

# Epidemiologic Investigation of a Cluster of Workplace HIV Infections in the Adult Film Industry: Los Angeles, California, 2004

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**Background.** Adult film production is a legal, multibillion dollar industry in California. In response to reports of human immunodeficiency virus (HIV) transmission by an adult film worker, we sought to determine the extent of HIV infection among exposed workers and to identify means of improving worker safety.

**Methods.** The Los Angeles County Department of Health Services initiated an outbreak investigation that included interviews of infected workers to elicit information about recent sex partners, review of the testing agency's medical records and laboratory results, molecular analysis of HIV isolates from the 4 infected workers, and a risk assessment of HIV transmission in the adult film industry.

**Results.** Many adult film workers participate in a monthly program of screening for HIV infection by means of polymerase chain reaction–based technology to detect HIV DNA in blood. A male performer tested negative for HIV on 12 February 2004 and 17 March 2004, then tested positive for HIV on 9 April 2004. During the period between the negative test results, he experienced a flulike illness after performing unprotected vaginal and anal intercourse for an adult film produced outside the United States by a US company. After returning to California, he performed unprotected sex acts for adult films with 13 female partners who had all tested negative for HIV in the preceding 30 days; 3 subsequently tested positive for HIV (a 23% attack rate). Contact tracing identified no reasonable sources of infection other than the male index patient.

**Conclusion.** Although current testing methods may shorten the window period to diagnosis of new HIV infection, they fail to prevent occupational acquisition of HIV in this setting. A California Occupational Safety and Health Administration–approved written health and safety program that emphasizes primary prevention is needed for this industry.

The San Fernando Valley area of Los Angeles County is home to the largest group of adult film industry producers in the United States. In this multibillion dol-

lar business, it is estimated that as many as 200 production companies employ 6000 workers, of whom 1200 are performers who engage in direct work-related sexual contact [1, 2] (Los Angeles County Economic Development Corporation, personal communication). Normal working conditions involve prolonged and repeated sexual contact with multiple partners over short periods and without barrier protection [3], conditions that favor transmission and acquisition of HIV infection and other sexually transmitted diseases (STDs).

Previous episodes of HIV transmission occurring as a result of exposure by workers in the adult film industry have been reported [3, 4]. In 1998, in response to these transmission events, a private industry-spon-

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sored nonprofit agency (the Adult Industry Medical Health Care Foundation [5]) was created in Los Angeles that provides medical care and disease screening on a fee-for-service basis to performers in the adult film industry in the United States. Many performers in heterosexual adult films participate in this screening program, which includes monthly testing for HIV infection as well as for urogenital infection with *Neisseria gonorrhoeae* and *Chlamydia trachomatis*. Testing is voluntary but often is a prerequisite to employment by production companies. Workers must provide producers with evidence of negative test results for HIV infection, gonorrhea, and chlamydia from the testing agency and must pay for all testing themselves. As a result of the HIV screening process implemented in 1998, HIV-infected persons have been identified before their entry into the heterosexual adult film industry, thus preventing the exposure of other workers.

In April 2004, the Los Angeles County Department of Health Services (LACDHS) received reports from the testing agency of work-related HIV infections that had occurred recently during the production of adult films [6]. The present article summarizes the epidemiologic investigation of this cluster of occupational infections, highlighting the need for improved workplace protections against HIV infection and other STDs for adult film industry performers.

## METHODS

**Field investigation.** The agency testing adult film workers for HIV infection and other STDs (the Adult Industry Medical Health Care Foundation) identified the index patient and his infected partners through its monthly screening program. After notification of the first positive HIV test result, that agency recommended that all adult film production be suspended until all primary and secondary sexual contacts of the index patient received HIV counseling and testing. The agency alerted LACDHS, which initiated an investigation and assisted with partner elicitation and notification and with referral of HIV-infected persons to appropriate medical care. Public health investigators assigned to the LACDHS Sexually Transmitted Disease Program, with assistance from the California Occupational Safety and Health Administration (Cal/OSHA), the National Center for HIV, STD, and TB Prevention, and the National Institute for Occupational Safety and Health, (1) conducted interviews of infected workers to elicit information about recent sex partners, (2) reviewed the agency's medical records and the laboratory results for infected workers and all primary and secondary sexual contacts, (3) reviewed the agency's counseling and testing protocol, (4) facilitated molecular analysis of HIV isolates from the 4 infected workers, and (5) conducted interviews with a convenience sample of ~50 performers and producers and reviewed testimony offered by workers, producers, and other stakeholders in the adult film industry, including the

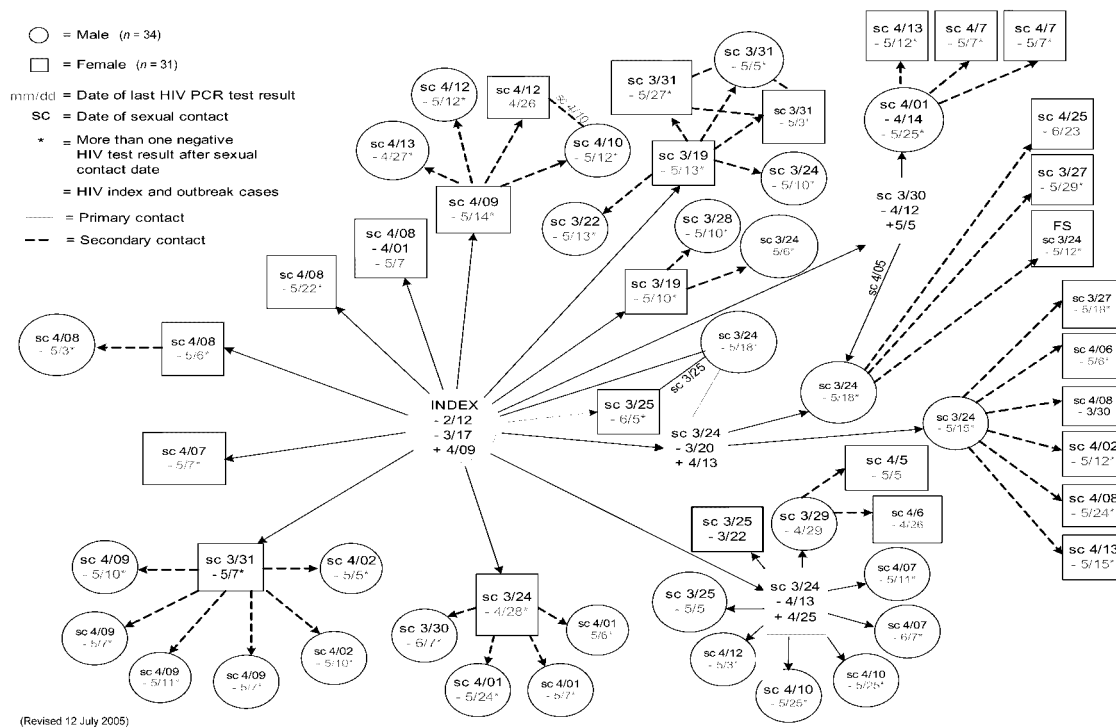
director of the Adult Industry Medical Health Care Foundation, regarding the use of personal protective equipment and general working conditions in the production of adult films.

**Laboratory methods.** The agency collected venous whole blood specimens for HIV testing. Specimens were tested by a California Clinical Laboratory Improvement Amendments–approved laboratory for the presence of HIV infection, using a PCR that detects HIV DNA in leukocytes (Amplicor HIV-1 Detection Kit; Roche). All patients from whom specimens tested positive for HIV by this method had their infections subsequently confirmed by US Food and Drug Administration–approved ELISA and Western blot methods at a separate laboratory. The HIV testing information described above was abstracted from medical records at the testing agency. Additional PCR testing for the purpose of sequencing was performed for the index patient and 2 of his 3 HIV-infected sexual contacts. The third infected contact refused additional testing. The genetic relationship among HIV isolates from infected workers was investigated by multiple methods reported elsewhere [7].

## RESULTS

The index patient, a 40-year-old man, tested negative for HIV by HIV DNA PCR on 12 February 2004. After this test, he traveled to Brazil, where he was directed to perform unprotected insertive vaginal and anal sex (with women) in an adult film. Production occurred sometime between 13 February 2004 and his return on or around 10 March 2004. He felt well in Brazil before the work but, a few days afterward, developed a flulike illness that included symptoms of malaise and night sweats. These symptoms resolved by the time he returned to the United States. He tested negative for HIV by HIV DNA PCR again on 17 March 2004 (7 days after his return). However, on 9 April 2004 (30 days after his return), he tested positive for HIV by HIV DNA PCR. He denied having any nonoccupational sexual contacts (since 12 February 2004) during the period between his negative and positive HIV test results and also denied having any work-related sexual contacts during the period between the work in Brazil and subsequent work in the United States. The index patient first presented for care on 19 May 2004, at which time he had positive HIV EIA results and Western blot results, a viral load of 20,800 copies/mL, and a CD4 cell count of 684 cells/mm<sup>3</sup> (32.2%).

It was during the 23-day period after his negative HIV test result in March and before his HIV infection diagnosis in April that the exposures in Los Angeles occurred. The index patient was employed to perform sex acts with 13 female performers. Three of these women subsequently tested positive for HIV, after having tested negative within the preceding 30 days (a 23% attack rate) (figure 1). Two of the 3 HIV-infected women performed unprotected oral, anal, and double-anal (2 penises in 1 anus simultaneously) sex with the index patient for a film



**Figure 1.** Adult film industry outbreak contact and transmission map, Los Angeles County, California, 2004

production on 24 March 2004; 1 of these 2 women also engaged in unprotected vaginal sex with the index patient on that date. Of these 2 female performers, one tested negative for HIV on 20 March 2004 and positive for HIV on 13 April 2004; the other tested negative for HIV on 13 April 2004 and positive for HIV on 25 April 2004. The third woman performed unprotected oral, vaginal, anal, and double-anal sex with the index patient on 30 March 2004; she tested negative for HIV on 12 April 2004 and positive for HIV on 5 May 2004.

The person who was the source of the index patient's HIV infection remains unknown. Two of the HIV-infected women reported no sexual contacts other than the index patient. The sole other sexual contact of the third woman tested negative for HIV 60 days after the last potential exposure. All 3 women denied having symptoms of an acute retroviral syndrome.

Fifty-nine of the index patient's 61 other primary and secondary sexual contacts tested negative for HIV at least 30 days after their last at-risk contact. All HIV testing of primary and secondary contacts was performed, by the Adult Industry Medical Health Care Foundation, using the PCR-based methodology to detect HIV DNA. Postexposure HIV test results were unavailable for 2 performers. One was a female primary contact of an infected woman, and the other was a secondary contact of a male partner of 1 of the 3 HIV-infected women.

The index patient and 2 of his 3 HIV-infected sexual contacts provided whole blood samples, from which HIV DNA was sequenced at the Centers for Disease Control and Prevention.

The third sexual contact declined to provide a blood sample. Molecular and virologic data indicated that these viruses were 100% identical [7], supporting the epidemiologic conclusion that the index patient transmitted HIV to 3 women through occupational sexual exposure.

Unstructured interviews with the 4 infected performers and with a convenience sample of ~50 affected workers and producers, as well as testimony from public hearings about this cluster of infections, indicated that condoms were used rarely to perform penetrative sex acts in heterosexual adult film production. Condoms and other barrier protections (e.g., latex gloves) were not generally made available at the work site. Few workers were aware of the existence of guidelines regarding postexposure HIV prophylaxis for sexual exposures [8] or of where such prophylaxis could be obtained locally.

## DISCUSSION

The occurrence of HIV transmission in the adult film industry underscores the life-threatening occupational health risks to which adult film workers are exposed as a result of having unprotected sexual intercourse. The underlying risk for HIV infection and other STDs stems from the basic work practices in the industry, in which performers have multiple sex partners over short periods, with whom they engage in frequent, often prolonged, and unprotected sex acts. The risk of infection is further increased by the infrequent use of barrier methods to

prevent exposure to infectious body fluids, which is of particular concern when internal ejaculation and other high-risk practices, such as double-anal penetration, are performed [3]. In addition, although current HIV testing methods in this industry may shorten the window period to diagnosis of new HIV infection, they fail to prevent occupational acquisition of HIV in this setting.

The method used by the testing agency to screen adult film workers for HIV infection is approved by the US Food and Drug Administration and the manufacturer only for the screening of blood products and not for individual human testing. It was adopted by the agency in this situation because PCR-based methods can reduce the time between infection and the ability to detect HIV in the blood—the window period—to ~10 days in most cases [9]. Intensive screening with partner counseling and referral services limited the extent of transmission that could have occurred, were such procedures not in place. However, as is illustrated by this investigation, intensive screening by use of a method that substantially reduces the window period is inadequate to prevent workplace transmission of HIV or other STDs in this industry.

Only the index patient (25% of these incident cases) had symptoms of an acute retroviral syndrome. Although the sample size in this investigation was small, this proportion is lower than the >80% reported by other sources describing symptomatic primary HIV infections and supports the limitations of the use of symptoms in targeted testing for primary HIV infection [10, 11]. Although the testing of samples for HIV, albeit with a test not licensed for this purpose, did not prevent the transmission of HIV in this setting, recent studies using pooled blood specimens for detection of HIV RNA in high-risk populations have identified recently infected persons who would otherwise have been missed by routine HIV counseling and testing [12, 13].

When used consistently and correctly, condoms provide an effective method for preventing transmission of HIV infection [14]; had they been used properly and consistently, this cluster of HIV infections could have been prevented. Condoms do not need to be visible to the consumer to protect adult film workers; however, showing condom use in adult films could benefit consumers as well as performers. Information concerning sexual health that has been embedded in television and radio entertainment can significantly impact consumers' knowledge, intentions, and actions [15, 16]. Modeling consistent and proper use of condoms as normative behavior in adult films could be expected to increase the acceptance and use of condoms among viewing consumers. Anecdotally, it has been reported that condoms are rarely present in heterosexual adult films, although they are widely used in male homosexual adult films [4]. Estimation of the potential impact that condom use by performers in adult films has on consumer behavior is limited by the lack of reliable and systematically collected data on

the frequency of condom use in adult films, on the proportion of sexually active persons who view adult films, and on the influence of behavior portrayed in adult films on consumers' subsequent sexual behavior. These are areas that may merit further research.

A limitation of the present study is that the outbreak involved the heterosexual side of the industry. We did not interview workers in the male homosexual segment of the industry and can, thus, comment reliably only on practices in the heterosexual segment. Nonetheless, this cluster of HIV infections and previous HIV infections in the adult film industry demonstrate the need to implement an effective worker health and safety program at work sites. Cal/OSHA has established that existing occupational health and safety regulations apply to this industry and has issued citations to 2 production companies related to these incidents, in the amount of \$30,560 [17]. These regulations require employers to develop and implement a written injury and illness prevention program and to comply with the Cal/OSHA Bloodborne Pathogens Standard [18]. The standard requires that industries also develop an exposure control plan to protect employees from hazards associated with exposure to blood and other potentially infectious materials (including semen and vaginal fluid) by using appropriate personal protective equipment and through work practice and other engineering controls. Other provisions in the standard include employee training and immunization for hepatitis B. Similar provisions of the national bloodborne pathogens standard [19] apply to this industry in states that have not adopted their own equivalent standard.

To reduce the occupational risk of HIV/STD acquisition, the LACDHS has recommended the following for inclusion in an exposure control plan tailored to this industry: (1) mandatory condom use for all penetrative sex acts, including oral sex; (2) routine screening of performers for HIV infection and other STDs, according to a schedule set by the state, with screening costs to be paid by the industry; (3) universal vaccination of nonimmune performers against hepatitis A and B; (4) mandatory education and training for all adult film industry performers on work-related health and safety hazards in this industry; and (5) medical monitoring for HIV infection and other STDs, paid for by the employer or the industry. The exposure control plan will be consistent with the existing Cal/OSHA Bloodborne Pathogens Standard and the California Injury and Illness Prevention Standard [18, 20]. Performers in the adult film industry should be invested in protecting their health and that of their coworkers, educated about the health risks associated with the sex acts they are employed to perform, afforded the opportunity to participate in making decisions about their health and safety at work, and able to report health and safety issues without fear of reprisal.

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