

# Prevalence of antichlamydial antibody in London blood donors

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**SUMMARY** The prevalence of type-specific antichlamydial antibody in a population of blood donors in London was studied using a microimmunofluorescence test. Twenty-six (17%) of 150 women and 38 (26%) of 150 men had antichlamydial antibody (IgG at  $\geq 1/16$  or IgM  $\geq 1/8$  or both). Of these, five (3%) women and one (0.75%) man had this antibody directed against *Chlamydia trachomatis* serotypes D-K, responsible for genital infections, and one man had antibody to *Chlamydia psittaci* agents. The remaining 57 men and women had antibody against an atypical chlamydial isolate designated *Chlamydia* IOL-207, which is iodine-negative and serologically distinct from both *C trachomatis* and *C psittaci*. The nature and location of infection by this agent are obscure.

The results of this study suggest that the prevalence of sexually transmitted infection with *C trachomatis* serotypes D-K in a normal adult population in London is very low.

## Introduction

Chlamydial genital infection is a common sexually transmitted disease. Chlamydia have been isolated from up to 68% of men with nongonococcal urethritis (NGU),<sup>1</sup> from up to 62% of women with gonorrhoea,<sup>2</sup> and from up to 31% of unselected women attending a sexually transmitted diseases clinic.<sup>2</sup> Ocular chlamydial infection of sexually transmitted origin—namely, TRIC ophthalmia neonatorum, inclusion conjunctivitis, and TRIC punctate keratoconjunctivitis—is also common,<sup>3</sup> and evidence is accumulating that *Chlamydia trachomatis* may cause pneumonitis,<sup>4</sup> pelvic inflammatory disease,<sup>5</sup> perihepatitis, peritonitis,<sup>7</sup> and endocarditis.<sup>8</sup>

The rate of exposure to chlamydial agents, particularly to *Chlamydia trachomatis*, in communities is not known. In San Francisco<sup>9</sup> an isolation rate of 11% was reported in women attending a birth control clinic, and in Seattle<sup>10</sup> the chlamydial isolation rate in pregnant women having routine examinations was as high as 12.7%. In this report we present the results of a study on the presence and concentrations of type-specific anti-

chlamydial antibodies in a group of adult men and women blood donors in South London.

## Subjects and methods

One hundred and fifty male and 150 female blood donors were selected from a population of volunteers attending a South London transfusion centre with a catchment area including Kent, Sussex, Surrey, and London. Their mean ages were  $38 \pm 14$  and  $40 \pm 13$  years respectively. The volunteers were apparently free from any major chronic diseases, were not under treatment, were feeling healthy at the time of blood donation, and were not known to be in contact with any infectious disease. Volunteers with overt herpes simplex virus infection or with known chronic urogenital infections requiring treatment were excluded.

Blood was collected by venepuncture; the serum was separated and kept at  $-20^{\circ}\text{C}$  for 2-4 months until tested.

## MICRO-IF TEST

The modified microimmunofluorescence (micro-IF) test of Treharne *et al*<sup>11</sup> was used to detect antichlamydial antibodies in serum samples. These samples were screened for antichlamydial IgG and IgM at dilutions starting at 1/16 and 1/8 respectively. Goat anti-human IgG and IgM fluorescein-labelled conjugates (Hyland Division, Travenol Laboratories)

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TABLE I Type-specific antichlamydial antibody in sera from 150 female and 150 male blood donors

Chlamydial species	No of sera giving positive results			
	Women		Men	
	No	%	No	%
<i>C trachomatis</i>				
Serotypes A-C	0		0	
Serotypes D-K	5	3	1	0.75
LGV serotypes 1-3	0		0	
<i>C psittaci</i>				
Representatives <sup>11</sup>	0		1	0.75
C IOL-207 (atypical)	21	14	36	24
All species	26	17	38	26

were used at a dilution of 1/20 for IgG and 1/10 for IgM. Rhodamine conjugated bovine serum albumin (Difco Laboratories) at a dilution of 1/40 was used as a counterstain. Sera were considered type-specific when the titre of antibody against a single antigen pool was at least twofold higher than against any other cross-reacting antigen.<sup>11</sup> Other technical details of the micro-IF test have been described elsewhere.<sup>11 12</sup>

Results

Antichlamydial antibody at any concentration was detected in 17% of women and 26% of men (table I and figure). Antichlamydial IgG (at titres  $\geq 1/16$ ) against *C trachomatis* serotypes D-K (responsible for genital and ocular infection) was detected in five (3%) women and one (0.75%) man. Antichlamydial IgM was detected in only one woman, and this was also directed against *C trachomatis* D-K. This patient also had IgG at a titre of 1/64 against serotypes D-K.

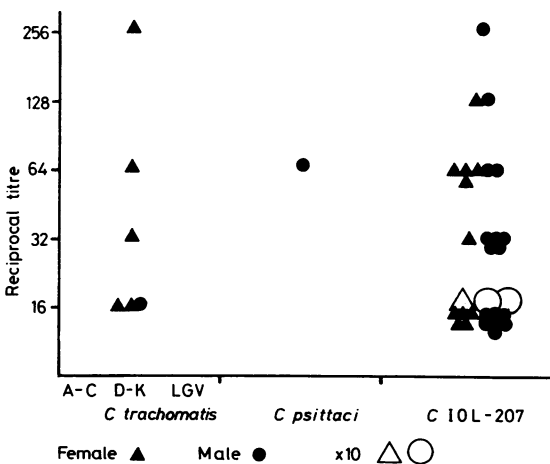


FIGURE Distribution of titres of type-specific antibody in sera from 150 female and 150 male blood donors.

If IgG at a titre  $\geq 1/64$  and IgM at a titre  $\geq 1/8$  is taken as indicative of a current chlamydial infection,<sup>13</sup> two women showed these significant micro-IF results against serotypes D-K.

Antichlamydial IgG at a titre of 1/64 against representatives of *Chlamydia psittaci* was detected in the serum of one man. No antibody was detected against *C trachomatis* serotypes A-C (responsible for hyperendemic trachoma) or the LGV serotypes.

Antichlamydial IgG (at a titre  $\geq 1/16$ ) against TRIC/IR/IOL-207/OT (IOL-207), an atypical chlamydial isolate,<sup>12 14</sup> was detected in 21 (14%) women and 36 (24%) men. In nine of them IgG was detected at a titre  $\geq 1/64$  (figure). No IgM antibody was detected against C IOL-207. The cross-reactivity of sera showing antibodies against C IOL-207 and *C trachomatis* serotypes are shown in table II.

Discussion

Cell culture systems for isolation of chlamydia<sup>15-18</sup> are sensitive for the diagnosis of chlamydial infections. Because of their technical complexities, however, and the particular requirements for collection and transport of specimens,<sup>19</sup> these tests are not considered to be practicable for use in small diagnostic laboratories or in epidemiological surveys of chlamydial infections.

The modified micro-IF test used in the present study is a sensitive, simple, and rapid serological test for the detection of type-specific antichlamydial IgG, IgM, or IgA in whole blood, sera, or local discharges. Detection of type-specific antibody after screening of blood against four antigen pools which correspond with each of the four main clinical and epidemiological types of chlamydial infections—that is, hyperendemic trachoma (*C trachomatis* serotypes A-C), ocular and genital infections of sexually transmitted origin (*C trachomatis* serotypes D-K), lymphogranuloma venereum (*C trachomatis* LGV agents 1-3), and *C psittaci* infections (representative isolates of *C psittaci*)—may indicate which clinical and epidemiological type of infection is implicated.

In the present study, antibody against *C trachomatis* serotypes D-K was detected in five (3%) of 150 of the women and in one (0.75%) of 150 of

TABLE II Cross-reactivity of 57 sera showing IgG antibody against Chlamydia IOL-207

IgG titre against <i>C trachomatis</i> serotypes	IgG titre against <i>C IOL-207</i>				
	16	32	64	128	256
0	43	5	5		
16			1	1	
32				1	
64					1

the men tested. Studies by Treharne *et al*<sup>11</sup> showed that in women with non-specific cervicitis the percentage of chlamydial isolation-positive patients with antibody titres  $\geq 1/8$  was 77% whereas only 14% of isolation-negative patients showed antibody at this titre or higher. In men with non-specific urethritis, the percentage of chlamydial isolation-positive patients with antibody at this titre was 51% whereas in isolation-negative patients antibody was detected in only 10%. These findings may suggest that the micro-IF positivity rate in women corresponds with the results of cell culture for defining chlamydial infection, whereas the micro-IF positivity rate in men may underestimate the frequency of the infection by approximately 50% in comparison with the cell culture system.

The prevalence of infection with *C trachomatis* D-K serotypes obtained in our group of healthy adults from South London is markedly lower than that obtained in Seattle, USA, where antibody against *C trachomatis* D-K was detected by a micro-IF test in 26% of the normal adult population.<sup>20</sup> This marked difference in prevalence, however, may partly reflect different patterns of sexual activity and the socioeconomic status of the people included in the two investigations and may be partly due to the testing of sera at the lower dilution of 1/8 by the workers in Seattle.

In the present study antibody against the chlamydial agent IOL-207 was detected in the blood of 14% of female and of 24% of male blood donors. *C IOL-207* is an atypical iodine-negative chlamydial isolate obtained from the eye of an Iranian child with trachoma using an egg-culture system. We found that this agent has certain properties in common with *C trachomatis* and *C psittaci* but is serologically distinct from both of these chlamydial species (unpublished data). Experimental inoculation of a baboon<sup>14</sup> demonstrated the pathogenicity of this organism for the conjunctiva and urethra. During this experimental work we found that cell culture is not sensitive for reisolation of *C IOL-207* but that the organism can be reisolated in egg culture if several passages were attempted (unpublished data). The high frequency of antibody against *C IOL-207* detected in our group of blood donors and in the blood of patients reported by Dwyer *et al*<sup>12</sup> may suggest that infection by *C IOL-207* is rather common in certain communities. Because of the apparent insensitivity of the cell culture systems commonly in use for isolating chlamydia, however, the nature and location of infection caused by this agent is still obscure.

The pattern of cross-reactions obtained by the micro-IF test when sera positive (at a titre  $\geq 1/16$ ) for *C IOL-207* are reacted against *C trachomatis*

antigens is shown in table II. As may be observed, if the *C IOL-207* antigen was excluded from this test four out of 57 sera would have been falsely recorded as having antibody titres  $\geq 1/16$  to *C trachomatis* alone. We have also found that more cross-reactions occur between all chlamydial antigens when lower dilutions of sera are tested (unpublished data).

*C psittaci* agents are commonly pathogenic for mammals and birds and occasionally may infect man. The presence of antibody against *C psittaci* antigens in one male blood donor may suggest an infection with one of the various *C psittaci* agents, including psittacosis infection.

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