HIV Voluntary Counseling and Testing and HIV Incidence in Male Injecting Drug Users in Northern Thailand

Evidence of an Urgent Need for HIV Prevention

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Summary: HIV voluntary counseling and testing (VCT), an important strategy for HIV prevention and care, has been available in all government hospitals in Thailand since 1992. We assessed factors associated with HIV testing, its uptake, and estimates of HIV incidence after HIV testing among male northern Thai injecting drug users (IDUs) admitted for inpatient drug treatment. Participants were interviewed about risk behaviors and HIV testing history before VCT was provided as part of the study. Of 825 IDUs who participated, 36% reported a prior HIV test. Factors associated with prior HIV testing in multiple logistic regression analysis included higher education and having >1 lifetime sex partner. Needle sharing was not associated with prior HIV testing. Of the 298 men with a prior test, 80% reported a negative result on their last prior HIV test, of whom 28% tested positive in our study, leading to an estimated incidence rate of 10.2 per 100 person-years. Fifty-nine percent of the IDUs who reported a prior HIV test stated that they did not receive pre- and/or posttest counseling. HIV incidence among IDUs remains high despite having VCT. Extending HIV prevention and harm reduction programs is urgently needed for IDUs in the region.

Key Words: injecting drug user, HIV incidence, voluntary HIV counseling and testing, Thailand

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The HIV epidemic in Thailand began with an explosive outbreak among urban injecting drug users (IDUs) in 1987. HIV rates went from a prevalence of almost 0 in mid-1987 to roughly 40% of IDUs nationwide by mid-1989.[1] This epidemic has been maintained, whereas rates in other risk groups in Thailand have fallen significantly since 1996. Currently approximately 5% to 10% of IDUs in Thailand are newly infected each year.[2,3] Thailand has actively promoted condom use, improved sexually transmitted disease (STD) care, and made access to voluntary testing and counseling (VCT) widespread. Prevention programs for IDUs have been limited in scope and have included pilot harm reduction, primarily needle and syringe exchange for ethnic minorities,[4] and long-term substitution therapy, which has been limited to Bangkok.[3,5,6] Before 2003, drug policy in Thailand focused primarily on possession; with the 2003 "war on drugs," the focus shifted to trafficking and active drug use.

Thailand has launched aggressive and extensive HIV prevention programs to control the spread of HIV, with VCT access a primary component of the program.[7] The government established confidential VCT services in all provincial and district hospitals starting in 1992[8] with a fee of US $5. VCT was also provided by some nongovernmental organizations (NGOs) and private practitioners. VCT was a core part of prevention but was also seen as an entry point to care and support for HIV-infected individuals. Studies have shown the efficacy of VCT in decreasing risky behaviors at individual levels in largely healthy populations.[9,10] Nevertheless, if VCT is to be effective it must first be accepted. In this report, we investigate the prevalence of VCT uptake, reasons for seeking VCT, and factors associated with VCT uptake among male IDUs who presented for drug detoxification at a regional treatment center in northern Thailand. We used a history of past VCT with a reported negative result and HIV status on recruitment into the study to estimate HIV incidence after VCT.

METHODS

Study Setting

Chiang Mai Drug Treatment Center (CDTC) is one of 6 comprehensive detoxification and drug treatment facilities in Thailand and serves 17 provinces in the northern region. The center is located in Mae Rim district, Chiang Mai province, approximately 30 kilometers north of Chiang Mai City. The northern region was the part of the country most severely affected by HIV early in the HIV epidemic, particularly the 6 upper northern provinces. Although the regional population represents only 8% of the country's total population, 26.8% of 267,663 AIDS cases and AIDS-related deaths nationally were from the region as of January 2003.[11] The upper northern region had the highest HIV prevalence in the country in national sentinel surveillance, including drug users, women

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attending antenatal care, and direct (brothel-based) female sex workers.[12]

Study Design and Process

A cross-sectional study among IDUs admitted for drug detoxification at the CDTC was carried out between February 1, 1999 and December 30, 2002. The eligibility criteria included age older than 12 years, willing to give informed consent to participate (by parent for those less than 18 years old, with signed informed consent from youth), and admission for opiate abuse. Exclusion criteria included persons admitted for drugs other than opiates, those aged 12 years or younger, and those unable to understand and give informed consent for participation.

IDUs who met the eligibility criteria were approached by the study staff for participation in the study when they were alert and able to provide informed consent, approximately 3 days after admission. The study process included interviews using a structured questionnaire in Thai and 7 ethnic minority languages conducted by project staff unaffiliated with the treatment center. Pretest counseling for HIV, blood draws for HIV, and receipt of HIV results with posttest counseling followed. The interview included sociodemographic characteristics, history and current risk behaviors for HIV infection, and history of HIV testing. All recruitment, interviews, counseling sessions, and informed consent were conducted in the language of the participants. Study instruments were developed in Central Thai and field tested before use.

Laboratory HIV Testing

Serum specimens were tested for HIV antibodies by enzyme-linked immunosorbent assay (ELISA) using commercially licensed reagents (Vironostica HIV Uni-form II plus 0; Organon Teknika). Nonreactive result specimens by ELISA were considered to be HIV-negative. Specimens tested reactive by ELISA were further tested with the gel particle agglutination (GPA) test for HIV antibodies (Serodia-HIV; Fujirebio, Japan). ELISA reactive specimens tested reactive by GPA were considered to be HIV-positive. GPA nonreactive specimens were confirmed by Western blot analysis (HIV Blot 2.2; Genelabs Diagnostics, Singapore).

Data Management and Statistical Analysis

Epi-Info version 6.04 (US Centers for Disease Control and Prevention, Atlanta, GA), SAS version 6.12 (SAS Institute, Cary, NC), and Stata release 6 (Stata Corporation, College Station, TX) were used for data management and analysis. All data were double entered and verified. Percent distributions, the χ^2 test, the χ^2 test for trend, odds ratios (ORs) and 95% confidence intervals (CIs), incidence rates and 95% CIs, logistic regression, and Poisson regression were used for data analysis.

A conservative approach was used to estimate incidence rates among participants who reported VCT before enrollment in the study and reported negative results. The month and year of having VCT were asked and recorded. If both were missing, the data were excluded from the incidence calculation. If the month was missing, January was assumed to be the month of testing. This provided an overestimation of person-years (PYs) contributed; therefore, the incidence rates are underestimated. For the incident cases, PYs were calculated using a midpoint assumption.

This study was reviewed and approved by the Ethical Review of Research Committee, Thai Ministry of Public Health, Nonthaburi, Thailand; the Human Experiment Committee of Chiang Mai University, Chiang Mai, Thailand; and the Committee on Human Research of The Johns Hopkins Bloomberg School of Public Health, Baltimore, Maryland.

RESULTS

Participant Characteristics

Of 976 eligible admissions, a total of 891 (91%) male IDUs consented to participate; 825 (84% of those eligible) completed all the study procedures. The mean (standard deviation [SD]) age of these 825 men was 30 (9) years. The overall HIV prevalence among these IDUs was 35.5%. Most were ethnic Thai (61.3%), had completed compulsory Thai education (6 years in school, 77.5%), and were employed (79.3%) at the time of enrollment. Ethnicity was correlated with age, education, and marital status. Ethnic minority (Hill-tribe) IDUs (38.7%) had a low level of education and were largely farmers, older, and married. Hill-tribe (c*hao khao* in Thai) refers to the mountain-dwelling ethnic minorities within the Thai borders, who comprise roughly 10% of the regional population.[13,14] Minorities represented in the study population, include Karen, Hmong, Akha, Lahu, Lisu, Yao, and Shan. Opium has long been a traditional crop among many of these ethnic minorities, and opiate use is common in several communities.[15]

Of the 825 male IDUs, 96.1% reported being sexually experienced; 75.0% reported having more than 3 sexual partners in their lifetime, 59.5% gave a history of visiting commercial sex workers (CSWs), 5.6% reported having sex with men, 2.2% had sex for money, and 0.6% ever had sex in exchange for drugs. More than 80% of the men never used condoms with their regular partners.

More than 60% of these IDUs started injecting drugs when they were young adults (aged $<$25 years). The mean (SD) age of first drug injection was 24 (8.2) years. More than 90% of participants reported injecting drugs in the 3 months before admission, of whom three quarters injected daily and approximately one half shared needles and syringes with other IDUs. Characteristics of the IDU participants are shown in Table 1.

HIV Testing History Profile

Having sought HIV testing before enrollment into the study was reported by 36.1% of men. Among those tested, 44.0% were tested more than 1 time; more than half (57.7%) had their first HIV test at a government facility. Approximately half (52.0%) sought their first HIV test to learn their HIV serostatus. Less common reasons for seeking testing included feeling sick (4.7%), employment (4.4%), military conscription (3.4%), pregnancy of partner (2.3%), and planning for marriage (2.0%). Most (86.9%) reported they had learned their prior HIV test results, of whom 91.5% reported negative results and 8.5% reported positive results (1 of whom tested negative in our study) on their most recent test. Many of the IDUs reported that they did not receive pre- and/or posttest

TABLE 1. Sociodemographic Characteristics of IDU Participants Who Came for Drug Detoxification at a Northern Drug Treatment Center (February 1, 1999–December 31, 2002)

Characteristics	No. Male IDUs (N = 825)	Percentage
Age (y)		
<20	44	5.3
20–29	366	44.4
30–39	277	33.6
≥40	138	16.7
Ethnicity		
Ethnic minority	319	38.7
Thai	506	61.3
Education		
None	185	22.4
Primary school	247	29.9
Secondary school or higher	393	47.6
Marital status		
Never married	363	44.0
Married/living together	278	33.7
Separated/divorced/widowed	184	22.3
Occupation		
Unemployed	148	17.9
Farmer/gardener	268	32.5
Laborer	216	26.2
Other (eg, trader, student, office or store employee)	193	23.4
History of being an IDU		
Age (y) of starting injected drug		
<20	263	31.9
20–24	240	29.1
25–29	142	17.2
≥30	180	21.8
Injected in the past year	763	92.5
Injected drugs in the past 3 mo	748	90.7
Ever shared needle and syringe	366	44.4
Reported sharing needles in the past 3 mo	321	38.9
Sexual behavior		
Ever had sex	793	96.1
Number of lifetime sexual partners		
None or 1	102	12.4
More than 1 (619 cases [75%] of IDUs had >3 partners)	723	87.6
History of CSW visit	491	59.5
History of having sex with men	46	5.6
History of having sex for money	18	2.2
History of having sex for drugs	5	0.6
Ever had an HIV test	298	36.1
HIV-positive at enrollment	293	35.5

counseling, of whom 56.4% and 63.5% were tested at government facilities and private clinics, respectively. Among IDUs who reported a prior HIV test, most (76.2%) had the test after initiating injection drug use (Table 2).

Factors Associated With Having Prior HIV Testing

The univariate analysis of factors associated with having a prior HIV test is presented in Table 3. Having a prior HIV test was more frequently found among Thai lowlanders compared with ethnic minority (odds ratio [OR] = 2.4); having a higher education level compared with those who did not have any education (OR = 2.2 for having primary school and OR = 3.9 for secondary school or higher; $P < 0.001$); having an occupation other than farmer, laborer, or unemployed (OR = 2.6); having had more than 1 sexual partner compared with those who had 1 or none (OR = 2.5 for those who had 2–3 partners

TABLE 2. VCT Profile Among Male IDU Participants

Profile	No. Male IDUs (n = 298)	Percentage
Number of previous HIV tests		
1	167	56.0
2	83	27.9
3 or more	48	16.1
Reasons for having the most recent HIV test		
Desire to know HIV status	155	52.0
Feel sick	14	4.7
Work-related requirement	13	4.4
Getting married	6	2.0
Plan to have a child	3	1.0
Wife pregnant	7	2.3
Tested during military requirement	10	3.4
Other	90	29.9
Place of having the most recent HIV test		
Government VCT services setting	172	57.7
Private VCT services setting	126	42.3
Did not receive pretest counseling at the most recent test	145	48.6
At government VCT services settings	74	43.0 (74 of 172)
At private VCT services settings	71	56.4 (71 of 126)
Did not receive posttest counseling at the most recent test	168	56.4
At government VCT settings	91	52.9 (91 of 172)
At private VCT settings	77	61.1 (77 of 126)
Did not receive pre- and/or posttest counseling at the most recent test	177	59.4
At government VCT settings	97	56.4 (97 of 172)
At private VCT settings	80	63.5 (80 of 126)
Know HIV test result		
Negative	237	79.5
Positive	22	7.4
Did not know	39	13.1
Time of having prior HIV test		
Before started injecting drugs	71	23.8
After started injecting drugs	227	76.2

TABLE 3. Percentage Having Prior HIV Test Before Participation in Study, ORs, and 95% CIs

Characteristics	No. Male IDUs	Percentage Having Prior HIV Test	Unadjusted ORs (95% CI)	Adjusted ORs (95% CI*) (logistic regression)
Ethnicity				
Highlanders	319	24.1	1	
Thai	506	43.7	2.4 (1.8 to 3.3)*	1.3 (0.9 to 2.0)
Age (y)				
<20	44	31.8	1	
20–29	366	41.5	1.5 (0.8 to 2.9)	
30–39	277	31.0	1.0 (0.5 to 1.9)	
≥40	138	33.3	1.1 (0.5 to 2.2)	
Education				
No education	185	18.4	1	
Primary school	247	32.8	2.2 (1.4 to 3.4)*	1.8 (1.0 to 3.0)*
Secondary school or higher	393	46.6	3.9 (2.5 to 5.9)*	2.7 (1.5 to 4.7)*
Occupation				
Unemployed	148	43.9		
Farmer	268	23.9		
Laborer	216	30.6		
Trader	69	49.3		
Student	23	65.2		
Other	101	53.5		
Unemployed/ farmer/ laborer	632	30.8	1	
Other	193	53.4	2.6 (1.8 to 3.6)*	
Marital status				
Never married	363	34.4	1	
Married and living together	278	38.1	1.2 (0.8 to 1.6)	
Separated/divorced/widowed	184	36.4	1.1 (0.8 to 1.6)	
No. lifetime sex partners				
None or 1	102	15.7	1	
2–3	104	31.7	2.5 (1.3 to 4.9)*	2.3 (1.1 to 4.6)*
More than 3	619	40.2	3.6 (2.1 to 6.3)*	3.0 (1.6 to 5.6)*
Had history of CSW visit				
Never	334	31.4	1	
Ever	491	39.3	1.4 (1.0 to 1.9)*	0.8 (0.6 to 1.2)
Had history of sex with other men				
Never	779	35.2	1	
Ever	46	52.2	2.0 (1.1 to 3.6)*	1.1 (0.6 to 2.2)
Had sex for money				
Never	807	35.6	1	
Ever	18	61.1	2.8 (1.1 to 7.4)*	1.8 (0.6 to 5.3)
Needle sharing				
Never	161	32.6	1	
Ever	366	37.5	1.2 (0.9 to 1.7)	

*$P < 0.05$.

and OR = 3.6 for those who had 4 or more partners; $P < 0.001$); history of visiting a CSW (OR = 1.4); reporting sex with men (OR = 2.0); and having themselves been a sex worker (OR = 2.8). Needle sharing was not associated with reporting a prior HIV test.

Logistic regression was used to examine the independent associations of these significant variables with HIV test history. Because education and occupation were highly correlated ($P < 0.001$), we used education in the analysis. The independent predictors of having a prior HIV test among male IDUs were a higher level of education and more than 1 lifetime sexual partner (see Table 3).

HIV Incidence Rates After Having HIV Testing

All the 237 IDUs who reported having a negative HIV result on their previous test recalled the year of their previous test. These IDUs contributed 647 PYs since their last negative test; the average time between the reported HIV test and enrollment in the study was 2.7 years. Of these men, 27.8% tested positive, for an overall incidence rate of 10.2 per 100

PYs (95% CI: 7.9 to 13.0). The incidence rates per 100 PYs stratified by the time since last having a prior test declined over time (Fig. 1).

The associations between HIV incidence rates after reporting a prior negative HIV test result and risk behaviors were explored (Table 4). Age, needle sharing in the past 3 months, and having a prior HIV test after initiating injecting drug use were associated with elevated HIV incidence in univariate analysis. IDUs less than 25 years of age were almost 2 times more likely to seroconvert to HIV than those who were older. HIV seroconversion among those who shared needles and syringes in the past 3 months was 1.8 times higher than among IDUs who did not share. Those IDUs who had a prior HIV test after initiating drug injection were 2.5 times more likely to seroconvert to HIV than IDUs who had an HIV test before starting injecting drug use. Needle sharing in the past 3 months and time since reporting an HIV test were correlated. IDUs who had a prior HIV test after initiating injecting drug use were almost 3 times more likely to share needles in the past 3 months than IDUs who had an HIV test before they initiated injecting drugs (OR = 2.70, 95% CI: 1.38 to 5.31).

We present 2 multivariate analysis models using Poisson regression techniques. First is the model with needle sharing and age, and the second addresses time of prior HIV test and age. Needle sharing and age were independently associated with HIV seroconversion in model I, with risk ratios (RRs) of 1.7 and 1.6, respectively. In model II, time of having a prior HIV test and age were also independently associated with HIV seroconversion, with RRs of 2.5 for time of having a prior HIV test and 1.8 for age less than 25 years.

Comparing Recent Risk Behaviors and HIV Prevalence Between Injecting Drug Users Who Ever and Never Had Prior HIV Testing

Needle sharing in the past 3 months, sexual behaviors in the past year before enrolling into our study, and HIV prevalence according to reports on past HIV testing and knowledge of test results (data not shown) were compared between IDUs who never reported having a prior HIV test, those who had the test but did not learn their test results, and those who had a test and learned that the result was negative. We excluded from consideration respondents with a prior positive test result because of small numbers (n = 22). Only HIV prevalence was found to attain statistical significance in comparing the 3 groups. The HIV prevalence of those who never had an HIV test (36.8%) was higher than that of those who learned that they were HIV-negative and those who did not receive their test results (27.8% and 30.8%, respectively; $P < 0.05$). Condom use with wives was rare (less than 5% reported always using condoms) and generally similar across the groups; IDUs who learned that they tested HIV-positive were more likely to report always using condoms with their wives (37.5%), although the numbers are limited. Overall, 82% and 65.8% of IDUs reported never having used a condom with their wives or girlfriends, respectively.

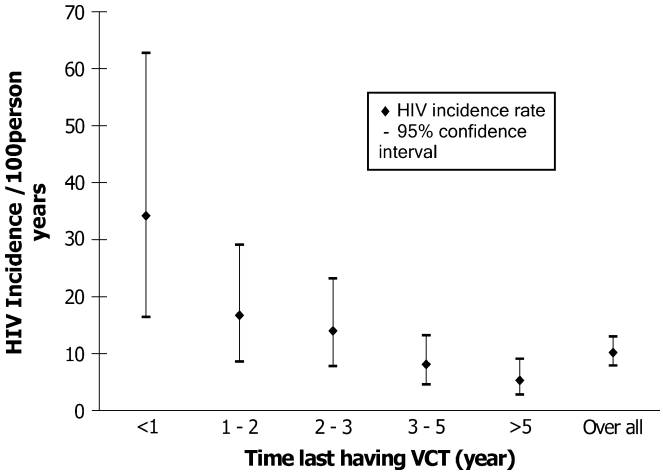

FIGURE 1. HIV incidence rates and 95% confidence interval among IDU who had prior HIV negative test before enrolling into the study by time of last having the prior test.

DISCUSSION

Approximately one third of northern Thai IDUs reported having an HIV test before enrolling in our study and the estimated HIV incidence among those who reported prior negative results was 10.2% annually. The method we used to estimate our incidence rate from this cross-sectional study is conservative and can easily be applied to estimate incidence rates in other populations and for other conditions. Cohort studies are expensive and time-consuming. The cross-sectional study approach to construct a retrospective cohort can be used for rapid estimation of HIV and other disease incidence rates when time and resources are limited.

The frequency of having an HIV test (36%) among northern Thai IDUs may be considered lower than desirable and is no higher than that of the general population in the region (47%),[16] despite a much greater risk of HIV. In 1997, 76% of 2701 IDUs recruited at storefront research and 87% of 2588 IDUs recruited at detoxification sites in New York reported an HIV test before enrollment.[17] The Thai government has not made HIV prevention among drug users a high HIV prevention priority. At present, no drug treatment center in Thailand offers HIV VCT to drug users who present for detoxification unless it is requested by patients. Only IDUs who participate in research studies are generally offered VCT. The efficacy of VCT to reduce HIV risk behaviors among IDUs has been well documented.[18–20] HIV VCT is critically important for individuals who use illicit drugs and should be incorporated routinely into drug treatment. Drug treatment facilities are uniquely situated to provide VCT to their patients,[21] because drug users who come for treatment may be ready to initiate behavior change and may be open to prevention messages that accompany VCT. Many IDUs do not want to know their HIV serostatus (only 52% of the IDUs in this study sought VCT to learn their HIV serostatus), however. At the minimum, pretest counseling provides IDUs the opportunity to assess their personal HIV risks, and risk perception for HIV acquisition or transmission has been shown to be a major motivator for seeking HIV testing.[22–26]

Approximately 13% of the IDUs in this study did not learn their prior HIV test results, similar to the percentages of

TABLE 4. HIV Incidence Rates After Having Prior Negative HIV Test Result and RRs (95% CI) by Characteristics

Characteristics	PYs	HIV Incidence	HIV Incidence Rate per 100 PYs	Unadjusted RRs (95% CI)	Adjusted RRs (95% CI) (Poisson regression)	
					Model I	Model II
Ethnicity						
Highlanders	189	15	7.9	1		
Thai	459	51	11.1	1.40 (0.77 to 2.68)		
Age (y)						
≥25	465	39	8.4	1	Reference	Reference
<25	183	27	14.8	1.76 (1.04 to 2.95)*	1.66 (1.01 to 2.71)*	1.78 (1.09 to 2.91)*
Marital status						
Ever married	385	36	9.4	1		
Never married	263	30	11.4	1.22 (0.72 to 2.04)		
Education						
Had formal education	398	43	10.8	1		
No formal education	250	23	9.2	0.85 (0.49 to 1.44)		
Visit CSW in the past year						
No	570	54	9.5	1		
Yes	78	12	15.4	1.62 (0.79 to 3.07)		
No. sex partners						
None or 1	37	2	5.4	1		
More than 1	611	64	10.5	1.94 (0.51 to 16.3)		
Needle sharing in past 3 mo						
No	379	29	7.6	1	Reference	
Yes	269	37	13.8	1.80 (1.08 to 3.03)*	1.71 (1.01 to 2.71)*	
Having prior VCT						
Before started injecting drug	213	11	5.2	1		Reference
After started injecting drug	435	55	12.6	2.45 (1.27 to 5.19)*		2.49 (1.30 to 4.75)*

*$P < 0.05$.

those who did not return for their HIV test results (10%) at a district hospital near the drug treatment center[7] and among periurban adults in Chiang Mai province (9.5%),[16] and hence missed the opportunity for posttest counseling. Learning one's HIV serostatus is a critical HIV prevention strategy and is essential for prompt entry into HIV care and support.[27] Posttest counseling provides the opportunity for tailored HIV/AIDS prevention planning to promote safer behaviors whether the results are positive or negative. Posttest counseling also offers referral for early medical treatment, social services, and psychologic supports for persons testing positive for HIV.[26,28,29]

The HIV prevalence at enrollment among the IDUs who did not learn their previous HIV test results was 30.8%, which is marginally higher than for those who tested negative at their prior test. Some cases of HIV infection might have been averted if IDUs had received their HIV test results and received posttest counseling. Strategies to increase posttest counseling are urgently needed in this setting. Rapid HIV testing has been shown to markedly increase posttest counseling rates because an additional visit is not required,[30] and rapid tests are accepted and preferred by northern Thai people.[31]

One potential concern is that approximately half of the IDUs who reported HIV testing did not receive pre- or posttest counseling, which was somewhat higher among participants who received HIV testing at private settings. A prospective study carried out among unmarried young adults in northern Thailand revealed even higher rates of reports of not receiving pretest (56.3%) and posttest (66.7%) counseling.[32] The benefits of HIV testing without counseling are limited and may intuitively promote risky behavior.[33,34] A randomized trial has shown that HIV testing without counseling had little effect on HIV risk behavior reduction.[35] Government policy must ensure that all voluntary HIV tests are accompanied by proper pre- and posttest counseling. Provider education and government enforcement are urgently needed.

Thai drug users with a higher level of education and multiple partners were more likely to report having a prior HIV test in this study. HIV/AIDS prevention programs in Thailand have focused almost exclusively on sexual transmission, and little attention has been paid to the risks from injecting illicit drugs. Clearly, there is a need for outreach to IDUs for HIV prevention, health education, and harm reduction. HIV rapid testing should be used and offered to IDUs who desire HIV testing. Attention must also be paid to the special needs of ethnic minorities and their language requirements.

The estimated HIV annual incidence rate of 10% among IDUs is high. Moreover, the incidence rate was alarmingly high in the first year after HIV testing (34.2 per 100 PYs), and it then gradually decreased over time after the HIV test. VCT sites serving populations with predominantly sexual risks usually find it difficult to work with substance users. Our finding that needle sharing was not associated with having a prior HIV

test but was associated with sexual risk also supports this inference. Effective VCT with IDUs would need to target that population with staff who are experienced in working with IDUs and to use methods that would overcome concerns about disclosing illegal behavior, particularly given the current law enforcement climate in Thailand.

There are several factors that are likely to be at play in the misperceptions of HIV risks among IDUs in northern Thailand. The Thai government has paid minimal attention and put few resources toward HIV prevention for drug users and has promoted HIV testing without ensuring adequate pre- and posttest counseling. Many IDUs may perceive HIV-negative results as an indicator of their safety from acquiring HIV. IDUs who had their first HIV test after initiating drug injection were 2.5 times more likely to seroconvert to HIV than IDUs who had an HIV test before their first injection. The HIV incidence rate and time trend after HIV testing reveal the need for harm reduction counseling and repeated HIV VCT for IDUs at frequent intervals. With repeated testing, those recently infected could learn their HIV status earlier and be appropriately counseled to reduce the risk of further transmission to their drug and sex partners. Aggressive outreach to IDUs for free VCT with rapid testing outside a treatment setting might be attractive to active drug users and could have a significant public health impact on preventing HIV transmission.

Our study results are derived from a cross-sectional study among northern Thai IDUs who sought drug treatment and volunteered to participate in this study; as such, our inferences are subject to several limitations. First, the findings may not generalize to IDUs outside treatment. IDUs who came for drug treatment may have different characteristics than those who do not seek treatment and those who did not volunteer to participate. Information on VCT services in government and private settings, such as reporting not receiving counseling, may be generalizable, however, because the results were provided from a large sample of IDUs. Studies among other populations in Thailand revealed a similar high rate of reporting not receiving counseling.[16,32] Second, our data are based solely on self-report; thus, they are subject to bias. Socially desirable and undesirable data may be over- or underreported. Participants may underreport risk behaviors and overreport low-risk behaviors. Data related to time may also be subject to recall bias. The incidence rates estimated from the data closely reflect the underlying problem of HIV infection in this population, however. The method used for calculation of the incidence is conservative and favors an underestimation of the real infection rate.

Our investigation provides important and useful information regarding the epidemic among IDUs. Insufficient HIV prevention efforts have been focused on IDUs in the region. Concerted efforts and strategies need to be launched to prevent the further spread of HIV among IDUs, a core group that bridges HIV to the general population.

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