 in 1984 to 51 in 1987 (Polakoff 1988; S. Polakoff, personal communication) (figure 3). It has been suggested that this fall might be partly attributable to the recent introduction of hepatitis B vaccination for homosexual men (Adler *et al.* 1983). However, a survey done in 1988 showed that less than a third of STD clinics in the U.K. offer vaccination (Loke *et al.* 1989). This suggests that vaccination has probably had little impact on changes dating back to 1984 and that the falling incidence of acute hepatitis B infection is more likely to be attributed to changes in sexual behaviour.

(iv) *Human Immunodeficiency Virus (HIV)*

Several studies suggest that there was a rapid rise in prevalence of HIV infection among homosexual men, particularly in London, between 1980 and 1984 (Carne *et al.* 1987; Mortimer *et al.* 1985; Weber *et al.* 1986). Carne *et al.* (1987) demonstrated a rise in HIV antibody prevalence from 3.7% in 1982 to 21% in 1984 in unselected anonymously tested homosexual men attending an STD clinic in central London. This is similar to the rise in prevalence occurring in the San Francisco City clinic cohort in 1978 to 1980 (Jaffe *et al.* 1985). Whereas prevalence in the San Francisco cohort continued to rise over 70% by 1985, the rapid

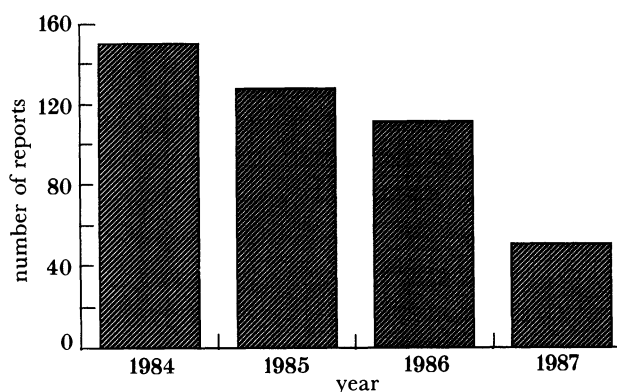


FIGURE 3. Acute hepatitis B reports in homosexual men. England and Wales 1984–1987. (Source: S. Polakoff, personal communication.)

rise in prevalence was not sustained in the London clinic study after 1984, and a prevalence of 26% was reached by the end of 1987 (Loveday *et al.* 1989). The slower rise in anti-HIV prevalence (figure 4) coincided with the continuing fall in gonorrhoea rates in the homosexual clinic population. However, figures based on serial prevalence studies must be viewed with caution because there may be underlying changes in the characteristics of the clinic population over that time (Gellan & Ison 1986).

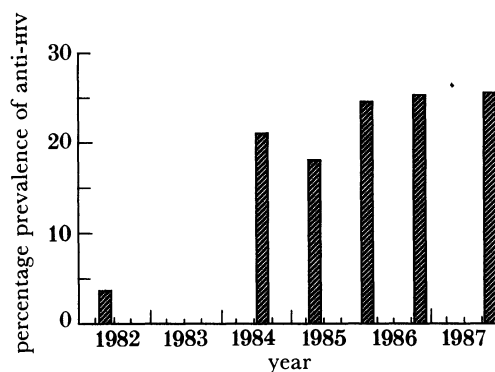


FIGURE 4. Prevalence of anti-HIV among homosexual and bisexual men attending a London genito-urinary medicine clinic 1982–87. (After Loveday *et al.* (1989).)

In a multicentre study of STD clinic attenders, mostly outside London, HIV antibody prevalence among homosexual men was relatively stable between 1985 and 1987 (around 14% in the South East and 3–6% elsewhere in the country (Collaborative Study Group 1989). These figures have been used to argue that prevalence is constant. However, the findings are difficult to interpret because of falling response rates in the clinics studied and the methodological problem of removing, from the estimate of prevalence for each year, clinic attenders who had tested positive in a previous year. Prevalence would therefore be consistently under-estimated. This problem is reflected in the work of Evans *et al.* (1989), who examined the prevalence of HIV antibody and behaviour patterns of men attending a west London clinic who requested testing for HIV antibody between 1984 and 1987. They observed a fall in antibody prevalence from 32% to 21% over the period and argue that this represents a change in

behaviour. However, one alternative explanation is that as time moves on, clinics are simply testing a lower risk population. Those at highest risk have already tested positive and therefore been removed from subsequent estimates of prevalence.

There is very little data available on the incidence of HIV infection in well-defined cohorts of homosexual men. Some useful data are available from the PHLS Working Group (1989) who have obtained risk factor and HIV antibody status on 34 222 subjects tested with consent between October 1986 and December 1987 in England. The annual incidence of infection in 632 homosexual or bisexual men without HIV antibody when re-tested was 3%. This is similar to the approximately 3% seroconversion rate between 1985 and 1988 observed in a cohort of 240 high-risk homosexual men in London in which 6/74 (9%) seronegative subjects subsequently seroconverted (I. V. D. Weller, personal communication). A lower incidence was observed in a cohort of 102 men in Oxford. Seven percent were initially antibody positive and over a three year period only 2% subsequently seroconverted (Eglin *et al.* 1988). The increase in prevalence of 7.4% per annum between 1982 and 1984 (Carne *et al.* 1987) suggests higher rates of infection at that time than the 3% incidence subsequently observed in the studies cited above.

None of these studies can be regarded as providing a definitive statement as to the current incidence and prevalence of HIV infection in homosexual men. Taken together, they suggest that incidence may have declined since the years 1982–84, but that it has by no means ceased. A 3% incidence rate among those already counselled and tested remains cause for concern.

(v) *Studies of sexual behaviour in homosexual men*

In a study of behaviour among homosexual men recruited through pubs, clubs and magazines in the U.K. in 1984, McManus & McEvoy (1987) documented high numbers of lifetime partners particularly among homosexual men in London, before the emergence of the AIDS epidemic.

There is now evidence that the slowing of the increase in HIV prevalence and the fall in incidence of other STDs in homosexual men occurred contemporaneously with a change in sexual behaviour. However, studies of behaviour change are often difficult to interpret, either because they are based on highly selected and heavily counselled clinic cohorts or because they are based on serial volunteer samples drawn from homosexual meeting places that may not be comparable over time.

Behaviour change among homosexual men recruited through STD clinics in London has been recorded in two cohort studies. Weber *et al.* (1986) showed a very marked reduction in numbers of partners per year between 1982 and 1985. Carne *et al.* (1987) studied behaviour change in a cohort of 100 homosexual men between 1984/5 and 1986. The median number of partners per month fell from three to one, whereas the proportion of respondents practising passive anal intercourse with more than two partners in a typical month fell from 41 to 16%. However, only 25% reported consistent condom use at the end of the study period.

More recently a study of homosexual men recruited from gay bars in the U.K. showed a fall in reported numbers of partners and in high risk sexual practices between 1986 and 1987, suggesting that behaviour change is currently sustained (Orton & Samuels 1988). In a study of 277 homosexual men, mostly recruited through homosexual organizations from October 1987 to July 1988, over 50% reported condom use for anal intercourse, a higher proportion than earlier studies (R. Fitzpatrick, M. Boulton & G. J. Hart, personal communication).

Evans *et al.* (1989) documented change in the pattern of sexual behaviour among those presenting at a London STD clinic for HIV antibody testing between 1984 and 1987. This was characterized by a reduction in the proportion practising ano-receptive intercourse and in the proportion with casual partners. Nevertheless, in 1987 half of those interviewed still had casual partners. The data is difficult to interpret because of the possibly changing characteristics of those requesting antibody testing.

Data from a national (England and Wales), non-clinic based, 3 year prospective study (1985–88) of homosexual and bisexual men (project SIGMA) broadly support these trends. In London and outside, various indicators of change in sexual and related behaviour show that such change has, by and large, been consistent (McManus *et al.* 1988; Coxon & Davies 1989; Coxon 1988), involving reduction in the number of sexual (and especially in penetrative sexual) partners, changes away from receptive and insertive anal intercourse and increased use of condoms. Over the period 1985–88 the study observed a reduction of lifetime sexual partners from a median of 70 (outside London, 38) to 6 (outside London, 4) in the last year. The number of penetrative sexual partners fell to a median of 1 in all sites. However, mean values of the number of sexual (and of penetrative sexual) partners are considerably higher, reflecting an 'upper tail' of those who have not greatly reduced numbers. By 1986 the amount of anal intercourse had reduced to 9.2% of sexual activity, engaged in by 53% of subjects, with a further reduction to 8% in the subsequent year. Nevertheless, a considerable amount of anal intercourse continues to be unprotected, both among couples and with casual contacts. Condoms have been adopted by 78% of those engaging in receptive anal intercourse but quite often men do not persist in their use, continue to avoid them in high-risk sexual activity, or have (more recently) given them up (McManus *et al.* 1988; McManus & Davies 1989; Coxon & Davies 1989; Coxon 1988).

2. CONCLUSION

Much of the evidence for changes in sexual behaviour among homosexual men is based on indirect measures, such as trends in incidence of other STDs rather than on direct measures of behaviour change. Because of the social, legal and ethical constraints that have constantly accompanied the public health response to the HIV epidemic, there are very few studies that have been able to measure HIV incidence and behaviour change in representative samples of homosexual men, or indeed in any other population sub-group.

Despite the methodological problems surrounding much of the evidence presented here, different direct and indirect approaches point to the same conclusion.

There has been a recent change in sexual behaviour among homosexual men in England and Wales characterized by a reduction in numbers of partners and adoption of safer sexual behaviour. In particular places this change may have begun as early as 1983. Subsequently, a marked change became generally apparent in 1985 and this was sustained in 1986 and 1987.

The magnitude of this change has been adequate to quite dramatically reduce the incidence of other STDs including acute hepatitis B. It has not, however, been adequate to eradicate new HIV infection. The finding of a 3% seroconversion rate per year in those previously tested, though not representative of all homosexual men, remains cause for concern. The findings presented here suggest that the epidemic curve characteristic of many cohorts in the U.S.A. has been stemmed at an earlier stage in the U.K. than in the U.S.A. However, continued

surveillance of both behaviour and HIV antibody incidence and prevalence, which allows meaningful comparisons to be made over time, is essential, for an infection whose natural history and potential spread is still incompletely understood.

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