



TCADA

Research Brief

Sexually Transmitted Diseases and Hepatitis B and C in Three Drug Abuse Treatment Clinics in Texas

Lu-Yu Hwang, M.D.
Michael W. Ross, Ph.D., M.P.H., M.H.P.Ed.
Carolyn Zack, M.P.H.
Lara Bull, M.P.H.

Center for Infectious Diseases
School of Public Health
University of Texas
Houston, Texas

In collaboration with

Lynn Wallisch, Ph.D.

Texas Commission on Alcohol and Drug Abuse
Austin, Texas

This research was supported by a grant from the Texas Commission on Alcohol and Drug Abuse, under a contract funded by the Center for Substance Abuse Treatment, Substance Abuse and Mental Health Services Administration. The authors thank Jane Maxwell, Ph.D. and John Keppler, M.D. for their helpful suggestions and comments in the course of this study.

The principal authors may be reached directly at the following address:

Center for Infectious Diseases
School of Public Health
University of Texas
P.O. Box 20186
Houston, TX 77225

February 2001, Texas Commission on Alcohol and Drug Abuse (TCADA), Austin, Texas. TCADA grants full permission to reproduce and distribute any part of this document for non-commercial use. Appropriate credit is appreciated. TCADA is a state agency headed by six commissioners appointed by the governor. TCADA provides educational materials on substance use, develops prevention, intervention, and treatment programs, and conducts studies on the problems of substance use in Texas.



Texas Commission on Alcohol and Drug Abuse
P.O. Box 80529
Austin, Texas 78708-0529
(512) 349-6600 ■ (800) 832-9623
Web site: www.tcada.state.tx.us

 This document was printed on recycled paper.

Sexually Transmitted Diseases and Hepatitis B and C in Three Drug Abuse Treatment Clinics in Texas

Research literature indicates that drug users are at high risk of infection with HIV and other sexually transmitted diseases (STDs), including hepatitis. However, few studies have looked specifically at STDs among drug users who are in treatment. In the present study, clients in three drug treatment programs in Texas were interviewed and submitted blood and urine samples to be tested for the presence of STDs. The tests identified current chlamydia or gonorrhea infection and past or current syphilis, herpes simplex-2 (genital herpes), hepatitis B, and hepatitis C virus. When interviewed, about a third of the sample reported having had a current or past STD. However, because many people may be infected with STDs without signs or symptoms of infection, this is likely to be an underestimate of the prevalence of STDs in this population. The blood testing revealed higher levels of STDs among these drug treatment clients. The most common were herpes simplex-2 (44 percent infection rate), hepatitis B (30 percent), and hepatitis C (35 percent). Gonorrhea, chlamydia, and syphilis are treatable STDs. According to blood testing, 7.4 percent of the patients screened had one of these treatable STDs.

HIV and hepatitis B and C are frequently transmitted by injecting drug use, particularly by using shared equipment. In the present study, 45 percent said they previously had injected drugs and, of these, 79 percent previously had shared injecting equipment. In multivariate analysis which examined both sexual-risk and drug-risk behaviors, injecting drug behavior risk variables were the most strongly associated with hepatitis B and hepatitis C infection.

Texas should ensure that licensed drug treatment facilities comply with state rules requiring that routine STD and hepatitis screening and education be offered to all patients. Access to treatment, where needed, should also be facilitated, either through referral or on-site delivery. Programs also should evaluate the benefits of various STD and hepatitis prevention efforts, including increased staff and client education and vaccinations against hepatitis A and B.

Background

Drug abusing populations are disproportionately affected by sexually transmissible diseases, both bacterial (e.g. syphilis and gonorrhea) and viral (e.g. herpes simplex-2), primarily as a result of high-risk sexual behaviors associated with drug use.¹ In addition, HIV and

hepatitis B are transmitted by blood or blood-product transfusion and perinatally, as well as by sexual activity. Intravenous drug use appears to be the major mode of transmission of hepatitis C, surpassing sexual activity and other modes of transmission.

Ross et al.'s previous study of a crack house population in Houston,² commissioned by TCADA in 1997, revealed a high prevalence of antibody markers for sexually transmissible infections among them: 13 percent for syphilis, 61 percent for herpes simplex-2, 11 percent for HIV, 53 percent for hepatitis B (Anti-HBc), and 42 percent for hepatitis C (Anti-HCV). These levels are several times higher than those found among the general population.³

Few studies, however, have investigated the prevalence of sexually transmitted diseases or hepatitis B and C among drug and alcohol users who are in treatment.⁴ Many patients in TCADA-funded substance abuse and dependence treatment have a number of risk factors that make them susceptible to contracting STDs and hepatitis, including high-risk sexual behaviors, low socioeconomic level, and intravenous drug use. Therefore, TCADA commissioned the authors of the crack-house study to collect data on this population.

The small-scale study was intended to help develop an understanding of the role of STDs and hepatitis B and C among drug and alcohol treatment populations in Texas. Respondents were sampled from publicly-funded substance treatment programs in Brazoria, Harris and Lubbock counties in Texas. These programs served primarily indigent substance users who voluntarily sought care or were mandated for treatment by the criminal justice system. Clients were in treatment environments that

included jail, residential, outpatient drug free, and methadone maintenance.

The clinics sampled were not necessarily representative of all substance abuse treatment facilities in Texas, nor were the individuals sampled necessarily representative of all clients in treatment at these clinics. Therefore, specific prevalence rates should not be generalized. However, the findings raise issues that are potentially applicable to all clinics, such as defining areas that need further investigation and providing some direction on needed education and technical assistance for programs.

Methods

Data were collected on consecutive patients admitted to each clinic in fall and winter 1998. During the first two weeks of the study, clients interviewed had been in treatment for varying lengths of time; after that, new clients were interviewed close to their admission to the clinic.

Every person in attendance at the clinic, inpatient or outpatient, on the days that the researcher visited the site was asked to volunteer for the study. There was no payment or other incentive for participation. First, every potential respondent was informed about the purpose of the study and assured of confidentiality and anonymity. Those who consented to participate then filled out a questionnaire, provided a urine sample, and had 10cc of blood drawn. After collection of the specimens, the blood was spun down, aliquoted into five

cyrovials, and frozen, along with the urine specimens. A total of 407 individuals volunteered to answer the questionnaire and provide blood and urine samples. The response rates ranged from 70 percent to 95 percent across the sites, with the most common reasons for refusal being a schedule conflict with work or rehabilitation activities.

The prevalence of HIV, hepatitis B virus (HBV), hepatitis C virus (HCV), herpes simplex-2 virus (HSV-2), and syphilis infection was determined by laboratory testing for the presence of antibodies. A positive result meant that the person either had had a past infection or might have a currently active infection.⁵

The infections of chlamydia and gonorrhea were detected by the presence of nucleic acid in the urine sample by using ligase chain reaction (LCR) (Abbott LCx), which resembles polymerase chain reaction (PCR). A positive result meant that the patient was currently infected.

The interview questionnaire asked about drugs of preference, drug treatment history, injecting drug experience, history of sexually transmitted diseases, and past-month sexual behavior. In two of the three sites, respondents were also asked if they had ever bought or sold sex in exchange for drugs or money. The questionnaire was the same as that used in the authors' earlier crack house survey.²

Results

Table 1 presents the demographic characteristics of the sample, with respondents from all sites combined. There were substantially more men than women, the majority were aged between 25 and 44, and the three major racial/ethnic groups in Texas were represented. Slightly more than half of the respondents were unmarried, and three-quarters were not employed. More than half of the respondents, both married and unmarried, had children.

Table 2 presents information about the substance use backgrounds of the respondents, as reported in the interview. Almost all of the respondents (95 percent) had drunk alcohol in their lifetimes. A majority also had used powder cocaine (82 percent), crack cocaine (65 percent), and marijuana (62 percent), and about half (51 percent) had used stimulants, primarily amphetamines. Respondents' stated substance of preference was cocaine or crack in more than half the cases. Just less than half of the sample had ever injected a drug and, of those injecting, more than three-quarters said they had shared equipment, which puts them at high risk for the transmission of disease, including HIV. Slightly more than half of the respondents had been in substance abuse treatment before this time.

Table 3 describes the sexual behavior of the subjects, as reported in the interview. Just more than half of the respondents reported having had sex within the past month and, of these, about 40 percent had had two or more different partners during that month.

More than a third reported having had an STD in the past, of which gonorrhea was the most common, followed by chlamydia. Up to a third said they had exchanged sex for money or drugs at some time.

Table 4 reports the number of respondents who tested positive for sexually transmissible diseases based on blood and urine samples taken at the time of interview. Only the tests for chlamydia and gonorrhea measured active infection, while the tests for the other infections indicated a current or past infection. Herpes simplex-2 (44 percent), followed by hepatitis C (35 percent) and hepatitis B (30 percent), were the most common infections detected. The prevalence of syphilis, chlamydia, gonorrhea, and HIV markers were all less than 5 percent each. Nevertheless, in this sample of 407 respondents, 22 cases of gonorrhea and chlamydia alone were identified. Further, an additional eight people had high MHAtp titers suggestive of untreated syphilis; in total, 30 people (7.4 percent) had one or more of these bacterial STDs.⁶ Syphilis, gonorrhea, and chlamydia are all potentially treatable infections. Eleven respondents were identified and confirmed as being infected with HIV. There were significant differences among the clinics on rates of herpes, hepatitis C, hepatitis B antigen, and HIV, which may reflect demographic and geographical differences among the sites.

It is important to note that respondents' self-reports of STDs did not necessarily correspond to

biological markers of these diseases. In some cases, respondents may not have known they were infected, while in other cases, they may simply not have wished to report it in the interview. For example, of 180 respondents who tested positive for hepatitis B or hepatitis C markers, only 4 reported during the interview having had hepatitis, and of 176 who tested positive for herpes, only 7 reported having had it. Therefore, STD prevention and education activities as part of substance abuse treatment could have a large impact. On the other hand, all of the 14 respondents who tested positive for syphilis admitted having had it in the interview. Additionally, the percentages who reported having had gonorrhea or chlamydia on the interview were substantially higher than those who tested positive for these diseases, probably reflecting a past infection that was no longer detectable.

Because both sexual behavior and drug use behavior are associated with risk for STDs, an analysis was performed to examine the relationship among these factors in these treatment populations. Table 5 presents the results of a multivariate logistic regression of drug- and sex-risk factors on respondents' probability of testing positive for hepatitis B, hepatitis C, herpes-simplex 2, and other STDs (gonorrhea, chlamydia, and/or syphilis) grouped together. (There were too few cases of HIV to allow a similar analysis.) The drug-behavior risk factors examined included having a history of injecting drug use, having shared injecting equipment, having had previous drug treatment, and having ever used crack.

The sex-behavior risk factors examined included having had an STD in the past, having had sex in the past four weeks, and having had three or more different sex partners within the past month. Each of these variables was significantly related to one or more of the STDs at the bivariate level. Multivariate regression permits one to assess the relationship of each risk factor with the STD while controlling for (holding constant) the other risk factors. In the analysis, gender, age, and race/ethnicity also were controlled.

The table presents the adjusted odds ratios for the variables examined. Adjusted odds ratios measure how strong the association is between a characteristic and a disease, net of other characteristics. They take a value of 1 when there is no association, a value less than 1 when there is an inverse association, and a value greater than 1 when there is a positive association. For instance, an odds ratio of 2 means that the odds in favor of the disease are twice as high for a person with that characteristic.

A history of intravenous drug use, needle sharing, and previous drug treatment were found to be positively associated with hepatitis B infection. Intravenous drug use and needle sharing also were associated with hepatitis C. None of the drug risk variables was significantly associated with herpes or the other STDs examined as a group. None of the sex-risk variables was independently related to the risk of hepatitis B or C or the group of

gonorrhea, chlamydia or syphilis. However, a history of previous STDs (particularly gonorrhea or chlamydia) raised the risk for having herpes.

These findings suggest that, among drug users, sexual behavior (at least that behavior indicated by the particular variables examined) does not independently contribute to the risk for hepatitis B or C. This may be because drug use already raises the risk substantially. This is especially likely in the case of hepatitis C, which is more often transmitted through injecting or needle sharing than through sexual activity. The positive association found between hepatitis B and prior drug treatment probably indicates that the period of exposure was extensive due to long-term drug use.

The findings also suggest that drug use is not an independent predictor of risk for herpes simplex-2 or the group gonorrhea/chlamydia/syphilis, and that the only sex risk variable that predicted any of these infections was a history of having another STD. (The lack of association of any variables with the “other STD” group may be due to the small number of respondents who had one of those infections, which limited the power of the analysis to detect any significant association).

Discussion

The results of this study must be interpreted with several cautions in mind. First, the clinics from which the study samples were drawn do not necessarily represent all drug abuse clinics, and the respondents may not

be typical of all drug abuse treatment populations in Texas or other parts of the United States. Second, specific policies of different programs, such as the policy of one clinic of screening and treating STDs on admission, may have significantly affected the levels of some of the STDs observed. While this clinic did not have significantly lower rates of most of the STDs reported, we cannot know whether it had had significantly higher rates before implementing its screening and treatment because it originally initiated this policy in response to the high STD rates in the community. Finally, the self-report data are subject to the usual cautions regarding these kinds of data, including misreporting due to lack of recall, comprehension, or truthfulness.

Nevertheless, the findings suggest that even a random one-time screen of a drug clinic population will likely turn up a number of individuals who currently have or have had some kind of STD. In this sample of clients at drug abuse treatment sites in three counties, 7.4 percent of clients had a potentially treatable STD (syphilis, gonorrhea or chlamydia).⁷ In addition, another 22 percent did not test positive currently but reported that they had had one of these three diseases in the past. Therefore, the incorporation of STD screening into drug abuse treatment is appropriate both from a clinical and an epidemiological point of view. Furthermore, the reported number of previous STDs is likely to represent a significant underestimate

of the true prevalence, as it most likely includes only clinically obvious disease⁸ or cases identified by a physician. Given the fact that more than 20 percent of the respondents had had two or more sex partners in the four weeks before the study, STD treatment and education, as well as preventative vaccination for hepatitis A and B for clients not previously exposed, would result in a significant reduction in the transmission of disease.

The high rates of herpes and hepatitis are notable. Recurrent herpetic outbreaks can be suppressed and some symptoms ameliorated with medications. Patients can be educated about preventing transmission to others, and women should be advised to notify their primary care doctor, particularly if they are pregnant.

The rates of markers for hepatitis B and C among these patients are troubling, though perhaps not unexpected considering the high rates of current or past injecting drug use in the populations studied. These patients should be educated about the meaning of their test results and receive appropriate information aimed at reducing transmission of the illness to family members, sex partners, and others. Those with active disease also should be informed about treatment options. Identification of these disorders in substance-abusing clients is imperative, not only for the patient's well-being but for prevention of spread of the illness to others. Based on the low number who reported having had these diseases but who tested positive for antibodies, it is likely that many individuals who are infected do not know it. This only serves to underscore

the need for education that emphasizes their particular health risks from drinking or using drugs in the presence of liver disease. Drug treatment clients identified with hepatitis or other STDs also should be given whatever prophylaxis is available to reduce the risk of progression of their disease and enhance their health as much as possible.⁹

These findings reinforce the argument made by Ross et al.⁶ that STDs and drug abuse are an integral part of the same problem and that treatment of one should be associated with screening and treatment of the other. Because some unsafe sex practices may be higher among drug users, treating drug use would help reduce the incidence of STDs and hepatitis through both routes of risk.

It has been suggested that STDs be considered as contributing to a nexus of *triple diagnoses* in drug users: drug dependence or addiction, mental health disorders, and STD infections.^{2,10} The present study showed that, while STD rates were lower among drug abusers in treatment than among abusers interviewed in crack houses, there is still a clinically significant STD problem that makes incorporation of STD screening into drug abuse programs an important consideration. The discovery of high rates of hepatitis C and its propensity for developing into a chronic condition only underscores this fact. Further, there is clear evidence in the literature that a history of STDs significantly

increases HIV transmission. In the present study, all 11 respondents with HIV also had blood markers for one of the other STDs tested. It is also biologically and behaviorally plausible that ulcerative and mucosal STDs may also increase rates of infection with hepatitis B and C, although the present data did not show a significant effect for these variables.

In summary, the findings of this study confirm that the prevalence of STDs among individuals in drug treatment is at a clinically significant level, and that a history of injecting and needle sharing increase the risk even further. The present one-time study of more than 400 people in drug abuse treatment in three sites in Texas identified 30 cases of treatable bacterial STDs (syphilis, gonorrhea, and chlamydia), which represents more than 7 percent of the population screened; 44 percent who had herpes infection; and 44 percent who had markers for hepatitis B or C. The state should ensure that licensed drug treatment facilities comply with rules requiring that screening for STDs, and referral to treatment where appropriate, be offered to all patients. Increased patient and staff education and vaccination of both patients and staff for hepatitis A and B should also be considered, particularly in programs that treat a high proportion of past or present intravenous drug users. As Bachman et al.⁴ point out, screening in the setting of voluntary substance abuse treatment targets people who are ready to change their behavior and who may be particularly open to counseling about STDs and HIV.

Endnotes

- ¹ M.W. Ross et al., "Sexually Transmissible Diseases in Injecting Drug Users," *Genitourinary Medicine* 67 (1991): 32-36; F.R. Cleghorn et al., "HIV-1 Prevalence and Risk Factors Among Sexually Transmitted Disease Clinic Attenders in Trinidad," *AIDS* 9 (1995): 389-394; T. Diaz et al., "Risk Behaviors with Persons with Heterosexually Acquired HIV Infection in the United States: Results of a Multicenter Surveillance Project," *Journal of Acquired Immune Deficiency Syndromes* 7 (1994): 958-963; J.A. DeHovitz et al., "Sexually Transmitted Diseases, Sexual Behavior, and Cocaine Use in Inner City Women," *American Journal of Epidemiology* 140 (1994): 1125-1134; R. Marx et al., "Crack, Sex, and STD," *Sexually Transmitted Diseases* 18 (1991): 92-101.
- ² M.W. Ross et al., "Sexual Behavior, STDs and Drug Use in a Crack-House Population," *International Journal of STDs and AIDS* 10 (1999): 224-230. M.W. Ross et al., "Crack Cocaine as a Major Risk for HIV Transmission in a Crack House Population. (Austin, TX: Texas Commission on Alcohol and Drug Abuse, 1997).
- ³ Division of STD Prevention, *Sexually Transmitted Disease Surveillance, 1998*, Department of Health and Human Services, Atlanta: Centers for Disease Control and Prevention, September 1999; *Hepatitis Surveillance Report No 57*. Atlanta: Centers for Disease Control and Prevention, 2000; Texas Department of Health, HIV/STD
- Epidemiology Division, Surveillance Branch. *Texas HIV/STD Surveillance Report*, Austin, March 31, 2000.
- ⁴ L.H. Bachmann et al., "Risk and Prevalence of Treatable Sexually Transmitted Diseases at a Birmingham Substance Abuse Treatment Facility," *American Journal of Public Health*, 90, 10 (2000): 1615-1618.
- ⁵ HIV antibody (anti-HIV) was performed by HIV-1 EIA (Abbott Laboratories, Chicago, IL.), and repeated reactive specimens were confirmed by anti-HIV Western Blot testing (Cambridge Biotech). The HBV core antibody (anti-HBc) was carried out by Corzyme EIA (Abbott Laboratories, Chicago, IL.), and HCV antibody (anti-HCV) by using HCV-EIA 2.0 (Abbott Laboratories, Chicago, IL.). HSV-2 was tested by a private lab (LabCorp, Raritan, NJ), using Cobas Core HSV-2 IgG EIA which employs highly specific gG-s antigen directed at HSV-2 antibody (anti-HSV-2). Syphilis antibody was performed using nontreponemal RPR test (Becton Dickinson). Reactive results were confirmed by Serodia-TP/PA (particle agglutination test for antibodies to *Treponema pallidum*). This test incorporates the technology from the MHA-TP syphilis confirmatory test, utilizing the same treponemal antigen.
- ⁶ One of the three sites surveyed was offering clients prophylaxis for gonorrhea and chlamydia at the time of their admission to drug treatment, and therefore the rates of these infections found among their clients may be lower than would have otherwise been the case. Note also that a few respondents

had markers for more than one of these diseases.

⁷ In comparison, rates among the general population in Texas were reported at less than 1 percent each in 1998 for syphilis, gonorrhea and chlamydia (Division of STD Prevention, *Sexually Transmitted Disease Surveillance, 1998*. Department of Health and Human Services, Atlanta: Centers for Disease Control and Prevention, September 1999).

⁸ M.W. Ross, A. Wodak, and J. Gold, "Accuracy of Self Report of Sexually Transmissible Disease in Injecting Drug Users," *Journal of the European*

Academy of Dermatology and Venereology 2 (1993): 147-148.

⁹ It is estimated that in the US, chronic HCV infection accounts for 8,000 to 10,000 deaths annually and costs more than \$600 million. (J.B. Wong et al., "Estimating Future Hepatitis C Morbidity, Mortality, and Costs in the United States," *American Journal of Public Health*, 90, 10 (2000): 1562-1569.

¹⁰ J. Baseman, M.W. Ross, and M. Williams, "Sale of Sex for Drugs and Drugs for Sex: An Economic Context of Sexual Risk Behavior for STDs," *Sexually Transmitted Diseases* 26 (1999): 444-449.

Table 1: Demographic Characteristics of Sample

Site	Total #	Percent
Lubbock	123	30.2%
Harris	139	34.2%
Brazoria/Harris	145	35.6%

Sex	Total #	Percent
Male	294	72.2%
Female	113	27.8%

Race	Total #	Percent
Caucasian	162	39.8%
African American	146	35.9%
Hispanic	75	18.4%
Asian+Other	11	2.7%
Unknown	13	3.2%

Age Group	Total #	Percent
1-17	13	3.2%
18-24	69	17.0%
25-34	121	29.7%
35-44	149	36.6%
45-64	51	12.5%
Unknown	4	1.0%

Married or have a regular partner	Total #	Percent
Yes	181	44.5%
No	226	55.5%

Number of children ever had?	Total #	Percent
0*	136	33.4%
1	93	22.8%
2	88	21.6%
3	43	10.6%
4	26	6.4%
5	13	3.2%
6 or more	8	2.0%

*Missing recoded to 0

Employed	Total #	Percent
Full time	76	18.7%
Part time	28	6.9%
Not employed	303	74.4%

Table 2: Substance Use Behaviors

What drugs have you done in the past?

Type of drug	Total #	Percent of n=407
Crack	266	65.4%
Cocaine	335	82.3%
Heroin	114	28.0%
Stimulants	208	51.1%
Sedatives	84	20.6%
Hallucinogen	119	29.2%
Marijuana	254	62.4%
Fry	13	3.2%
Opiates	29	7.1%
Alcohol	386	94.8%

What is your drug of preference?^a

Type of drug	Total #	Percent of n=407
Crack	139	34.2%
Cocaine	101	24.8%
Heroin	53	13.0%
Stimulants	22	5.4%
Sedatives	10	2.5%
Hallucinogen	7	1.7%
Marijuana	73	17.9%
Fry	1	0.2%
Opiates	6	1.5%
Alcohol	93	22.9%

^aTotals do not add to 100% as respondents could list >1 preferred drug

Have you ever been in drug treatment before this time?

Treatment	Total #	Percent
Yes	225	55.3%
No	182	44.7%

Have you ever injected any drug?

Injected	Total #	Percent
Yes	185	45.5%
No	222	54.5%

Have you ever shared needles and works while injecting any drug?

Shared	Total #	Percent
Yes	147	36.1%
No	259	63.6%
Unknown	1	0.2%

Table 3: Sexual Behaviors

How many different people have you had sex with in the past 4 weeks?

Different People	Total #	Percent
0	186	45.7%
1	134	32.9%
2	36	8.8%
3	17	4.2%
4	7	1.7%
5	5	1.2%
6 or more	22	5.4%

Have you ever had an STD?

STD	Total #	Percent
Yes	153	37.6%
No	254	62.4%

If yes, what type of STD?

Type	Total #	Percent*
Gonorrhea	89	21.9%
Chlamydia	39	9.6%
Syphilis	14	3.4%
Herpes HSV -2	10	2.5%
Warts HPV	7	1.7%
Trichomonas	7	1.7%
Hepatitis B/C	4	1.0%
HIV	6	1.5%
Other	3	0.7%
Unknown	19	4.7%
No STD	254	62.4%

*N=407; percentages total more than 100 because some respondents reported more than one STD

Have you ever sold sex for money or drugs?	Total #	Percent
Yes	73	18.0%
No	211	51.8%
Not asked	123	30.2%

Have you ever bought sex for money or drugs?	Total #	Percent
Yes	88	21.6%
No	196	48.2%
Not asked	123	30.2%

Table 4: Number and Percentage Testing Positive for Sexually Transmissible Infections

	N Positive	% Positive (n=407)	Clinic A* % positive (N)	Clinic B* % positive (N)	Clinic C* % positive (N)	Chi-Square & p value**
HSV-2 (Herpes)	176	44.4%	31.6% (37)	50.0% (71)	49.6% (68)	11.06 p<0.01
HCV (Hepatitis C)	143	35.1%	43.9% (54)	23.5% (34)	39.6% (55)	14.03 p<0.01
HBab (Hep B)	120	29.5%	30.1% (37)	28.3% (41)	30.2% (42)	0.159 ns
HBag	20	4.9%	13.8% (17)	2.1% (3)	0.0% (0)	30.58 p<0.01
Elisa HIV	12	3.0%	0.8% (1)	6.9% (10)	0.7% (1)	12.27 p<0.01
Westblot HIV	11	2.7%	0.8% (1)	6.2% (9)	0.7% (1)	10.52 p<0.01
Gonorrhea	7	1.7%	2.4% (3)	2.8% (4)	0.0% (0)	3.73 ns
Chlamydia	15	3.7%	4.9% (6)	2.1% (3)	4.3% (6)	1.71 ns
RPR syphilis	19	4.7%	2.4% (3)	6.2% (9)	5.0% (7)	2.187 ns
MHAtp syph	14	3.4%	1.6% (2)	4.8% (7)	3.6% (5)	2.069 ns

*Based on total number of tests performed: some missing data.

**Mantel-Haenszel Chi-square for differences among clinics.

Table 5. Adjusted Odds Ratios of Risk Factors for Sexually Transmissible Infections/Diseases Among Substance Users in Treatment

	<u>Hepatitis B</u> <u>Adj OR</u> (95% CI)	<u>Hepatitis C</u> <u>Adj OR</u> (95% CI)	<u>Herpes-2</u> <u>Adj OR</u> (95% CI)	<u>Other STD</u> ♦ <u>Adj OR</u> (95% CI)
Ever Injected a Drug	2.4* (1.0-6.2)	9.2* (3.8-22.3)	1.8 (0.7-4.5)	2.1 (0.6-7.0)
Ever Shared a Needle	3.8* (1.6-9.2)	2.7* (1.2-6.2)	0.7 (0.3-1.8)	0.5 (0.1-1.6)
History of Drug Treatment	2.4* (1.4-4.1)	1.3 (0.7-2.3)	1.3 (0.8-2.1)	1.4 (0.6-3.2)
Ever Used Crack	1.1 (0.6-2.1)	1.1 (0.6-2.1)	1.4 (0.8-2.4)	0.9 (0.4-2.3)
Had Sex in Past Month	1.2 (0.7-2.1)	1.2 (0.6-2.1)	1.5 (0.9-2.5)	0.8 (0.3-1.9)
3+ Sex Partners Past Month	1.8 (0.8-4.2)	0.9 (0.4-2.1)	0.7 (0.3-1.7)	2.2 (0.8-6.6)
History of STD	1.4 (0.8-2.4)	1.0 (0.6-1.9)	2.1* (1.2-3.5)	1.8 (0.8-4.3)
Age 30 or Older	2.9* (1.6-5.5)	6.5* (3.3-12.6)	4.3* (2.4-7.7)	0.4* (0.2-1.0)
Female	2.0* (1.2-3.5)	1.3 (0.7-2.3)	6.5* (3.6-11.8)	1.7 (0.7-3.9)
African American	2.0* (1.0-4.0)	1.1 (0.5-2.2)	3.2* (1.7-5.9)	2.3 (0.9-5.7)

♦ Other STDs include gonorrhea, chlamydia and syphilis. Results should be interpreted with caution, as only 30 respondents had one or more of those diseases.

* $P \leq 0.06$

♣ The variable *Number of Sex Partners* was excluded from the HSV-2 regression model because of its collinearity with *Sold Sex* and *Female* gender.

Appendix A

Facts About Hepatitis B

HEPATITIS B CLINICAL FEATURES	<ul style="list-style-type: none"> • Jaundice, fatigue, abdominal pain, loss of appetite, intermittent nausea, vomiting 		
ETIOLOGIC AGENT	<ul style="list-style-type: none"> • Hepatitis B virus 		
INCIDENCE	<ul style="list-style-type: none"> • 140,000-320,000 infections/yr in United States • 70,000-160,000 symptomatic infections/yr 		
SEQUELAE	<ul style="list-style-type: none"> • Of symptomatic infections, 8400-19,000 hospitalizations/yr and 140-320 (0.2%) deaths/yr; • Of all infections, 8,000-32,000 (6%-10%) chronic infections/yr, and 5,000-6,000 deaths/yr from chronic liver disease including primary liver cancer 		
PREVALENCE	<ul style="list-style-type: none"> • Estimated 1-1.25 million chronically infected Americans 		
COSTS	<ul style="list-style-type: none"> • Estimated \$700 million (1991 dollars)/yr (medical and work loss) 		
TRANSMISSION	<ul style="list-style-type: none"> • Bloodborne • Sexual • Perinatal 		
RISK GROUPS	<table border="0"> <tr> <td data-bbox="578 1289 997 1734"> <ul style="list-style-type: none"> • Injection drug users • Sexually active heterosexuals • Men who have sex with men • Infants/children of immigrants from disease-endemic areas • Low socioeconomic level </td> <td data-bbox="997 1289 1385 1734"> <ul style="list-style-type: none"> • Sexual/household contacts of infected persons • Infants born to infected mothers • Health care workers • Hemodialysis patients </td> </tr> </table>	<ul style="list-style-type: none"> • Injection drug users • Sexually active heterosexuals • Men who have sex with men • Infants/children of immigrants from disease-endemic areas • Low socioeconomic level 	<ul style="list-style-type: none"> • Sexual/household contacts of infected persons • Infants born to infected mothers • Health care workers • Hemodialysis patients
<ul style="list-style-type: none"> • Injection drug users • Sexually active heterosexuals • Men who have sex with men • Infants/children of immigrants from disease-endemic areas • Low socioeconomic level 	<ul style="list-style-type: none"> • Sexual/household contacts of infected persons • Infants born to infected mothers • Health care workers • Hemodialysis patients 		
SURVEILLANCE	<ul style="list-style-type: none"> • National Notifiable Diseases Surveillance System • Viral Hepatitis Surveillance Program • Sentinel Counties Studies 		

TRENDS

Incidence increased through 1985 and then declined 55% through 1993 because of wider use of vaccine among adults, modification of high-risk practices, and possibly a decrease in the number of susceptible persons. Since 1993, increases observed among the three major risk groups: sexually active heterosexuals, homosexual men, and injection drug users.

PREVENTION

- Hepatitis B vaccine available since 1982
- Screening pregnant women and treatment of infants born to infected women
- Routine vaccination of infants and 11-12 year olds
- Catch-up vaccination of high-risk groups of all ages
- Screening of blood/organ/tissue donors

Appendix B

Facts About Hepatitis C

CLINICAL FEATURES	<ul style="list-style-type: none">• jaundice• fatigue• abdominal pain• loss of appetite• intermittent nausea• vomiting		
ETIOLOGIC AGENT	<ul style="list-style-type: none">• Hepatitis C virus (HCV)		
INCIDENCE	<ul style="list-style-type: none">• 36,000 new infections in the United States (1996 estimates)• 25-30% of infections are symptomatic		
SEQUELAE	<ul style="list-style-type: none">• Chronic infection \geq85% of infected persons• Chronic liver disease: 70% of infected persons• Deaths from chronic liver disease: 8,000-10,000/yr• Leading indication for liver transplantation		
PREVALENCE	<ul style="list-style-type: none">• Estimated 3.9 million (1.8%) Americans have been infected with HCV of whom 2.7 million are chronically infected		
COSTS	<ul style="list-style-type: none">• Estimated \$600 million (1991 dollars) (medical and work loss, excluding transplantation)		
TRANSMISSION	<ul style="list-style-type: none">• Primarily bloodborne; also sexual and perinatal		
RISK GROUPS	<table border="0"><tr><td><ul style="list-style-type: none">• Injecting drug users• Hemodialysis patients• Health care workers• Sex contacts of infected persons</td><td><ul style="list-style-type: none">• Persons with multiple sex partners• Recipient of transfusions before July 1992• Recipient of clotting factors made before 1987• Infants born to infected women</td></tr></table>	<ul style="list-style-type: none">• Injecting drug users• Hemodialysis patients• Health care workers• Sex contacts of infected persons	<ul style="list-style-type: none">• Persons with multiple sex partners• Recipient of transfusions before July 1992• Recipient of clotting factors made before 1987• Infants born to infected women
<ul style="list-style-type: none">• Injecting drug users• Hemodialysis patients• Health care workers• Sex contacts of infected persons	<ul style="list-style-type: none">• Persons with multiple sex partners• Recipient of transfusions before July 1992• Recipient of clotting factors made before 1987• Infants born to infected women		

TRENDS	<ul style="list-style-type: none"> • Incidence stable in 1980's; decline in 1990's • Transfusion-associated cases occurred prior to donor screening, now very rare • Most new infections due to high risk drug (60%) behaviors 	
ROUTINE TESTING	<ul style="list-style-type: none"> • Transfusion recipients notified of receipt of blood from positive donor • Recipients of transfusions or solid organs prior to July 1992 • Recipients of clotting factor concentrates prior to 1987 • Chronic hemodialysis patients 	<ul style="list-style-type: none"> • Persons who ever injected illegal drugs, even if a few times many years ago • Health care and public safety workers after exposure to HCV-positive blood • Children born to HCV-positive women
PREVENTION	<ul style="list-style-type: none"> • Screening of blood/organ/tissue donors • Counseling to reduce/modify high-risk practices 	
TREATMENT	<ul style="list-style-type: none"> • Drugs are licensed for the treatment of persons with chronic hepatitis C • Treatment is effective in 10-40% of persons 	
ADDITIONAL INFORMATION	<ul style="list-style-type: none"> • Hepatitis Foundation International (800) 891-0707 • CDC, Hepatitis Branch (888) 443-7232 (4HEPCDC) • American Liver Foundation (800) 223-0179 (GOLIVER) (888) 443-7222 (4HEPABC) • National Digestive Diseases Information Clearinghouse (301) 654-3810 	