

Volume 11

Number 27

5 July 2001



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Oro-genital contact (oral sex) and transmission of HIV and other sexually transmitted infections

A recent statement from the Expert Advisory Group on AIDS (EAGA) recognises that there is a small, but real, risk of HIV transmission through oro-genital sexual contact (oral sex). The statement says *'There is a risk of HIV transmission during unprotected oral sex. This risk is less than that from unprotected anal or vaginal sex. The risk of HIV and other sexually-transmitted infections can be reduced by using a condom for all forms of penetrative sex, including oral sex. If a condom is not used, avoiding ejaculation into the mouth probably lessens (but does not eliminate) the risk of HIV transmission'* <www.doh.gov.uk/eaga>.

Literature reviews (1,2,3) conclude that, although uncommon, HIV transmission occurs via oral sex. Most extensively described and biologically plausible is HIV acquisition resulting from receptive oro-penile intercourse (ROI) to ejaculation, especially if there are oral sores, inflammation of the oro-pharynx, or oro-pharyngeal damage due to the effects of other sexually transmitted infections (STIs). Cases of HIV transmission attributed to oro-vaginal or oro-anal contact have been described even more rarely (1,2). With these low levels of risk it might be assumed that the contribution of the oro-genital route to HIV transmission is small. The high frequency of unprotected oral sex however means that it might account for as many as 3% to 8% of sexual transmissions, most commonly among men who have sex with men (4,5). Other STIs, especially gonorrhoea, syphilis, and herpes are more readily transmissible through oro-genital contact. Emphasizing that oral sex is not risk-free, however, should not detract from the message that unprotected anal intercourse is still the main route of HIV transmission in men who have sex with men and vaginal intercourse is the main route of heterosexual transmission for HIV and other STIs, both in the United Kingdom (UK) and worldwide.

Background

In June 2000, the Department of Health published a booklet *Review of the evidence on risks of HIV transmission associated with oral sex* (1), the output of a working group set up by the Expert Advisory Group on AIDS (EAGA). That document included as an appendix an exhaustive literature review of the evidence for HIV transmission through oro-genital contact. A review of the literature on HIV and oral transmission has also been published in *AIDS* (2). The conclusions from both were that transmission of HIV can and does occur through oro-genital contact.

From what is known about the oral defence mechanisms to infection, it seems likely that the risk of HIV transmission is increased if ejaculation occurs in the mouth and/or if there are oral lesions causing breaches in the mucosa (*eg* trauma, microtrauma from recent tooth brushing, or the effects of infections) (1). The evidence for HIV transmission from oro-penile contact is much clearer than for HIV transmission associated with oro-vaginal contact but reports of both appear in the literature reviews (1,2,3). Because of the lower efficiency of viral transmission through oro-genital contact compared with vaginal or anal intercourse and because of the reduced likelihood of a break in the protective barrier the risk of transmission through *protected* oral sex is effectively negligible. Furthermore, although there have been reports of HIV transmission between discordant couples (one HIV positive and the other negative) associated with other forms of oral sex, unprotected receptive oro-penile contact to ejaculation is the only behaviour likely to be associated with HIV acquisition sufficiently frequently for the risk to be thought measurable.

Estimating the transmission risk from unprotected oral sex

There are behavioural and biological factors, some of which are listed here, which complicate the estimation of the risk from available data of even unprotected oro-penile sex.

- Misclassifications resulting from false denial of higher risk activities or lack of awareness of condom split in receptive anal intercourse
- The high frequency of unprotected ROI in some groups which makes finding controls difficult
- The frequency, particularly among homosexual men, of using protected anal sex and unprotected oral sex as a risk reduction strategy

- Cofactors for transmission, such as the presence of oral lesions or trauma, or penile lesions
- As the additional risk of oral sex seems small, large sample sizes are needed to detect the effects of its inclusion in an individual's sexual practice.
- The increased risk from ejaculation into the mouth compared with the risk from pre-ejaculatory fluid.

Recent studies

Since January 2000 a *Lancet* editorial has been published (4) and three studies, all of which await publication in peer reviewed journals (5,6,7).

The most recent study was of 494 HIV positive patients, homosexual and heterosexual, who completed a questionnaire at a London HIV clinic. Thirty (6%) believed themselves to have been infected via oral sex. Further follow up of these cases is being undertaken to ascertain whether or not other risks were present.

The second, presented at the 7th Conference on Retroviruses and Opportunistic Infections, was based on interviews in San Francisco of people identified within twelve months of HIV seroconversion. Of 102 men who have sex with men who had recently seroconverted, 19 were initially thought to be HIV infected through oral sex. On follow up eight were reclassified and three were lost to follow up. This left eight of the 102 infections (7.8%) attributed to oral sex. Of these eight, two had unprotected anal intercourse (UAI) as well as oral sex but the UAI was with a documented HIV negative partner, four had protected anal sex and unprotected oral sex and two admitted only to oral sex as an HIV risk.

The third report was of two studies from Australia, from the Sydney Men and Sexual Health (SMASH) project. These were a retrospective interview based study of recently HIV infected homosexual men and a cohort study of initially HIV negative homosexual men. In the interview study seven of the 75 seroconverters gave unprotected ROI as a possible source of HIV infection. All denied partner ejaculation as part of their oral sex, but also denied having unprotected anal sex around the time of seroconversion. The cohort study of over 700 men, however, found that 26% reported ROI with ejaculation and this was not associated with an increased risk of seroconversion. The possible explanations for these apparently contradictory findings from the SMASH study are:

(a) that the seven seroconverters who admitted only oral sex risks around the time of seroconversion did have other risks;

(b) that the power of the cohort study was insufficient to detect the small excess risk of oral sex, or that the study design had other biases;

(c) there is no excess risk from oral sex.

EAGA's conclusions would favour (b) to be the most likely explanation. In the press release associated with the conference, however, the researchers themselves focussed on (a) and (c) as the likely explanations.

Transmission of other sexually transmitted infections through oral sex

Other STIs are transmitted through oral sex more readily than HIV. The UK's Gonococcal Resistance to Antimicrobials Surveillance Programme (GRASP) collects data on the site of infection in a sentinel network of clinics (8). The data available for analysis at this stage only gives anatomical site of infection for those specimens collected outside London but these show that 19% (36 of 190) of gonorrhoea isolates from homosexual men and 5% (15 of 289) of isolates from women were from the throat. These are likely to be minimum estimates as throat swabs are not always taken in GUM clinics and oro-pharyngeal gonorrhoeal infections may often be treated unrecognised in primary care settings, without swabs being taken. If the percentages given above applied to all cases of gonorrhoea then around 800 of the 16,000 (5%) of isolates reported annually in England is a minimum estimate for cases of gonorrhoea acquired through oral sex.

Several syphilis outbreaks have occurred over the past two years in the UK. Some of these have mainly affected men who have sex with men. The initial descriptive study based in interview of patients from the ongoing outbreak in Manchester (9) showed that oral sex was a risk factor in many of the cases, as it may well have been in the syphilis clusters elsewhere in the country. Some of the patients who contracted syphilis were also HIV infected and the transmissibility of HIV will have been increased for these dually infected individuals.

The changing epidemiology of herpes simplex virus (HSV) types 1 and 2 reflects both changing sexual practices and other societal changes. The latter have resulted in HSV 1 infection being less common in childhood in industrialised countries. Furthermore there is evidence that among sexually active adults new genital HSV 1 infections are now as common as new oro-pharyngeal ones and in some populations half the first episodes of genital herpes are caused by HSV 1. The practice of oral sex is thought to have played an important part in this transition (10).

Chlamydia, too, can be transmitted by oro-genital contact. In a recent study 262 gay men attending for sexual health screening at a London GUM clinic were swabbed from rectal, urethral and pharyngeal sites and tested for *Chlamydia trachomatis* (11). Of the pharyngeal specimens 1.6% were positive,

compared with 4.5% of the urethral and 7.9% rectal swabs. Some were positive from more than one site and in total 11.4% were infected.

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Syphilis transmission among homosexual and bisexual men in London and Manchester

CDSC has recently received reports from some genitourinary medicine (GUM) clinics in London of increased numbers of diagnoses of primary and secondary syphilis among men who have sex with men (MSM). Four clinics alone have reported a total of 24 new diagnoses since the start of the year. In the last year with complete data (1999), these clinics reported seven cases among MSM. In the same year 34 clinics across the whole of London contributed a total of 24 new cases. Some of the recent diagnoses probably reflect recent increased ascertainment in one clinic.

Eighteen of the 24 cases reported having had sex, including oral sex, with casual male partners in gay clubs and saunas in London. High rates of partner acquisition, unprotected oral and anal intercourse have been a feature and cases have included at least 15 men known to be HIV infected. Local control measures have been initiated and include raising awareness among venue owners and patrons, increasing condom provision in gay clubs and cruising areas, enhanced surveillance for new cases in GUM clinics, and reinforcing syphilis screening among gay men attending GUM clinics. A pan-London syphilis incident team, including representation from public health, GUM, microbiology and voluntary sector organisations, has been convened by CDSC to co-ordinate the response.

Initial indications suggest a number of similarities with the syphilis outbreaks among gay men previously reported in Greater Manchester and Brighton which have proved especially difficult to control, despite proactive education and testing campaigns (1,2). The Manchester outbreak is currently the largest in the country with over 160 cases (1). Health authorities in Manchester are about to implement a number of other initiatives to enhance the health promotion campaign, case finding, and treatment. Testing and treating those identified with syphilis may be particularly important because of the large number of casual partners and unwillingness to adopt safer sex practices (3). The pressure on some GUM clinics due to the increasing number of new diagnoses does, however, mean that it is difficult for them to provide ready access. Many of these factors exist in other parts of England and Wales, and especially in London. HIV transmission among gay men in the capital is already substantial (4), and levels of risky sexual behaviour have seemingly worsened recently (5,6).

These trends have implications for HIV epidemiology. Syphilis co-infection among HIV infected homosexual men is especially concerning as this may enhance HIV transmission (7). Also trends in syphilis and HIV transmission in gay men in the United Kingdom (UK) have previously closely paralleled each other (8). Recent increases in transmission among gay men have been reported from other European countries (9). In the United States syphilis transmission has increased among gay men in some cities, undermining a commitment to eliminate syphilis transmission from that country (10). These increasing trends among homosexual men in at least two major urban areas in the UK suggest that a national co-ordinated approach to syphilis is required.

Syphilis among homosexual and bisexual men has been increasing in the UK since 1998. Between 1998 to 1999 cases of infectious syphilis (primary and secondary syphilis) attributed to sex between men more than doubled in the UK from 23 to 51. The numbers of cases among all men (heterosexual, bisexual, and homosexual) increased by 79% from 89 to 159. The increases attributed to sex between men, and all men reported by London clinics, was from 11 to 24 from 34 to 61 respectively. Similar increases have been observed outside of London among both MSM and all males, with rises from 12 to 27 and 65 to 98 respectively.

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Respiratory tract infections, England and Wales: laboratory reports, weeks 22-26/01

	Number of reports received					Total reports
	22/01	23/01	24/01	25/01	26/01	22-26/01
Adenovirus (excluding EM faeces)	59	24	23	2	33	164
Coronavirus	–	–	–	–	–	–
Influenza A	10	1	5	6	4	26
Influenza B	80	4	4	5	4	97
Parainfluenza	56	24	22	14	9	125
RS virus	31	14	4	8	68	125
Rhinovirus	9	–	1	3	2	15
<i>Chlamydia sp</i>	13	–	4	1	2	20
<i>Coxiella burnetii</i>	2	1	–	1	1	5
<i>Legionella sp</i>	2	3	5	4	4	18
<i>Mycoplasma pneumoniae</i>	14	8	10	14	14	60

Adenovirus (excluding types 40, 41, group F, EM faeces): 90 patients had eye infections. M35y had pleurisy, M 37y impaired immunity, and F 1y tonsillitis.

Coronavirus: No cases were reported.

Influenza A: 26 cases were reported. South West region reported eight cases, Northern and Yorkshire six, and North West, South East, and Trent four each. Thirty-eight per cent of cases were aged between 15 and 44 years.

Influenza B: 97 cases were reported. M 25y and F 23y had cystic fibrosis. Northern and Yorkshire region reported 64 cases and South West 20. Fifty-seven per cent of cases were aged between 15 and 44 years.

Parainfluenza (type 3, 117; untyped 8). 125 cases were reported, and one died (F age not stated). M age not stated, F 1y and F 49y had impaired immunity. Four patients had bronchiolitis. South West region reported 36 cases, Trent 30, and West Midlands 17. Fifty-one per cent of cases were aged under 1 year of age.

Respiratory syncytial virus: 47 patients had bronchiolitis. M 79y had Guillain-Barré syndrome. South East region reported 70 cases, South West 17, and Northern and Yorkshire 13. Eighty-two per cent of cases were aged under 1 year of age.

Rhinovirus: 15 cases were reported. Trent region reported 11 cases. Eighty per cent of cases were aged under 1 year of age.

Respiratory chlamydia (*C. psittaci*, 12; *C. pneumoniae*, 5; *Chlamydia sp*, 3): nine patients had pneumonia.

Coxiella burnetii: five cases were reported. M 38y and M 61y had acute hepatitis. South West region reported two cases, and London, Northern and Yorkshire, and Wales 1.

Legionella: 18 cases were reported, eleven were males aged between 39 and 80 years and seven females aged between 49 and 84 years. All had pneumonia. F 74y died. Fifteen cases were associated with travel abroad: Greece and Turkey (four each), Spain (three), China, Italy, Mediterranean cruise, and Tunisia (one each). One case, F 70y, acquired infection in the community. Two cases, M 39y and M 61y, were

associated with an outbreak in London, England. Two cases were late reports with a date of onset in 2000.

Mycoplasma pneumoniae: 60 cases were reported. Thirteen patients had pneumonia. M 5y had acute arthritis, M 6y Stevens-Johnson syndrome, F 42y arthralgia. South West region reported 23 cases, Eastern 10, and South East seven. Forty-three per cent of cases were aged under 15 years of age.

Opportunist mycobacterial infections, England and Wales: laboratory reports, weeks 14-26/01

	Number of reports received weeks 14-26/01				Cumulative totals 01-26*	
	Male	Female	Not stated	Total	2001	2000
Avium-intracellulare group	34	19	1	54	124	183
Site of isolate**						
pulmonary	26	13	1	40	92	125
lymph node	–	–	–	–	4	3
blood	2	2	–	4	10	14
other	7	4	–	11	21	43
M. malmoense	20	11	1	32	66	81
Site of isolate						
pulmonary	16	8	–	24	47	65
lymph node	–	–	–	–	1	–
other	4	3	1	8	18	16
M. kansasii	7	7	–	14	51	64
M. xenopi	5	1	–	6	18	18
Other species#	7	3	1	11	24	16

* provisional data; ** number of isolates may exceed number of cases, as cases may have disease at more than one site; # *M. marinum* 4; *M. fortuitum* 3; *M. chelonae* 2; *M. goodii* 2.

Enhanced surveillance of tuberculosis, England and Wales: 2000

Enhanced surveillance of tuberculosis by region and site of disease, England and Wales: 2000*

Region	Non-pulmonary	Pulmonary	Site unknown	Total
Northern and Yorkshire	230	328	–	558
Trent	180	271	9	460
Eastern	107	166	–	273
London	1233	1413	34	2680
South East	217	385	–	602
South West	63	166	–	229
West Midlands	302	409	–	711
North West	204	307	–	511
Wales	55	120	–	175
Total	2591	3565	43	6199

* provisional data; Source: Enhanced Tuberculosis Surveillance database

Enhanced surveillance of tuberculosis by age, sex, and site of disease, England and Wales: 2000*

Age group	Sex	Pulmonary	Non-pulmonary	Site unknown	Total
0-14 years	Male	90	85	–	175
	Female	103	84	2	189
	Unknown	1	–	–	12
	Total	194	169	2	365
15-34 years	Males	693	584	15	1208
	Female	593	464	5	956
	Unknown	4	5	–	31
	Total	1290	1053	20	2363
35-54 years	Males	549	357	7	913
	Female	298	390	4	692
	Unknown	4	3	1	8
	Total	851	750	12	1613
55-74 years	Male	543	183	5	675
	Female	317	269	4	537
	Unknown	–	2	–	7
	Total	860	454	9	1219
75+ years	Male	222	80	–	302
	Female	144	78	–	222
	Unknown	–	–	–	–
	Total	366	158	–	524
Age unknown	Male	1	3	–	4
	Female	3	4	–	7
	Unknown	–	–	–	–
	Total	4	7	–	11
Total		3565	2591	43	6199

* provisional data; Source: Enhanced Tuberculosis Surveillance database

Enhanced tuberculosis surveillance in 1999 – how complete is the data?

Enhanced surveillance of tuberculosis has now been running for two and a half years in England and Wales (and Northern Ireland since 2000). Assessment of the reports received during 1999 indicate that levels of data completion for certain key data fields are sub-optimal. For example, whereas age and sex were provided for at least 99% of cases, and ethnic group and place of birth (UK vs non UK born) for 97% of cases, sputum smear status (positive, negative, not done) was only completed for 49% of pulmonary cases compared to 72% in the 1998 National Tuberculosis Survey in England and Wales. Lack of sufficient resources at local level may have contributed to this lower level of completion.

Although 2000 data are still preliminary at this stage, they suggest that completeness of some key data fields has improved. For example, 61% of pulmonary cases reported in 2000 had a 'positive', 'negative' or 'not done' result for sputum smear status. However, completion rates for place of birth and year of entry to the UK have both slipped to less than 70%.

Reconciliation of data from enhanced tuberculosis surveillance with Mycobnet, the system coordinated by the PHLS to monitor anti-tuberculosis drug resistance in the UK, has yet to take place for 2000. This process enables demographic and clinical data missing from one system to be completed from data provided to the other, although demographic data provided in Mycobnet is limited. Chasing incomplete data items is best achieved at local level. It is important that this be carried out as soon as possible after diagnosis, as the information is more readily available at this time.

Surveillance of legionnaires' disease in England and Wales and throughout Europe

A recent issue of CDR Weekly ([link](#)) highlighted transmission of legionnaires' disease in London detected through surveillance when cases presented in London, the midlands, and Sweden (in a traveller who had stayed in London). This demonstrates the value of national and international surveillance for this and other infections

There are two distinct national and international surveillance systems for legionnaires' disease in operation, both based at PHLS Colindale: the PHLS National Surveillance Scheme for Legionnaires' Disease in residents of England and Wales, and the European Surveillance Scheme for Travel Associated Legionnaires' Disease (LEGIONET) operated by the European Working Group for Legionella Infections (EWGLI). In both schemes cases must have clinical or radiographical (x-ray) evidence of pneumonia as well as microbiological evidence of legionella infection, according to national and internationally agreed case definitions.

England and Wales

Legionnaires' disease is not notifiable in England and Wales, and cases are reported voluntarily and in confidence by PHLS, NHS, and private laboratories; consultants in communicable disease control (CCDCs); and other health care workers. The Respiratory and Systemic Infection Laboratory (RSIL) at PHLS Central Public Health Laboratory provides microbiological confirmation of diagnosis. Each case is followed up using the PHLS surveillance questionnaire to obtain full information on clinical status and category of possible exposure in the two weeks before onset of illness. Each case can then be categorised as community acquired, hospital acquired (nosocomial) or travel associated (in the United Kingdom (UK) or abroad).

The full case details are entered into a database that is searched for other cases that may be linked in time and place. Cases, and possible links, are notified to the CCDC in the relevant health authority so that investigations into possible sources of infection can be initiated.

Nearly 4000 cases have been reported since 1980. Although the numbers reported each year range from 112 to 279 (average 183), the proportion of cases by category has remained relatively unchanged between community, nosocomial, and travel associated cases. Overall, travel associated and community acquired cases each account for 48% of the England and Wales database from 1980 onwards (1).

Travel associated legionnaires' disease (LEGIONET)

In contrast, the EWGLI surveillance scheme, which is funded by the European Commission, focuses on identifying cases in returning travellers across Europe. Surveillance was established in 1987 by a group of epidemiologists and microbiologists who wished to promote collaborative work in the field. Full details on the history of the group and its range of activities are reported elsewhere (2). The surveillance scheme currently has 53 collaborators in 32 countries. Their case reports are pooled to identify outbreaks of legionnaires' disease in travellers which might otherwise be undetected when individual cases return to their homes across Europe and onset of illness occurs away from the site of infection.

Each country completes a standard form (available to collaborators on the EWGLI website <www.ewgli.org> for secure data submission) giving anonymised information on the case's clinical and microbiological status and on their travel itineraries in the ten days before onset of illness. An accommodation site is of interest to the scheme if a case stayed there overnight and is a residential establishment, such as a hotel, campsite or cruise ship. Stays at private accommodation are not included.

Single cases are notified to the collaborators in the country of infection who then contact the accommodation site and remind them of the principles of legionella risk management. Two or more cases with onset within two years who have stayed at the same site are deemed to be a cluster. All collaborating countries are notified and a risk assessment and environmental investigation are initiated by the collaborator in the country of infection. Where three or more cases are associated with the same site in less than two years, the local public health authorities may consider closing the site until control measures are in place.

Over the 15 years of the scheme's operation, information on nearly 2500 cases has been gathered and disseminated. In recent years, the number of cases reported to EWGLI has increased, as the national surveillance schemes of the constituent countries are enhanced (3).

European guidelines for the control and prevention of travel associated legionnaires' disease are currently being produced by EWGLI. These will help to ensure that European citizens are protected from legionella infection when travelling in Europe.

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Mycobacterium tuberculosis* complex isolates reported to Mycobnet, England and Wales: 2000

Region	Isoniazid-resistance†		MDR‡		Total number of isolates
	No	%	No	%	
Northern and Yorkshire	11	3.2	3	0.9	343
Trent	13	4.3	6	2.0	304
Eastern	7	4.0	–	–	173
London	143	8.1	19	1.1	1764
South East	22	5.8	6	1.6	381
South West	5	4.0	1	0.8	125
West Midlands	31	6.5	4	0.8	480
North West	22	5.8	6	1.6	381
Wales	3	2.0	–	–	152
Total	262	6.4	44	1.1	4107

* provisional data; † with or without other resistance; ‡ multi-drug resistance, ie. resistance to isoniazid and rifampicin with or without other resistance

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