

The Potential Role of Custody Facilities in Controlling Sexually Transmitted Diseases

ABSTRACT

Background. The National Commission on Correctional Health Care recommends that medical screening, including tests for syphilis and other sexually transmitted diseases, be performed by the 14th day after initial booking procedures. Because the average length of stay in detention is usually less than 14 days, most detainees are not screened or treated for asymptomatic communicable diseases.

Methods. In order to determine the incidence and prevalence of syphilis among those booked through a large county jail, a rapid screening procedure to test newly incarcerated inmates and treat those infected was implemented over a 3-week period.

Results. Among 6309 detainees eligible for testing during the 3-week period of the study, 129 (2%) were diagnosed with syphilis. During the preceding month when only those reporting symptoms or high-risk behaviors were screened, 20 cases were diagnosed. The sensitivity and predictive value of self-reported risk factors for syphilis infection were low. Among the first 110 diagnosed cases, 17 (15.5%) were released within 3 days and 86 (78%) were released within 6 days.

Conclusion. If screening and treatment for syphilis are delayed until the 14th day after booking, the majority of infected inmates will be released prior to evaluation and treatment. Rapid screening and treatment for selected sexually transmitted diseases are likely to be an effective public health measure when implemented in custody settings. (*Am J Public Health.* 1992;82:552-556)

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Introduction

Several studies have documented the high prevalence of sexually transmitted diseases (STDs) among persons in custody facilities.¹⁻³ Screening for STDs among both adult and juvenile offenders is mandatory in some states and is recommended by the American Medical Association.⁴ The National Commission on Correctional Health Care recommends that medical screening or review of medical screening be performed on or before the 14th day after initial booking procedures.⁵ Because the average length of stay in detention is usually less than 14 days,⁶ most persons arrested are not screened or treated for asymptomatic communicable diseases. Even when screening is performed at the time of booking, results may not be available until after the inmate has been released. Subsequently, those at risk may not be located and treated. Considering the rapid turnover of inmates in the custody setting, rapid screening, diagnosis, and treatment may significantly reduce STD morbidity.

Background

Beginning in 1986, Men's Central Jail (MCJ), the main custody facility for men in Los Angeles County (LAC), offered a serologic test for syphilis (STS) on admission only to persons who self-identified any of several risk factors, i.e., homosexuality, history of STD, intravenous drug use, and current symptoms of STD. This policy was instituted primarily to reduce costs. It was assumed that the yield of true positives would be greater through a self-identification process. In addition, all inmates would receive a full health appraisal after 2 weeks of residence.

In 1988, cases of syphilis reported from custody facilities comprised more than 10% of the county's early syphilis morbidity, even though fewer than 10% of the persons booked through custody facilities were tested.⁷ The LAC jails comprise the largest custody facilities in the United States, booking approximately 250 000 persons annually and having about 25 000 residents on any given day.⁶

In order to determine the incidence and prevalence of syphilis among those booked through MCJ and to establish a risk profile of infected inmates that might be more objective than self-identification, a 3-week project to test newly incarcerated inmates was implemented. Because inmates who are released are difficult to locate for further evaluation and treatment, the protocol included immediate STS results and treatment prior to release.

Methods

Between March 29, 1989, and April 19, 1989, the Sexually Transmitted Disease Program of the Los Angeles County Department of Health Services provided a "stat" rapid plasmin reagin (RPR) test to all inmates booked at MCJ between 6 PM and 4 AM, Monday through Friday, when

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the majority of men held for at least 24 hours are processed.

Because syphilis screening in custody facilities is mandated by law, all inmates were asked to submit to phlebotomy. Inmates who refused to have their blood drawn were separated from the others and referred for an interview and exam by project staff. To obtain a random subsample of nonreactor inmates for comparison, the third inmate whose RPR was nonreactive out of a batch of 10 to 15 specimens tested was also evaluated. A venereal disease research laboratory (VDRL) test and a confirmatory microhemagglutination assay for *Treponema pallidum* (MHA-TP) was performed on all inmates with reactive RPR as well on nonreactor controls.

Demographic data including age, race, and criminal charges were obtained from custody records. Public health nurses administered a questionnaire assessing sexual behavior, history of sexually transmitted diseases, and drug use. Physicians examined inmates with a history of symptoms or a reactive RPR. Inmates with reactive tests were interviewed for contacts, and named contacts were referred for field follow-up by health department investigators. Record searches through the Los Angeles County Venereal Disease Record System (VDRS) were performed for all persons with confirmed reactive serologies to compare prior titers and verify a history of prior diagnosis and treatment.

An inmate was classified as having primary syphilis if the physicians documented a typical chancre, regardless of RPR result. A diagnosis of secondary syphilis was made based upon typical lesions and confirmed reactive treponemal tests. Early latent syphilis was diagnosed if the patient had a reactive serology confirmed by a reactive MHA-TP, a history of typical lesions or negative serology in the previous 12 months or sexual contact with another case of early syphilis, and no documentation or history of treatment. Any asymptomatic inmate who had a confirmed reactive RPR, had no history of treatment, or did not fall into the previous categories was diagnosed with late latent syphilis. A case was defined as the presence of untreated syphilis, regardless of stage.

Inmates with reactive RPR, no history of treatment, or physical findings consistent with syphilis were offered treatment with benzathine penicillin G or with doxycycline in case of penicillin allergy. Those with a history of prior treatment or

Race/Ethnicity	N	Infectious Syphilis	Early Latent Syphilis	Late Latent Syphilis	Total Syphilis
Whites	1292	0 (0)	0 (0)	1 (77)	1 (77)
Blacks	2135	21 (984)	22 (1030)	24 (1124)	67 (2998)
Hispanics	2632	11 (418)	21 (798)	27 (1026)	59 (2242)
Asians	84	0 (0)	0 (0)	0 (0)	0 (0)
Other/Unknown	166	0	0	2	2
Total	6309	32 (507)	43 (682)	54 (856)	129 (2045)

Note. Data are number of cases (rate per 100 000).

a weakly reactive RPR and no physical findings were treated at the discretion of the project physicians.

All data were analyzed using the Statistical Analysis System (SAS) and Epi-Info, which uses the Cornfield method for determining odds ratios (ORs) and confidence intervals (CIs).

Results

Population Description

During the 3-week project period, 12 147 men were booked through MCJ. The study population comprised 6309 men who were booked for at least 24 hours between 6 PM and 4 AM and offered an STS. Of these, 95 refused phlebotomy, leaving 6214 men tested. The remaining 5867 inmates not in the study sample were either booked during daytime hours or were immediately released on their own recognizance. No data are available for this group.

The study population was predominantly Black and Latino (75.6%). The average age was 30. Forty-eight percent of the inmates were charged with alcohol- or drug-related offenses, 22.2% with theft-related charges, 9.6% with crimes of violence, 7.2% with traffic violations, and 1.5% with crimes related to sexual behavior. The majority of the study group said they lived in LAC.

Rates of Syphilis

Of the men screened for syphilis, the RPR was reactive in 308 (4.9%). Physicians reported active lesions in 32 persons, one of whom had a nonreactive RPR and was diagnosed because he had been part of the interviewed nonreactor group and had symptoms. Another case of primary syphilis was found in an inmate who had refused the blood test but was examined. Untreated syphilis was identified in 129 men for a rate of 2045/100 000. The

rate of infectious syphilis was 507/100 000. (The county-wide rate was 45.1/100 000 in 1988.) Early latent syphilis was diagnosed in 43 men for a rate of 682/100 000. The race-specific rate for early syphilis was highest among Blacks (2014/100 000). Fifty-four men had latent syphilis infection of unknown duration which we classified as late latent syphilis (Table 1). Of the 308 men with reactive RPRs, 75 (24%) had a negative MHA-TP and 84 (27%) were patients who had a history of prior treatment for syphilis.

Time of Release of Cases

Among the first 110 diagnosed cases, 17 (15.5%) were released within 3 days and 86 (78%) were released within 6 days. Twenty-one of the 233 inmates with a reactive MHA-TP were not available for further evaluation and so a diagnosis could not be made for them.

Risk Factors

Because of time and security constraints, inmates with reactive RPRs were preferentially evaluated over nonreactors. Among reactors, 278/308 (90%) were evaluated, among refusers 33/95 (35%), and among nonreactors, 372/531 (70%).

Ninety-eight percent of all cases were either Black or Latino and their risk of syphilis was, respectively, 41.7 and 29.6 times that of Whites. Cases were more likely than noncases to have a history of syphilis, gonorrhea, or any STD and were more likely than controls to have had three or more sex partners in the previous 90 days (OR=3.46, 95% CI=1.48–8.26). Only three cases (2.3%) and four nonreactors (1.1%) admitted to ever having sex with other men. These seven men said they also had sex with women. Cases were more likely to be between the ages of 31 and 40 (Table 2). Inmates with syphilis were less likely to be married and more likely to say they had less education than nonreactors.

TABLE 2—Characteristics of Study Sample

Characteristic	Cases n (%)	Noncases ^a n (%)	OR (95% CI) ^b
Race			
White	1 (0.8)	1289 (20.9)	1.00
Black	67 (51.9)	2070 (33.5)	41.72 (7.21–1,673.46)
Hispanic	59 (45.7)	2573 (41.6)	29.56 (5.09–1,187.89)
Asian	0 (0)	84 (1.4)	
Other/unknown	2 (1.6)	164 (2.7)	
Total	129	6180	
Age			
15–20	0 (0)	311 (5.1)	
21–25	23 (18.3)	1515 (24.9)	1.00
26–30	31 (24.6)	1547 (25.4)	1.32 (0.74–2.35)
31–35	35 (27.8)	1248 (20.5)	1.85 (1.05–3.25)
36–40	21 (16.7)	660 (10.8)	2.10 (1.11–3.96)
41–45	9 (7.1)	392 (6.4)	1.51 (0.64–3.46)
>45	7 (5.6)	414 (6.8)	1.11 (0.43–2.75)
Missing	3	93	
Mean age	31.7	30.4	
Booking charge			
Alcohol related	13 (10.7)	1268 (20.9)	0.65 (0.24–1.80)
Drug related	39 (32.2)	1684 (27.8)	1.46 (0.62–3.60)
Sex related crimes	3 (2.5)	91 (1.5)	2.08 (0.42–9.12)
Theft/burglary	38 (31.4)	1334 (22.0)	1.79 (0.76–4.43)
Violence/firearms	11 (9.1)	580 (9.6)	1.19 (0.43–3.44)
Other	10 (8.3)	663 (10.9)	0.95 (0.33–2.78)
Traffic violations	7 (5.8)	441 (7.3)	1.00
Missing	8	119	

^aNoncases are all inmates with no diagnosis of syphilis.
^bOR=odds ratio; CI=confidence interval.

There was no association between booking charge and syphilis infection.

Only 3 of the 32 inmates with infectious syphilis identified themselves as having symptoms at the time of entry into the study. In a confidential setting, an additional 15 men said they had a genital "sore" or ulcer. Upon examination, 5 of these men did not have syphilitic lesions.

Cases were more likely than nonreactors to say they regularly used smokable crack cocaine (OR=2.07, 95% CI=1.16–3.69). No other drug was associated with syphilis cases more than with noncases. The sensitivity and positive predictive value of the hypothesized risk factors obtained in a confidential setting were low (Table 3).

Refusers

Compared to cases, the 33 refusers were more likely to be White (21% vs 1% of cases), to be married (27% vs 13%), and to say they had had a blood test for syphilis in the previous 12 months (39% vs 15%).

False-Positive Results

Among 75 inmates who had false positive RPR results, 44.7% reported regular heroin use and 70% said they had tried

heroin at least once. These inmates were older than cases (average age=36.5 years) and more of them were White (24% vs 1%). They were more likely to say they had a history of syphilis or "bad blood" (23% vs 8%) and more likely to have been booked for alcohol-related charges (35% vs 11%).

Contact Interviewing and Tracing

Of the 308 patients with reactive, qualitative RPRs, 187 were interviewed by investigators. During the interview process, 29 said they had been treated previously and another 29 were subsequently found not to be infected based on a negative MHA-TP. Interviewers elicited 93 new contacts from 60 interviewed inmates with early syphilis. Of these, 31 (33%) were located during field follow-up. Eight of the contacts had early syphilis. Field investigations were initiated for acquaintances of reactors who were pregnant. Out of eight pregnant women named, the only one found infected was a prostitute with secondary syphilis. Preventive treatment was given to 19 contacts. One contact had been previously treated and one refused evaluation. The overall contact index (number of contacts elicited per case) was 1.6, and the disease intervention index

(percentage of cases where at least one contact was treated⁸) was 0.32.

Discussion

This study documents a 2% rate of syphilis among inmates booked through Los Angeles County's Men's Central Jail and the feasibility and effectiveness of integrating rapid screening and treatment into the booking process. In the month prior to the screening project, 20 cases of syphilis were reported by the jail compared to 129 cases during the 3-week project.

Usefulness of Risk Factor Identification

The attempt to identify factors that could be used to select out the highest risk inmates with a high degree of sensitivity and specificity was unsuccessful. In the jail setting with criminal charges pending, inmates are unlikely to bring special notice to themselves or to be forthcoming about behaviors that are illegal. Although the study verified that a history of gonorrhea or syphilis and the presence of symptoms elicited in a confidential setting were associated with syphilis, these risk factors had low sensitivity and positive predictive value. Other risk factors such as homosexuality and heroin use did not appear as risk factors, probably because so few admitted to these behaviors.

Risk factors identified through the case-reference methodology included the use of crack cocaine, three or more sex partners in the previous 90 days, history of syphilis or gonorrhea, and less than 10th-grade education. However, if a screening program depended on obtaining a history of drug use or high-risk sexual behavior in a confidential setting, approximately half of the infected cases would be missed. Given the rapidity with which men are booked, the crowded conditions, and the lack of confidential settings in the county jail, individual history taking for all inmates is not feasible.

Race (i.e., being Black and Latino) was the risk factor with the highest sensitivity (98%) for syphilis, reflecting the county-wide trend in Los Angeles: compared to Whites, Blacks were at a 30-fold and Hispanics at an 8-fold greater risk of being reported with infectious syphilis.⁹

Limitations

We could not interview all members in the reference group; however, there was no difference between the reference group and the entire population in the distribution of race, age, and booking charge.

We believe there was no systematic bias in selecting the reference group and our findings are likely to be generalizable to the entire population of men booked at night for criminal offenses in Los Angeles.

Recommendations

The criminal justice setting may be one of the few public institutions in which there is an opportunity to break chains of infection among high-risk populations. Rapid screening and treatment of STD in custody facilities should be considered public health control measures in localities with a high incidence of STDs. When the development of antibiotic resistance is not a concern and the incidence of serious adverse reactions is minimal, all inmates with laboratory evidence suggestive of disease should be empirically treated. In our study we treated very few inmates whose qualitative RPR was weakly reactive. Eleven inmates subsequently had titers $\geq 1:16$ and reactive MHA-TP tests but could not be found for treatment.

Contact tracing was generally unproductive. The achieved disease intervention index (0.32) compares poorly to expected national standards of 0.60. Results might have been higher if the interviewer had been the person assigned to field follow-up. Given the morbidity and mortality of congenital syphilis, intensive efforts to locate only contacts or suspects who are pregnant may be useful.

While we have not explored the feasibility of screening and treatment for other STDs such as gonorrhea and chlamydia, the prevalence of these STDs is likely to be higher¹ and the cost of screening men with the leukocyte esterase dipstick substantially lower than with the RPR.¹⁰ Syphilis, gonorrhea, and chlamydia have been found to be potential risk factors for human immunodeficiency virus (HIV) disease.¹¹⁻¹³ A substantial reduction in morbidity might occur, not only for transmission of HIV, but also for other sequelae such as infertility, pelvic inflammatory disease, and ectopic pregnancies.¹⁴

Few public resources are devoted to providing preventive medical care for persons charged with criminal offenses; yet, the public health impact of treating a large infected population is likely to be enormous in decreasing the chance that many other individuals in the community will become infected. Population-based screening of groups characterized by the societal conditions associated with high-risk behavior and lack of access to health

Factors	Cases n (%) ^a	Reference Group n (%)	OR (95% CI) ^b	PPV ^c
Marital status				
Single	77 (67)	210 (62)	1.00	0.02
Married	15 (13)	89 (26)	.46 (0.24–0.87)	0.01
Other (divorced separated, widowed)	23 (20)	38 (11)	1.65 (0.89–3.06)	0.03
Education				
<9 years	40 (31)	73 (19)	2.49 (1.16–5.41)	0.03
10–12 years	75 (58)	240 (65)	1.42 (0.71–2.88)	0.02
>12 years	13 (10)	59 (16)	1.00	0.01
Sexual partners (in last 90 days)				
0	10 (8)	49 (14)	1.00	0.01
1	46 (38)	183 (53)	1.23 (0.55–2.81)	0.01
2	23 (19)	53 (15)	2.13 (0.86–5.36)	0.02
≥3	41 (34)	58 (17)	3.46 (1.48–8.26)	0.04
Sexual preference				
Sex with men and women	3 (2)	4 (1)	3.02 (0.63–14.62)	0.05
Sex with women	121 (98)	366 (99)	1.00	0.02
STD history				
Syphilis	10 (8)	23 (6)	2.22 (1.04–4.74)	0.03
Gonorrhea	54 (45)	109 (31)	1.86 (1.19–2.92)	0.03
Other STD	9 (7)	20 (6)	1.78 (0.73–4.26)	0.02
Any STD in the past	60 (49)	133 (37)	1.67 (1.08–2.59)	0.03
No STD in the past	62 (51)	230 (63)	1.00	0.02
Smokable cocaine use				
Regular use	22 (17)	49 (9)	2.07 (1.16–3.69)	0.04
No regular use	106 (83)	486 (91)	1.00	0.02
Heroin use				
Ever used	20 (16)	90 (24)	0.32 (0.18–0.55)	0.01
Never used	108 (84)	282 (76)	1.00	0.02

^aSensitivity
^bOR=odds ratio (calculated using Cornfield method); CI=confidence interval.
^cPPV=positive predictive value.

care, such as socioeconomic status, race, and place of residence, is likely to be more effective in limiting STDs than control programs that require individuals to identify themselves to be at risk and to actively seek screening and treatment. □

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Workshop on Statistics & Computing in Disease Clustering to Be Held July 23 & 24, 1992, in Stony Brook, NY

Applied Biomathematics, with funding from the Electric Power Research Institute and the National Cancer Institute, is conducting a 2-day workshop on statistical methods and computer resources for disease clustering. This field is changing rapidly and novel approaches for analyzing clusters are frequently proposed. The aim of this workshop is the active involvement of the participants in discussion of the following areas:

Scientific Merit How should clustering methods be selected, and what can clustering studies offer?

Cluster Allegations How should we deal with post hoc data analyses?

Cluster Patterns How can patterns in space and time be characterized?

Methods What is the power of clustering techniques under different space-time arrangements of cases?

Applications What research needs are revealed by past analyses?

GIS How can geographic information systems and geographic statistics be used to identify links between environment and health?

Resources What databases and microcomputer software are currently available for cluster investigations?

Contributed papers are solicited on these or related topics. The program committee consists of Dr. Geoffrey Jacques, Applied Biomathematics (chair); Dr. Roger Grimson, Department of Preventive Medicine, SUNY at Stony Brook; Dr. Leeka Kheifets, Electric Power Research Institute; and Dr. Daniel Wartenberg, Robert Wood Johnson Medical School.

This workshop will bring together those who develop statistical and computational methods with those who use them. Workshop information may be obtained from Dr. Jeffrey A. Millstein, Applied Biomathematics, 100 North Country Road, Setauket, New York 11733. Tel: 516/751-4350; Fax: 516/751-3435.