

Trends in HIV Prevalence, Estimated HIV Incidence, and Risk Behavior Among Men Who Have Sex With Men in Bangkok, Thailand, 2003–2007

Frits van Griensven, PhD,† Anchalee Varangrat, MA,* Wipas Wimonsate, MSc,* Suvimon Tanpradech, MSc,* Keratikarn Kladsawad, MSc,‡ Tareerat Chemnasiri, MA,* Orapin Suksripanich, MSc,* Praphan Phanuphak, MD,§ Philip Mock, MappStats,* Kamolset Kangarnrua, MA,|| Janet McNicholl, MD,*† and Tanarak Plipat, MD‡*

Background: Men who have sex with men (MSM) continue to be at high risk for HIV infection. Here we evaluate trends in HIV prevalence, estimated HIV incidence, and risk behavior among MSM in Bangkok, Thailand.

Methods: Between 2003 and 2007, 3 biennial cross-sectional HIV prevalence assessments were conducted among MSM in Bangkok, Thailand, using venue-day-time sampling. Oral fluid was tested for HIV infection; demographic and behavioral data were self-collected using hand-held computers. Estimates of annual HIV incidence in young MSM were derived as follows: (number of HIV infections/sum of [current age–age at start of anal intercourse]) × 100. Logistic and Poisson regression was used to evaluate trends in HIV prevalence, estimated HIV incidence, and risk behavior.

Findings: The overall HIV prevalence increased from 17.3% in 2003 to 28.3% in 2005 to 30.8% in 2007 ($P < 0.001$ for trend). The estimated HIV incidence among young MSM increased from 4.1% in 2003 to 6.4% in 2005, to 7.7% in 2007 ($P < 0.02$ for trend). The

increase in HIV prevalence from 2005 to 2007 was not statistically significant. The proportion of men reporting anal sex and casual or steady male sex partners in the past 3 months significantly decreased, whereas the proportion reporting drug use and drug use during sex significantly increased. No increase was observed in the proportion of men reporting consistent condom use.

Interpretation: Our data suggest that after a strong increase from 2003 to 2005, the HIV prevalence among MSM in Bangkok may have begun to stabilize. Given the continuing high levels of risk behavior and the estimated high HIV incidence in young MSM, additional HIV preventive interventions are necessary.

Key Words: epidemiology, HIV, men who have sex with men, Thailand (*J Acquir Immune Defic Syndr* 2009;00:000–000)

INTRODUCTION

The Royal Thai Government has been credited for its successful policy in reversing the epidemic of heterosexual HIV transmission that swept through the country in the mid-1990s.^{1,2} Within few years after the implementation of its “100% condom use in commercial sex program” in 1991, HIV prevalence indicators in the general population started to fall as expressed by the decrease in HIV prevalence in young military recruits from 4% in 1993 to 0.5% in 2001 and among pregnant women from 2.3% in 1995 to 1.0% in 2004.^{3,4}

Despite these successes, high and increasing HIV prevalence has recently been documented among populations of men who have sex with men (MSM) in varying parts of the Kingdom.^{5,6} In Bangkok, in 2003, the HIV prevalence in MSM was found to be 17.3% and increased to 28.3% in 2005.^{5,6} In response to these alarming findings, the Thailand Ministry of Public Health included MSM as a key target population in its National Strategic Plan for AIDS,⁷ and several clinical and behavioral interventions to prevent HIV infection for MSM were initiated by the governmental and nongovernmental sectors.^{8,9} Interventions in Bangkok included establishment of HIV voluntary counseling and testing and sexually transmitted infection treatment and care services for MSM, a general media campaign targeting MSM, and increased implementation of peer-driven interventions and condom and lubricant outreach activities at MSM venues. In 2007, the third consecutive

Received for publication February 5, 2009; accepted June 19, 2009.

From the *Thailand Ministry of Public Health—US Centers for Disease Control and Prevention Collaboration, Nonthaburi, Thailand; †Division of HIV/AIDS Prevention, Centers for Disease Control and Prevention, Atlanta, GA; ‡Bureau of Epidemiology, Ministry of Public Health, Nonthaburi, Thailand; §Thai Red Cross Society, AIDS Research Centre, Bangkok, Thailand; and ||Rainbow Sky Association of Thailand, Bangkok, Thailand.

This work was supported by the Division of HIV/AIDS Prevention and the Global AIDS Program of the US Centers for Disease Control and Prevention and by the Ministry of Public Health of Thailand.

Author contributions: F.V.G. designed the study, wrote the study protocol and the first version of the article. A.V., S.T., and Ke.K. oversaw sampling procedures, volunteer enrollment, and data collection. W.W. assisted in venue preparation and performed data analysis. O.P. and J.M. oversaw specimen collection, processing, shipping, and testing. P.P. and Ka.K. contributed to the design of the study and oversaw HIV counseling and returning of HIV test results. T.P. coordinated the execution of the study. All authors provided critical review of the article and have seen and approved the final version.

Conflicts of interest: none.

The data and conclusions presented in this article are those of the authors and do not necessarily represent the views of the US Centers for Disease Control and Prevention.

Correspondence to: Dr. Frits van Griensven, PhD, Thailand Ministry of Public Health—US Centers for Disease Control and Prevention Collaboration, Ministry of Public Health, Nonthaburi 11000, Thailand (e-mail fav1@cdc.gov). Copyright © 2009 by Lippincott Williams & Wilkins

biennial survey of HIV prevalence and risk behavior among MSM in Bangkok was conducted. This third survey allows evaluation of epidemiologic and behavioral trends, and an assessment of whether increased HIV prevention efforts have led to increased preventive behaviors and possibly to a decrease in HIV incidence. Here we report the results of the 2007 survey and analyze trends in HIV prevalence and risk behaviors between 2003 and 2007 among MSM in Bangkok. In addition, we present estimates of HIV incidence among MSM of 22 years and younger. Because these men have been sexually active only for a short period, HIV prevalence in this group can be used as a proxy for HIV incidence.

METHODS

Three biennial cross-sectional surveys of HIV prevalence and risk behavior were conducted in 2003, 2005, and 2007 using venue-day-time sampling (VDTS). Adaptation of the VDTS methodology to the Thai setting has been described in detail elsewhere.¹⁰ In brief, VDTS is a systematic method of identification, description, and mapping of venues where members of the target population congregate, followed by enumeration of venue attendance, determination of attendees' eligibility and willingness to participate, and selection of venues to be included in the assessment.

In 2003, a list was created of venues where MSM socialize and look for sexual partners. In 2005 and 2007, MSM venues that had closed or ceased to exist were removed from the venue list, whereas new venues were added. All venues were physically verified for existence, described in terms of owner and gatekeeper support, accessibility, safety, target audience and activity, outward characteristics of clientele, venue attendance, and expected yield.¹⁰ Based on this information, in each year, a selection of venues was made for inclusion in the assessment: 14 of 225 in 2003 [4 entertainment venues (bar/disco), 6 saunas, and 4 parks], 21 of 199 in 2005 (6 entertainment venues, 11 saunas, and 4 parks), and 19 of 281 in 2007 (7 entertainment venues, 7 saunas, and 5 parks). Before 2003, HIV prevalence was unknown and 1121 men were enrolled (enrollment rate 90.2%) to account for a wide range of possible prevalences and to have sufficient cell sizes for subgroup analysis. Based on the HIV prevalence found in the previous year, sample size calculation determined the number enrolled in 2005 (estimated HIV prevalence 20.0%, 95% confidence interval $\pm 5\%$; $n = 399$, enrollment rate 94.1%) and in 2007 (estimated HIV prevalence 30.0%, 95% confidence interval $\pm 5\%$; $n = 400$, enrollment rate 98.8%). Between April and May of every survey year, trained peer interviewers approached venue attendees to screen for eligibility and recruitment. Participants had to be Thai, 15 years or older (18 years or older in 2003), male, resident of the study area, reporting anal or oral sex with a man in the past 6 months to be eligible for enrollment, and be willing to complete a questionnaire and provide an oral fluid sample for HIV testing. Participation was anonymous and voluntary and verbal informed consent was obtained before inclusion in the assessment. Participants completed self-administered questionnaires on hand-held computers, providing information on demographic and behavioral characteristics. Oral fluid samples

were collected using the OraSure Salivary Collection Device (OraSure Technologies, Inc, Bethlehem, PA) for HIV-antibody testing. Samples were tested at a dilution ratio of 1:2 in single wells by an enzyme immunoassay (EIA) (Oral Fluid Vironostika HIV Microelisa System; Organon Teknika Corp, Durham, NC). In 2003 and 2005, samples positive for HIV antibodies were retested with Western blot (OraSure HIV-1 Western Blot; OraSure Technologies, Inc, Bethlehem, PA), and if positive were considered oral fluid HIV positive. In 2007, positive samples were retested with EIA in duplicate and if reactive in both wells, were considered oral fluid HIV positive. After completion of the survey, men received a bar-coded card to retrieve their HIV test results at a mobile clinic at the recruitment venue 1 week later and at a fixed clinic for a period of up to 3 months. All who returned were counseled and those with a positive HIV test result were offered confirmatory EIA serum testing and referred for medical services according to Thai national guidelines.

Estimates of annual HIV incidence density in young MSM (22 years and younger) were derived according to a method developed by Osmond et al¹¹: [number HIV infections/sum of (current age–age at start of anal intercourse)]. Because 15-year to 17-year olds were not eligible for enrollment in 2003, HIV incidence calculations were repeated excluding 15-year to 17-year olds in 2005 ($n = 4$) and 2007 ($n = 2$). Because this did not change the estimated annual HIV incidence density in the youngest age group, all participants were included in the analysis.

HIV prevalence was determined by dividing the number of HIV positives by the total number of participants and then multiplying by 100. HIV prevalence estimates did not change after excluding 15-year to 17-year olds in 2005 and 2007. Therefore, in all years, all participants were retained in the HIV prevalence analysis.

Logistic and Poisson regression analyses were used to evaluate differences and trends in demographic characteristics, HIV prevalence, risk behavior, and estimated HIV incidence although adjusting for venue-day-time cluster sampling (31 clusters in 2003, 20 in 2005, and 25 in 2007). STATA 9.0 (Version 9.1, 2005; STATA Corp, College Station, TX) was used for all data analysis.

Ethical Review

The protocol of the current study was reviewed by the US Centers for Disease Control and Prevention and determined a surveillance activity, which, subsequently, did not require further ethical review. It was reviewed and approved by the Ethical Review Committee of the Thailand Ministry of Public Health.

Role of the Funding Source

The protocol of this study and the current article were reviewed and approved by the US Centers for Disease Control and Prevention.

RESULTS

Demographic and Behavioral Characteristics

In 2007, MSM participants were generally young (62.5% ≤ 28 years old), had at least vocational education

(96.5%), and were born outside Bangkok (60.5%). Approximately one third of participants were recruited from entertainment venues (bar/disco) (36.0%), one-third from saunas (31.0%), and one-third from parks (33.0%). There were no differences in these characteristics between the 3 survey years (Table 1).

Trends in HIV Prevalence

The HIV prevalence was 17.3% in 2003, 28.3% in 2005, and 30.8% in 2007 ($P < 0.001$ for trend). The HIV prevalence significantly increased between 2003 and 2005 ($P < 0.001$) but not between 2005 and 2007 ($P = 0.57$) (Table 2). Among MSM, 15–22 years old, the HIV prevalence was 12.9% in 2003, 22.3% in 2005, and 22.2% in 2007 ($P < 0.03$ for trend); among 23-year to 28-year olds, it was 17.5% in 2003, 30.5% in 2005, and 29.1% in 2007 ($P < 0.008$ for trend); and among those ≥ 29 years, it was 20.8% in 2003, 29.7% in 2005, and 38.0% in 2007 ($P < 0.001$ for trend). The HIV prevalence significantly increased in all age groups between 2003 and 2005 (all $P < 0.05$), but not between 2005 and 2007 (all $P > 0.1$) (Table 2).

Among men recruited from entertainment venues, the HIV prevalence was 13.0% in 2003, 23.0% in 2005, and 29.2% in 2007 ($P < 0.006$ for trend); among men recruited from saunas, it was 16.9% in 2003, 31.9% in 2005, and 29.0% in 2007 ($P < 0.001$ for trend); and among men recruited from parks, it was 22.0% in 2003, 29.6% in 2005, and 34.1% in 2007 [$P = 0.062$ for trend (not significant)]. The HIV prevalence significantly increased between 2003 and 2005 at entertainment venues and saunas ($P < 0.007$ and $P = 0.001$, respectively) but not in parks ($P = 0.13$); there were no significant increases between 2005 and 2007 (all $P > 0.3$) (Table 2).

Trends in Estimated HIV Incidence Density

Among 15-year to 22-year old men, the mean age at start of anal intercourse (17 years) and current age (21 years) did not differ between the 3 survey years. Using the number of person-years since age at start of anal sexual intercourse as the denominator, the estimated annual HIV incidence density in 15-year to 22-year olds was 4.08 in 2003, 6.42 in 2005, and 7.69 in 2007 ($P < 0.02$ for trend) (Table 3). The increases in estimated HIV incidence between 2003 and 2005 and between 2005 and 2007 were not statistically significant ($P = 0.07$ and $P = 0.48$, respectively).

Trends in Risk Behavior

Between 2003 and 2007, there were no significant changes in the percentage of MSM reporting alcohol use during the past 3 months (73.7% in 2003, 81.2% in 2005, and 77.5% in 2007) (Table 1). Upward trends were seen in reports of drug use (mostly amphetamine-type stimulants and benzodiazepines) in the past 3 months (3.6% in 2003, 17.5% in 2005, and 20.8% in 2007; $P < 0.001$ for trend); use of drugs during last sex (0.7% in 2003, 1.5% in 2005, and 5.5% in 2007; $P < 0.001$ for trend); sex in exchange for receipt of money, favors or valuables (2.0% in 2003, 17.0% in 2005 and 17.3% in 2007; $P < 0.001$ for trend), self-reported history of sexually transmitted infections [sexually transmitted

infection (STI); genital ulcer and/or discharge] (3.1% in 2003, 18.5% in 2005, and 16.0% in 2007; $P < 0.001$ for trend) having ever undergone an HIV test (43.8% in 2003, 49.4% in 2005, and 52.3% in 2007; $P = 0.04$ for trend) and unwillingness to disclose HIV status (6.3% in 2003, 12.6% in 2005 and 25.9% in 2007; $P < 0.001$ for trend) (Table 1). Of those who were unwilling to disclose their HIV status, 35.6% tested HIV positive in 2003, 45.6% in 2005, and 45.6% in 2007 ($P = 0.33$ for trend). Downward trends were seen in the percentage of reports of anal intercourse (97.9% in 2003, 95.7% in 2005, and 87.5% in 2007; $P < 0.001$ for trend), having 1 or more casual (65.3% in 2003, 51.1% in 2005, and 38.5% in 2007; $P < 0.001$ for trend) and steady male sexual partners during the past 3 months (45.9% in 2003, 34.1% in 2005, and 27.8% in 2007; $P < 0.001$ for trend) (Table 1). No changes were seen in reports of ever having had sex with a woman (37.0% across surveys; $P = 0.22$ for trend) and of always using condoms with male intercourse partners (64.0% across surveys; $P = 0.61$ for trend) (Table 1).

DISCUSSION

Our data suggest that after a strong increase from 17.3% in 2003 to 28.3% in 2005, the HIV prevalence among MSM attending venues in Bangkok may have begun to level off at around 30% in 2007. This pattern was consistent across all age groups and at all recruitment venues. This may imply that the increased preventive interventions in the past several years may have been able to decrease HIV incidence. Nevertheless, our data show continuing HIV transmission, particularly among the youngest men. This points at a possible equilibrium between the number of new infections and the number of HIV-infected men exiting the population. As Thailand is rolling out its universal access to antiretroviral treatment program, MSM will become less and less likely to exit the population for reasons of HIV and AIDS-related morbidity and mortality. Normally, this would lead to an increase in HIV prevalence, unless fewer people become HIV infected. Future studies are needed to confirm or reject the hypothesis that the HIV prevalence in MSM in Bangkok is stabilizing.

Despite some indications for a possible stabilization in HIV prevalence, the continued high estimated HIV incidence in the youngest MSM is a reason for grave concern. These men have been sexually active only for a short period; and the combination of strong sexual desires, sexual opportunities, and HIV risk factors and behaviors in this population is likely fuelling this epidemic. Unprotected sex, multiple sex partners, STI, high background HIV prevalence, and a relatively large number of men in the primary stages of infection all probably contribute to the high estimated HIV incidence in the youngest MSM. Other factors may include alcohol and drug use, sex in exchange for money, and the increasing number of venues for recreational sex in Bangkok.

Our analysis of trends in HIV risk behaviors showed mixed results. The proportion of men reporting anal intercourse and casual or steady sexual partners in the past 3 months decreased, and an increasing proportion of men reported ever having had an HIV test. These are positive developments and suggest that behavioral change is possible,

TABLE 1. Demographic and Behavioral Characteristics of MSM in Bangkok, 2003–2007

Characteristic	2003		2005		2007		P
	n	(%)	n	(%)	n	(%)	
Overall	1121	(100)	399	(100)	400	(100)	—
Age group							
15–22 years	318	(28.4)	94	(23.6)	99	(24.8)	0.43
23–28 years	428	(38.2)	177	(44.4)	151	(37.8)	
29 years and above	375	(33.5)	128	(32.1)	150	(37.5)	
Education							
Primary or less	38	(3.4)	12	(3.0)	14	(3.5)	0.16
Vocational	609	(54.3)	177	(44.4)	188	(47.0)	
University	474	(42.3)	210	(52.6)	198	(49.5)	
Birthplace							
Bangkok	375	(33.5)	118	(29.6)	158	(39.5)	0.10
Outside Bangkok	746	(66.5)	281	(70.4)	242	(60.5)	
Recruitment venue							
Entertainment	376	(33.5)	126	(31.6)	144	(36.0)	0.99
Sauna	367	(32.7)	138	(34.6)	124	(31.0)	
Park	378	(33.7)	135	(33.8)	132	(33.0)	
Alcohol use (past 3 months)							
Yes	826	(73.7)	324	(81.2)	310	(77.5)	0.134
No	295	(26.3)	75	(18.8)	90	(22.5)	
Drug use (past 3 months)							
Yes	40	(3.6)	70	(17.5)	83	(20.8)	<0.001
No	1081	(96.4)	329	(82.5)	317	(79.2)	
Drug use (last sex)							
Yes	8	(0.7)	6	(1.5)	22	(5.5)	<0.001
No	1113	(99.3)	393	(98.5)	378	(94.5)	
Usual anal sex role							
Insertive only	525	(46.8)	137	(34.3)	163	(40.8)	<0.001
Receptive only	197	(17.6)	106	(26.6)	86	(21.5)	
Versatile	376	(33.5)	139	(34.8)	101	(25.3)	
Any anal sex	1098	(97.9)	382	(95.7)	350	(87.5)	
No anal sex	23	(2.1)	17	(4.3)	50	(12.5)	
Had male casual partner(s) (past 3 months)							
Yes	732	(65.3)	204	(51.1)	154	(38.5)	<0.001
No	389	(34.7)	195	(48.9)	246	(61.5)	
Had male steady partner(s) (past 3 months)							
Yes	514	(45.9)	136	(34.1)	111	(27.8)	<0.001
No	607	(54.1)	263	(65.9)	289	(72.3)	
Condom use with all male steady and casual partners (past 3 months)*							
Always	585	(63.2)	165	(65.7)	124	(65.6)	0.61
Not always	341	(36.6)	86	(34.3)	65	(34.4)	
Sex in exchange for money, gifts or favors with male partner (past 3 months)							
Yes	22	(2.0)	68	(17.0)	69	(17.3)	<0.001
No	1099	(98.0)	331	(83.0)	331	(82.7)	
Self-reported genital ulcer or unusual discharge (past 3 months)							
Yes	35	(3.1)	74	(18.5)	64	(16.0)	<0.001
No	1086	(96.9)	325	(81.5)	336	(84.0)	
Had sex with a woman (ever)							
Ever	404	(36.0)	137	(34.3)	169	(42.3)	0.22
Never	717	(64.0)	262	(65.7)	231	(57.8)	
Had HIV test (ever)							
Ever	491	(43.8)	197	(49.4)	209	(52.3)	0.04
Never	630	(56.2)	202	(50.6)	191	(47.8)	

TABLE 1. (continued) Demographic and Behavioral Characteristics of MSM in Bangkok, 2003–2007

Characteristic	2003		2005		2007		P
	n	(%)	n	(%)	n	(%)	
HIV test result							
Not tested	630	(56.2)	202	(50.6)	191	(47.8)	<0.001
Negative	461	(41.1)	166	(41.6)	156	(38.9)	
Positive	1	(0.09)	9	(2.3)	10	(2.5)	
Would not disclose†	29	(6.3)	22	(12.6)	43	(25.9)	<0.001
Tested HIV positive in current survey‡	10	(34.5)	10	(45.5)	20	(46.5)	

*Among those with steady and casual sexual partners.

†Among those who were tested before.

‡Among those who would not disclose.

but it remains to be seen to what extent they will be able to significantly reduce or stop the spread of HIV infection among MSM. It is unlikely that the increased reporting of protective behaviors is due to men reporting the normative, for example, socially desirable answers. Our data were collected using hand-held computer-assisted self-interviews, which has been shown to increase more candid and reliable self-reports of sensitive behaviors.¹² A likely absence of perceived pressure to report positive behaviors can also be derived from the lack of increasing reports of condom use and from increasing reports of drug use, drug use during sex, and sex in exchange for money. The absence of an increase in condom use is disappointing, particularly in combination with the increasing trend in self-reports of STI. Lack of condom use and STI are closely related to each other and are strong risk factors for both the acquisition and transmission of HIV infection.^{13,14} Drug use in general, and particularly drug use during sex, are widely known to impair judgment and to increase the risk for HIV infection among MSM, particularly if combined with erectile enhancement drugs.¹⁵ The increase in drug use observed in this study is likely due to the increased availability and demand for methamphetamine crystal (ice) on the Thai market,¹⁶ which is mainly used by MSM to increase and prolong sexual pleasure.¹⁵ Use of erectile enhancement drugs was rare in our study population (data not shown), but the increasing levels of drug use during sex in the Thai MSM community should be closely monitored for timely intervention.

We do not have any clear explanation for the increasing trend in sex in exchange for money reported by study

participants. The relatively high proportion of men reporting this type of behavior needs to be understood in the Thai cultural context of reciprocity and compensation in sexual relationships, which is also common outside the MSM community. These types of relationships would not be viewed as sex work or prostitution by the Thai general audience.¹⁷

A negative finding was the increasing proportion of study participants who were not willing to disclose their HIV status. This may be the result of an increasing number of men who have tested HIV positive and who are not willing to reveal this to others. Even though Thai culture is relatively tolerant toward homosexual behavior, HIV infection remains highly stigmatized and many men may therefore be reluctant to disclose this.¹⁸ Indeed, as our data show, more than 35% to 45% of those who were unwilling to disclose their HIV status tested HIV positive in the 3 survey years. This is problematic because openness about HIV infection and the visible presence of HIV-infected people in the MSM community would probably help to create increased awareness of the problem and facilitate behavioral risk reduction.

The results presented here are subject to a number of limitations. First of all, our assessments were conducted among MSM present at venues, and thus men who do not attend venues or who attend venues that were not included in the assessment were not enrolled. These men might have different risk behaviors and different HIV prevalence. Second, men who attend the selected venues frequently might have higher HIV prevalence and may have been more likely to be included in this assessment than men attending venues

TABLE 2. HIV Prevalence by Age Group and Recruitment Venue in MSM, Bangkok, 2003–2007

Characteristic	2003		2005		2007		P Value for Trend	P Value 2003–2005	P Value 2005–2007
	HIV Prevalence n/N	(%)	HIV Prevalence n/N	(%)	HIV Prevalence n/N	(%)			
Overall	194/1121	(17.3)	113/399	(28.3)	123/400	(30.8)	<0.001	<0.001	0.57
Age group, yrs									
15–22	41/318	(12.9)	21/94	(22.3)	22/99	(22.2)	<0.03	<0.03	0.98
23–28	75/428	(17.5)	54/177	(30.5)	44/151	(29.1)	0.008	0.006	0.84
≥29	78/375	(20.8)	38/128	(29.7)	57/150	(38.0)	0.001	<0.02	0.16
Venue									
Entertainment	49/376	(13.0)	29/126	(23.0)	42/144	(29.2)	<0.006	0.007	0.38
Sauna	63/367	(16.9)	44/138	(31.9)	36/124	(29.0)	0.001	0.001	0.58
Park	83/378	(22.0)	40/135	(29.6)	45/132	(34.1)	0.06	0.13	0.62

TABLE 3. Current Age, Age at Start of Anal Intercourse and Estimated Annual HIV Incidence Density Among 15-year-old to 22-year-old MSM, Bangkok, 2003–2007

	2003, n = 318	2005, n = 94	2007, n = 99	P
Current age (mean)	20.5	20.7	20.5	0.4
Age at start of anal intercourse (mean)	17.3	17.1	17.2	0.46
Number HIV positive	41	21	22	ND
No. person-years at risk	1006	327	286	ND
Estimated HIV incidence density	4.08	6.42	7.69	0.02

ND, not done.

infrequently. However, no associations between frequency of attendance and HIV prevalence could be established, and we therefore did not weight the HIV prevalence for venue attendance in our analysis. It may have also been possible that some men enrolled more than once at different venues. This possibility is unlikely, however, because data collection periods were relatively brief (2 weeks), and travel among venues in Bangkok is uncommon due to traffic and other barriers. Finally, our data consist of 3 cross-sectional assessments, and no longitudinal or paired analysis could be performed, limiting causal inference, for example, it is unknown whether behaviors and the changes therein occurred before or after prevalent HIV infection was established.

The high HIV prevalence among MSM in Bangkok is not a phenomenon observed in Thailand alone. It is part of a global picture of resurgent and newly described epidemics of HIV infection among MSM in North and South America, Europe, Africa, and Asia.¹⁹ More often than not, MSM have multiple times the HIV prevalence of the general population and contribute a number of cases disproportionate to their population size.²⁰ Even though some encouraging signs of a possible epidemic plateau of HIV infection were observed among MSM in Bangkok, additional prevention efforts are needed. In the absence of proven biomedical interventions, efforts should include improved access to HIV testing and treatment, programs for behavioral risk reduction and promotion of condom use, drug use education, STI control, destigmatization of HIV infection, community mobilization, and emphasis of individual responsibility. Whether these, or the combinations of these interventions, will be enough to reverse the ongoing HIV epidemic among MSM remains to be seen.

ACKNOWLEDGMENTS

The authors would like to acknowledge the helpful assistance from the owners and managers of the venues included in this assessment; from the staff of the HIV/AIDS Research Program and the Global AIDS Program, Thailand Ministry of Public Health—US Centers for Disease Control and Prevention Collaboration, the Bureau of Epidemiology and STI Cluster, Bureau of AIDS, TB and STI, Bangrak Hospital, Thailand Ministry of Public Health, the AIDS Research Centre of the Thai Red Cross Society, and the Rainbow Sky Association of Thailand. The authors also would

like to express their sincere gratitude to the men who participated in this study.

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