

# The Epidemiology of Human Immunodeficiency Virus Infection, Sexually Transmitted Infections, and Associated Risk Behaviors Among Men Who Have Sex With Men in the Mekong Subregion and China: Implications for Policy and Programming

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**Background:** Little systematic knowledge is available regarding risk behaviors and the prevalence of human immunodeficiency virus (HIV) and sexually transmitted infections (STI) in populations of men having sex with men (MSM) in the Mekong Subregion and China.

**Methods:** Data on HIV/STI prevalence and risk behavior of MSM in the region were collected through internet searches, were summarized and assessed for their policy and programming implications.

**Results:** Twenty-four articles, reports and abstracts of research studies were identified for review. High levels of HIV, STI and associated risk behavior were reported among MSM throughout the region. The HIV prevalence among MSM in urban areas varied between 5.5% and 28.3% in Thailand and Cambodia and between 0.0% and 9.4% in Vietnam and China. No HIV/STI prevalence data were available for Lao PDR and Myanmar.

**Conclusion:** Levels of HIV/STI prevalence and risk behavior among MSM in the Mekong Subregion and China are high. Continued monitoring and surveillance and targeted preventive interventions are necessary to stop the spread of HIV in this vulnerable population.

Although the epidemic of human immunodeficiency virus (HIV) infection among men who have sex with men (MSM) in the industrialized world has been documented in detail since the beginning of the 1980s,<sup>1</sup> the spread of HIV among MSM in the Mekong subregion and China has been described only fairly recently.<sup>2-4</sup> Epidemiologic data regarding the prevalence of HIV in MSM can be found scattered

throughout the region, but no comprehensive picture of the role of male-to-male transmission of HIV within the context of the overall HIV epidemic in this part of the world exists. This hampers efforts to mobilize international and national commitment for expanding HIV preventive strategies for MSM, and impedes strategic allocation of resources for HIV interventions.

This article summarizes what is known about the epidemiology of HIV, sexually transmitted infections (STI), and associated risk behaviors among MSM in China, Vietnam, Lao People's Democratic Republic (Lao PDR), Cambodia, Myanmar, and Thailand as well as discusses implications for policy and programming.

## METHODS

Data on HIV/STI prevalence and sexual behavior of MSM were collected through internet searches (PubMed, abstract databases of International AIDS Conferences) and the HIV prevalence database of the U.S. Census Bureau.<sup>5</sup> Criteria for inclusion were that studies had to include HIV and/or STI prevalence data or associated risk behaviors among MSM populations in Thailand, Lao PDR, Cambodia, Myanmar, Vietnam, or China; had a sample size of >50; listed information about their study design, data collection, and sampling technique. In addition, studies had to be published in a peer-reviewed journal or as an abstract in the proceedings of international conferences with a peer-reviewed abstract selection process. If studies were commissioned by international donor-agencies or international non-governmental organizations they were also included. Studies were limited to those reporting in the English language. Studies presenting data collected before January 1, 2000, were excluded; the cut-off date for our search was December 31, 2007. The following search terms were used: "homosexual, men" or "homosexual," cross-referenced with the key word (and) "HIV" or "human immunodeficiency virus" or the term "STI" or "STIs," in combination with the countries listed above. Additional search terms used were: "male-to-male sex," "MSM," "men who have sex with men," "male sex work(er) (MSW)," "transgender," "homosexual(ity)."

In general, in this article, "MSM" refers to any human who has sex with a human, including transgender (TG) and male sex workers (MSW), unless a distinction is explicitly made between these categories.

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**TABLE 1.** HIV Prevalence Data Among MSM From Cambodia, China, Thailand, and Vietnam, 2000–2007 (No Data Available for Myanmar and Lao PDR)\*

Year	Cambodia		China		Thailand		Vietnam	
	Location [ref]	% (N)	Location [ref]	% (N)	Location [ref]	% (N)	Location [ref]	% (N)
2000	Phnom Penh (MSW) [3]	14.4 (206)	N/A		N/A		Ho Chi Minh City [14]	5.8 (208)
2001	N/A		Heilongjiang [11]	1.3 (215)	N/A		N/A	
2002	N/A		Heilongjiang [11]	1.4 (140)	N/A		N/A	
			Harbin [12]	1.3 (154)				
2003	N/A		Beijing [2]	3.1 (481)	Bangkok [4]	17.3 (1,121)	N/A	
			Jiangsu [8]	0.0 (144)				
2004	N/A		Beijing [9]	0.4 (325)	N/A		Ho Chi Minh City [15]	8.0 (600)
			Heilongjiang [11]	1.4 (148)				
			Harbin [12]	0.9 (320)				
2005	Phnom Penh & Provinces [13]	2.6 (348)	Beijing [9, 10]	4.6 (427)	Bangkok [17]	28.3 (399)	N/A	
	Phnom Penh & Provinces (TG) [13]	9.8 (193)	Shanghai [7]	1.5 (477)	Chiangmai [17]	15.3 (222)		
				3.2 (526)	Phuket [17]	5.5 (200)		
				4.6 (427)	Bangkok (MSW) [17]	18.9 (350)		
				3.2 (526)	Chiangmai (MSW) [17]	11.4 (202)		
				1.5 (477)	Phuket (MSW) [17]	14.4 (202)		
					Bangkok (TG) [17]	11.5 (200)		
					Chiangmai (TG) [17]	17.6 (148)		
					Phuket (TG) [17]	11.9 (126)		
2006	N/A		Guangzhou [6]	0.0 (200)	Bangkok [18]	22.5 (850)	Ho Chi Minh City [16]	5.3 (393)
			Beijing [10]	5.8 (540)			Hanoi [16]	9.4 (397)
			Harbin [12]	2.2 (674)			N/A	
2007	N/A		N/A		N/A		N/A	

\*All data are on “general” men who have sex with men (MSM), unless marked “MSW” (male sex workers) or “TG” (transgenders).

## RESULTS

### Epidemiologic Data Regarding HIV and STI Among MSM

Between 2000 and the end of 2007, data on HIV and STI among MSM has been reported from China, Thailand, Cambodia, and Vietnam, but not from Myanmar and Lao PDR. HIV prevalence in MSM differed across study sites and MSM subpopulations, ranging from 0% to 5.8% in China,<sup>2,6–12</sup> 2.6% to 14.4% in Cambodia,<sup>3,13</sup> 5.3% to 9.4% in Vietnam,<sup>14–16</sup> and 5.5% to 28.3% in Thailand<sup>4,17,18</sup> (Table 1).

In 2000 and 2005, in Phnom Penh and 2 provincial towns in Cambodia, 0.0% to 1.7% of MSM tested positive for current syphilis and 5.5% for *Treponema pallidum* antibodies; 0.3% to 1.8% had rectal and 0.4% to 4.8% had urethral *Neisseria gonorrhoeae*; 1.0% to 6.0% tested positive for rectal and 1.2% to 7.2% for urethral *Chlamydia trachomatis*.<sup>3,13</sup> No data on herpes simplex virus Type 1 or 2 (HSV-1 or HSV-2) infection or on hepatitis A virus (HAV), hepatitis B virus (HBV), and hepatitis C virus (HCV) were found for Cambodia (Table 2).

In 2003 to 2006, in several cities in China, 4.7% to 12.4% of MSM surveyed had current syphilis infection,<sup>8,9</sup> 10.5% to 18.8% had *T. pallidum* antibodies,<sup>6–8,10</sup> 2.7% had urethral *N. gonorrhoeae*, 8.0% had urethral *C. trachomatis*, and 27.7% had nonchlamydial nongonococcal urethritis; 7.8% had HSV-2 antibodies.<sup>8</sup> Between 7.5% to 17.5% MSM had evidence of HBV infection (hepatitis B surface antigen positive) and 0.0% to 5.2% had evidence of HCV infection (hepatitis C surface antigen positive).<sup>6,8,9</sup> No data on HAV, HSV-1, or rectal STI were found (Table 2).

In a cohort study among MSM in Bangkok, Thailand, since 2006, 2.6% were reactive for *T. pallidum*, 1.9% for

urethral *N. gonorrhoeae* and 3.4% for urethral *C. trachomatis*. Over half (52.8%) had antibodies against HSV-1 and nearly a fifth (17.9%) had antibodies against HSV-2. The prevalence of antibodies against HAV, HBV (antisAg and/or antic), and HCV was 26.8%, 50.8%, and 1.0%, respectively.<sup>18</sup> No data on rectal STIs were found.

In Vietnam in 2006, 0.1% to 1.7% of MSM had current syphilis, 6.7% to 11.5% had rectal and 1.7% to 3.1% had urethral *N. gonorrhoeae* whereas 3.8% to 5.4% tested positive for rectal and 5.0% to 7.6% for urethral *C. trachomatis*.<sup>16</sup> No data on HSV-1 or 2 infection or on HAV, HBV, HCV infection were found (Table 2).

### Risk Behavior Data Among MSM

Behavioral data (Table 3) indicate that most MSM reported practicing anal sex, although the levels varied between countries.<sup>3,10,13,18–20</sup> Condom use was universally inconsistent, with 26.0% to 78.1% reporting unprotected anal intercourse in the past 6 months across different partner types.<sup>6–10,13,16,18–23</sup> Most MSM in these studies reported having multiple male sexual partners.<sup>6,8–10,14,18,20,21</sup> Paying or receiving money for sex was common,<sup>3,7,10,16,17,19,21</sup> and a substantial proportion reported having female partners as well.<sup>3,6,8,13,15,19,20,23</sup> MSM often reported more than 1 steady partner over a time frame of a few months, with whom lower levels of condom use were reported than with casual or commercial ones (analysis of this data not shown). Lastly, there was low awareness of current HIV serostatus among MSM, due to a limited uptake of HIV testing, ranging from 14.9% among MSM in China to 60.1% among MSM in Thailand.<sup>3,9,15–17,21,24,25</sup> Only 19.4% of the MSM testing HIV-positive in a recent survey in Thailand and 6.7% in China were aware of their current HIV status before they were tested<sup>17,24</sup> (Table 3).

**TABLE 2.** STI Prevalence in MSM in Cambodia, China, Thailand, and Vietnam, 2000–2007 (No Data Available for Myanmar and Lao PDR)\*

STI	Cambodia		China		Thailand		Vietnam	
	City, yr [ref]	% (N)	City, yr [ref]	% (N)	City, yr [ref]	% (N)	City, yr [ref]	% (N)
Current syphilis	Phnom Penh & Provinces 2005 [13]	1.7 (299) 0.0 (249)	Jiangsu 2003 [8] Beijing 2004 [9] Beijing 2005 [9] Beijing 2006 [9]	6.9 (144) 4.7 (325) 12.4 (427) 9.9 (540)			Hanoi 2006 [16] Ho Chi Minh City 2006 [16]	0.1 (397) 1.7 (393)
Ever syphilis	Phnom Penh (MSW) 2000 [3]	5.5 (206)	Jiangsu 2003 [8] Shanghai 2005 [7] Beijing 2005 [10] Guangzhou 2006 [6]	18.8 (144) 13.5 (475) 11.2 (526) 10.5 (200)	Bangkok 2007 [18]	2.6 (420)		
Rectal N gon.	Phnom Penh (MSW) 2000 [3] 2005 [13] & Provinces 2005 [13]	0.3 (206) 1.8 (299) 0.4 (249)					Hanoi 2006 [16] Ho Chi Minh City 2006 [16]	11.5 (397) 6.7 (393)
Urethral N gon.	Phnom Penh (MSW) 2000 [3] Phnom Penh & Provinces 2005 [13]	4.8 (206) 0.7 (299) 0.4 (249)	Jiangsu 2003 [8] <sup>†</sup>	2.7 (112)	Bangkok 2007 [18]	1.9 (414)	Hanoi 2006 [16] Ho Chi Minh City 2006 [16]	3.1 (397) 1.7 (393)
Rectal C. trach.	Phnom Penh (MSW) 2000 [3] Phnom Penh & Provinces 2005 [13]	1.0 (206) 4.9 (299) 6.0 (249)					Hanoi 2006 [16] Ho Chi Minh City 2006 [16]	5.4 (397) 3.8 (393)
Urethral C trach.	Phnom Penh (MSW) 2000 [3] Phnom Penh & Provinces 2005 [13]	7.2 (206) 2.7 (299) 1.2 (249)	Jiangsu 2003 [8] <sup>†</sup>	8.0 (112)	Bangkok 2007 [18]	3.4 (414)	Hanoi 2006 [16] Ho Chi Minh City 2006 [16]	7.6 (397) 5.0 (393)
HSV-1					Bangkok 2007 [18]	52.8 (405)		
HSV-2			Jiangsu 2003 [8]	7.8 (90)	Bangkok 2007 [18]	17.9 (418)		
HAV					Bangkok 2007 [18]	26.8 (406)		
HBV			Jiangsu 2003 [8] Beijing 2004 [9] Beijing 2005 [9] Beijing 2006 [9] Guangzhou 2006 [6]	9.1 (99) 7.5 (325) 8.0 (427) 10.3 (540) 17.5 (200)	Bangkok 2007 [18]	50.8 (376)		
HCV			Jiangsu 2003 [8] Beijing 2004 [9] Beijing 2005 [9] Beijing 2006 [9] Guangzhou 2006 [6]	0.0 (93) 0.4 (325) 1.3 (427) 5.2 (540) 1.0 (200)	Bangkok 2007 [18]	1.0 (417)		

\*All data are on “general” men who have sex with men (MSM), unless marked “MSW” (male sex workers) or “TG” (transgenders).

<sup>†</sup>In this study, 27.7% had nonchlamydial, nongonococcal urethritis (N = 112).

STI indicates sexually transmitted infections; N Gon, *Neisseria gonorrhoeae*; C Trach, *Chlamydia trachomatis*; HSV-1/HSV-2, infection with herpes simplex virus type 1 or 2, respectively; HAV/HBV/HCV, infection with hepatitis A, B, and C virus, respectively.

## DISCUSSION

The high HIV prevalence seen in MSM in some urban centers in the region demonstrates that HIV transmission among MSM plays a significant role in national Asian epidem-

ics, especially if compared to the prevalence in the general adult population. In every country for which data are available, the HIV prevalence among MSM is several times the prevalence in the population at large. MSM throughout the region

**TABLE 3.** Behavioral Data Among MSM in the Mekong Subregion and China, 2000–2007\*

Behavior	Cambodia	China	Lao PDR	Thailand	Vietnam
Anal sex with men in the past 1/6 mo (M) (%)	80.1 (6M) [3] 69 <sup>†</sup> (Phnom Penh) 94 <sup>†</sup> (1M) (Provinces) [13]	98.7 (6M) [10] 37.5 (6M) [20]	55.0 (ever) [23]	MSM 83.6 (6M) [18]	
Unprotected anal intercourse with men in the past 1/3/6 mo/last client/partner (%)	48.4 (1M) [3] 37 <sup>†</sup> (Phnom Penh) 82 <sup>†</sup> (1M) (Provinces) [13]	54.7 (6M) [6] 56.0 (6M) [7] 46.2 (3M) [8] 61 <sup>†</sup> (6M) [22] 42.1–49.8 (6M) [9] 76.4–78.1 regular partner, 58.6–64.6 casual partner (6M) [10] 67 <sup>†</sup> (6M) [20] 49.4 (6M) [21]	MSM Casual partner 66.3 Steady partner 55.3 TG Casual partner 70.0 Steady partner 64.7 (6M) [19] Last partner 26 <sup>†</sup> [23]	MSM 31.7 MSW 40.2 TG 41.1 (3M) [18]	MSW with last client: Hanoi 55.8 Ho Chi Minh City 71.5 MSM with last casual partner: Hanoi 75.5 Ho Chi Minh City 54.4 [16]
No. male sexual partners in the past 1/3/6 mo or lifetime (%)		>2 38.8 (6M) [7] >4 34.7 (3M) [8] 2–9 53.6 >10 30.3 (6M) [9] >10 40.9 (lifetime) [10] 3–5 30.9 >6 30.3% (6 M) [21]		Steady partners MSM 1.5, MSW 2.7 TG 2.7 Casual partners MSM 4.2, MSW 12.2, TG 7.4 (3M) [17]	3.3 (1M) [14]
Commercial sex (%) ever	58 R (Phnom Penh) 41 R (Provinces) [13]	24.3 R, 9.8 P [21] 8.6 R, 4.2 P [10]		MSM 36.9 R, 30.8 P MSW 81.4 R, 41.0 P TG 61.3 R, 30.3 P <sup>†</sup> [18]	21.8 P (Ho Chi Minh City) 40.7 P (Hanoi) [16]
Sex with women (%) in the past 1/3/6/12 mo or ever	61.0 (6M) [3] 41 <sup>†</sup> (12M) [13] 40 <sup>†</sup> (12M) [13]	13 <sup>†</sup> married, 25 <sup>†</sup> (6M) [7] 25.9 married, 31.8 (6M) [6] 10.6 (6M), 33.3 ever [7] 28.9 ever [10] 14.9 married, 64.5 ever, 30.5 (6M) [21]	54.1 female partner 43.2 FSW (6M) [19]	MSM 15.2 MSW 43.1 TG 0.6 (3M) [17]	MSM (Hanoi) 39.5 MSM (Ho Chi Minh City) 40.0 (12M) [16]
Ever tested for HIV (%)	20 <sup>†</sup> [3]	14.9 (2005), 19.8 (2006) [9] 18.3 [21] 18 <sup>†</sup> (2001–2002) [24] 15.5 (6M) [25]		MSM 43.4 MSW 60.1 TG 46.6 [17]	19 <sup>†</sup> [15] 20.1 MSM (Hanoi) 24.0 MSM (Ho Chi Minh City) [16]

\*The Mekong Subregion consists of Cambodia, Lao PDR, Myanmar, Thailand and Vietnam. In some studies MSM may include TG and MSW.

<sup>†</sup>Data were presented in the original document without digit(s).

MSM indicates men who have sex with men; MSW, male sex workers; TG, transgender; M, months; R, received money; P, paid money.

also appear at substantial risk for a variety of STI, reflecting the underlying behavioral risk as well as the potential of STI to further accelerate the spread of HIV.

The reasons behind the emergence and growth of HIV epidemics among MSM may include the relative ease with which HIV can be transmitted through penile-anal sex (as compared to penile-vaginal sex),<sup>26,27</sup> a high prevalence of STI, low levels of consistent condom use, high partner change rate, and little awareness of current HIV infection status among MSM and MSW. Stigma and discrimination against MSM, limited self-organization, and lack of MSM-friendly HIV and STI clinical services probably further contribute to the spread of HIV. The increasing use of the internet for accessing new partners may be an additional catalyst, and many urban areas

offer environments that provide MSM easy access to large numbers of partners (for example, in saunas, bars, and public areas), where access to condoms and lubricants is often limited.

In most Asian countries, studies on HIV and STI prevalence and risk behavior among MSM were conducted once – and in a few 2 or 3 times. Studies from Thailand and China show that repeated measurements with similar methodologies are helpful in describing trends in HIV prevalence and may be used as tools for advocacy and the evaluation of prevention programs.

MSM are now included in the national strategic HIV plans of the majority of countries, but despite this, a recent report estimated that only 2% of MSM in Southeast Asia (including the Mekong countries) and 8% of MSM in China

had access to HIV prevention, care and support services.<sup>28</sup> It is likely that the HIV prevalence among MSM in the Mekong Subregion and China will continue to grow, unless quality prevention programs are brought to scale rapidly.

### Implications for Policy and Programming

The behavioral data presented here show that consistent condom use in anal sex remains low in most places, whereas partner change rate remains high. If efforts to raise consistent condom use in anal intercourse are improved and expanded, it is likely that the number of new HIV infections among MSM will decrease.

The majority of MSM in the region do not know their HIV status and are thus less likely to take preventive measures to protect their partners.<sup>29</sup> Lack of knowledge of serostatus also limits access of MSM to programs for HIV treatment and care, including access to antiretroviral (ARV) treatment. Recent improvements in access to ARV drugs in Asia provide a potentially powerful incentive for MSM to get tested. However, without policy efforts to destigmatize same-sex behavior and HIV, it is unlikely that increased HIV testing among MSM will easily be achieved.

Further operational research is needed, for example, on the possibility of promoting structural interventions at MSM entertainment venues, where HIV prevention and awareness is integrated into the environments where MSM meet,<sup>30–33</sup> or on how to reach men dating through the internet and the extent to which their networks overlap with venue-based networks.<sup>34–37</sup> Other research questions concern the applicability to Asian contexts of more comprehensive, multisectoral approaches to prevention in vulnerable groups developed elsewhere, such as the sexual health model<sup>38</sup> or the mobilization of social and sexual networks of MSM for prevention efforts.<sup>33</sup> Evaluation research – including cost-effectiveness studies – on prevention strategies among Asian MSM is urgently needed in order to know what works and what is worth taking to scale.

### Limitations

No epidemiologic data from Lao PDR and Myanmar are currently available and only scattered data from China and Vietnam exist. Where information is available, it is unknown to what extent the men sampled are representative of all MSM in a city or country. Most studies are venue-based, and may overrepresent men at higher risk, which may inflate HIV prevalence estimates.<sup>39</sup> Since demographic characteristics of the total population of MSM are unknown, this problem will be difficult, if not impossible, to address. However, recently developed methodologies such as respondent-driven sampling and time-location sampling<sup>40–42</sup> use a more random approach to select participants, which may help in increasing the representativeness of samples.

Collecting comparable data on the prevalence of male-to-male sex, risk behavior, and HIV and STI prevalence is also challenging because differing definitions of MSM are often used,<sup>43</sup> leading to selection bias in studies. Variations in behavioral instruments and sampling methodologies further limit the comparability of the data,<sup>39,43</sup> and may also lead to differences in the quality of the data collected. Development of a more consistent set of behavioral indicators and more standardized sampling methodologies may improve this. The varying level of stigmatization of male same-sex relations across different settings also leads to variations in willingness to report such behaviors. Recently developed technologies for data collection on sensitive behaviors are producing promising results,

with computer and hand-held-assisted self-interviewing yielding higher levels of self-reported risk behavior than traditional self- and interviewer-administered questionnaires.<sup>44</sup> These methods also reduce within- and between-subject variation by eliminating interviewer biases and reduce the likelihood of social desirability biased answers.

Our search method may have missed certain studies or data that were not published in peer-reviewed articles or abstracts. Other information may have been missed because it was published in local languages or considered not valuable for publication, for instance, whether the prevalence of HIV or STI was low or zero.

In conclusion, the epidemiologic and behavioral data presented in this paper show the presence of substantial HIV epidemics among MSM in the region, and the underlying potential for continued growth in the future. Due to the high HIV prevalence found among MSM in some countries, in comparison with the low prevalence found in the general population, these epidemics are and will continue to be substantial contributors to national epidemics in the Mekong Subregion and China. In order to reduce the impact of HIV in these countries, male-to-male transmission must be made a much stronger priority in national HIV/AIDS strategies, which should be supported by sufficient resources to evaluate effectiveness and increase coverage of interventions addressing the HIV prevention and care needs of MSM.

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