

REVIEW

PROGRAM ISSUES IN DELIVERING TARGETED STI SERVICES THROUGH THE PUBLIC SECTOR IN THE GREATER MEKONG REGION

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Abstract. This review discusses the delivery of targeted STI services for both female sex workers (FSWs) and other high-risk groups through the public sector in the Greater Mekong region. Vaginal discharge algorithms for the general population are also discussed. High STI rates that justify targeted interventions have been reported recently amongst FSW in Cambodia, Lao PDR and Vietnam. Such interventions need to take into account the different patterns of sex work in the three countries. In Cambodia, there are large numbers of brothel-based FSWs although this pattern is changing as more brothels are closed by the authorities. In Lao PDR, services targeted towards reducing the burden of HIV/STI in FSW / service women are probably best delivered through NGO-led clinics. In Vietnam, commune based district health centers appear to offer better services for FSW than STI clinics. Male clients of FSW are an important group to target, but reaching such a heterogeneous population is difficult. Provision of quality STI drugs to those places where men present with STI symptoms should be a priority. The optimal way to manage STIs in FSWs is still unclear in this region. Clinical and laboratory specialists are keen to promote laboratory tests for STIs but there is an over reliance on direct staining techniques. In areas with high STI prevalences, periodic presumptive treatment could offer an effective option to reduce STI levels in high-risk groups until syndromic management algorithms are evaluated for local use. Social patterns of sex work are changing continually and require close monitoring in the future so that services can be adapted to these changes.

INTRODUCTION

STIs received little attention in Cambodia, Lao PDR and Vietnam until the emergence of HIV in the region. Subsequent national responses have depended upon the severity of the HIV epidemic within the countries. Preliminary analysis of the HIV epidemic in these three countries indicates, as in Thailand, commercial sex and injecting drug use are the most

important modes of transmission with the former being more common in Cambodia and the latter in Vietnam.

Of the three countries, Cambodia has the highest HIV prevalence. In 1997 just under 4% of antenatal clinic (ANC) attenders were infected (Cambodia Working Group, 2002) whilst 29% of direct/brothel-based female sex workers (DFSWs) and 15% of indirect female sex workers (IDFSWs) tested HIV positive in 2002 (NCHADS, 2002a). In Cambodia, the HIV epidemic has been driven largely by supply and demand for commercial sex. In Vietnam, the HIV epidemic has varied throughout the country with the worst affected areas being in

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the provinces of Haiphong, Can Tho, Ho Chi Minh and An Giang (Hien *et al*, 2004). Recent national HIV sentinel surveillance data report HIV prevalences of 28.6% in injecting drug users (IDUs), 4.4% in FSWs, 1.4% in STI clinic attenders and 0.35% in ANC attenders (NIHE and FHI, 2005). However, these data may mask important local differences: the prevalence of HIV in IDUs in 11 provinces was >40% in 2002 (Hien *et al*, 2004) whilst 24% of FSWs in An Giang tested HIV positive in 2002 (O'Farrell *et al*, 2004). In Lao PDR, the HIV prevalence remains low. Prevalences of 1.1-3.9% were detected in service women, 0.8% in male state enterprise workers and no cases in truckers or the military in the STI sentinel surveillance study conducted in 2004 (FHI, 2005). However, a significant increasing HIV trend in service women in Bokeo and Savannakhet Provinces was also reported in this survey. Although the numbers of HIV positive cases in Lao PDR are much lower than elsewhere in the region, a pattern is emerging whereby provinces that border on other countries have higher prevalences of HIV than those without.

Whilst commercial sex is an important area to target for HIV prevention activities, of the three countries, only Cambodia mentions FSWs for specific targeting as part of its national HIV/AIDS prevention strategy. In Cambodia, significant numbers of DFSWs are brothel-based, although recently local authorities have closed many of these establishments with a subsequent increase in the numbers of IDFSWs. In Vietnam, sex work is diverse and involves a wide variety of risk behaviors (Rekart, 2002). Most provinces have rehabilitation centers where FSW that repeatedly come to the attention of the authorities may be detained (Thuy *et al*, 1998). In some provinces significant numbers of FSW inject drugs making them an important group to target for HIV prevention activities (Tuan *et al*, 2007). In Lao PDR where there are no brothels, sex

workers prefer to be known as service women. These women tend to comprise entertainment or service industry workers, most of whom sell sex. The number of clients of FSWs varies between the three countries. In Cambodia, the number of partners of IDFSWs are less than those of DFSWs but still significantly more than similar groups in Vietnam and service women in Lao PDR (O'Farrell, 2004). However, the situation in Lao PDR has changed rapidly. In 2001 the mean number of partners of service women was 14 per year (FHI, 2003) but by 2004 this had increased to about 1.5 per week (Oula, 2005).

This review compared and contrasted the technical aspects of STI control with a particular focus on how improved STI control for FSWs can be accomplished through the public sector in Cambodia, Lao PDR and Vietnam. In addition, other essential elements of delivering targeted STI services to FSWs nationally, including services for high-risk men, availability of STI drugs and STI surveillance, are discussed.

MATERIALS AND METHODS

The data used in this article was obtained from two main sources. First, through a Medline search (<http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?DB=pubmed>) using the keywords, STD, STI, Cambodia, Lao PDR and Vietnam in medical subject headings (MeSH) and in free text, and second, from experience working with the National STI units of the Ministries of Health for Cambodia, Lao PDR and Vietnam from mid 2002-2005 as part of the Community Action for Preventing HIV/AIDS, funded by the Japan Fund for Poverty Reduction (JFPR-9006) and managed by the Asian Development Bank.

RESULTS

Cambodia

In 1994, the National Center for HIV/

AIDS/STDs (NCHADS) was set up with a public health focus. STI activities in Cambodia have mainly focused on FSWs following the results of the first STI survey in 1996 that showed high STI rates (Ryan *et al*, 1998). National STI guidelines and policies were drawn up (Table 1) for the first time shortly after (NCHADS, 2001a,b) and an extensive program of STI training began. STI clinics were set up in all provinces and formed an integral part of the 100% condom use program that has seen significant increases in condom use in FSWs (Gorbach *et al*, 2006). This program required monthly STI checks for registered DFSWs at designated STI clinics. While the numbers of DFSWs treated at each monthly check has varied, attendances have reached 100% in some provinces. STI guidelines that include

algorithms for FSW have been in place for some time and have changed little over the past few years other than the introduction of basic laboratory tests. The National STI guidelines include clinical examinations and laboratory tests to determine whether cervicitis treatment is given at the monthly visit. Treatment is given if >10 pus cells per high power field are detected on cervical smears stained with methylene blue (Table 2). STI services are also available at some health centers but women attending are treated based on a low risk algorithm for vaginal discharge (Table 2).

Although extensive on-going STI training has been undertaken, following the introduction of laboratory tests in STI clinics in 2004/2005, the proportion of those treated at each monthly check dropped significantly to a level

Table 1
Framework of components of STI care and service delivery in the public sector for high risk groups and women in the general population in Cambodia, Lao PDR and Vietnam.

Components of STI care and service delivery in high risk groups	Country		
	Cambodia	Lao PDR	Vietnam
STI policy that includes focus on female sex workers	+	-	-
STI strategy that includes focus on female sex workers	+	-	-
STI National guidelines	+	+	+
STI clinics and guidelines for female sex workers	+	-	-
STI surveillance (Passive)			
- general population	+	+	+
- Female sex workers	+	-	-
STI prevalence in female general population	Very low	Very low	Very low
STI prevalence in high risk men in general population	Low	High	Low
STI prevalence in female sex workers	(NCHADS <i>et al</i> , 2006)	(O'Farrell <i>et al</i> , 2006)	(Thuong <i>et al</i> , 2005)
- gonorrhea	13%	15%	11%
- chlamydia	14%	26%	12%
- gonorrhea and/or chlamydia	22-25%	32%	20%
STI services for men who have sex with men	Limited- NGO in Phnom Penh, Siem Reap		Limited- Various NGO

Table 2

Criteria for cervicitis treatment in female sex workers and women with vaginal discharge in the general population in Cambodia, Lao PDR and Vietnam according to National Guidelines.

Criteria for cervicitis in female sex workers and women in the general population	Country		
	Cambodia	Lao PDR	Vietnam
Sex worker			
Behavioral	2 or more of the following: Mucopurulent discharge since last visit, Deep dyspareunia, 5 clients/day, condoms not always used with new clients	N/A	N/A
Clinical	1 or more of the following: Yellow discharge from cervix, Cervical erosion or bleeding from cervix, Yellow secretion on cervical swab or >10 pus cells /high power field (if microscopy available), Deep pain on bimanual examination,		
General population	Any one of the following:	1 or more of both behavioral and clinical indicators positive:	2 or more of the following:
Behavioral	Age <25 Unmarried and sexually active, >1 partner in last 3/12, New partner in last 3 months, Lower abdominal pain, Partner has symptoms	Age <25, > 1 partner in last 3/12, Woman suspects regular partner has had other partners, Sex with partner within 7 days of travel in last 3/12	Age 15-25, >1 partner in last 3/12, New partner in last 3 months
Clinical	Treat for cervicitis if initial treatment for vaginitis not effective	Iliac fossa tenderness on external examination, Bleeding on touching cervical ectopy, Visible cervical discharge after cleaning os, Cervical motion tenderness	1 or more of the following: Cervical mucus observed, Cervical motion tenderness

n/a = not applicable

of less than 10% in some places. The reason for this appears to be that health care workers were not following protocols by only considering those with vaginal discharge for treatment whilst excluding asymptomatic subjects and not using risk assessment. Following a supervision visit, an increase in presumptive treatment from 13% to about 50% in Sihanoukville was demonstrated in repeat attenders (Crabbe F, personal communication).

The recognition of low treatment levels in FSWs coincided with the recognition of a continued high prevalence of STIs as indicated by the results of the National Sentinel STI Survey in 2005 (NCHADS *et al*, 2006). Clearly some clinics have had adequate levels of treatment but many others have not. A new data management unit has been created at NCHADS and will have the capability to assess the proportion of DFSW treated at repeat visits so that clinics that appear to be either under or over treating can be identified. In the future, a decision must be made about whether or not to continue with these simple laboratory tests.

User-friendly clinics for FSW and MSM

A number of NGO clinics (RHAC, FHI, Care and MEC) offer services for sex workers and operate in many Cambodian provinces. Similarly, some user-friendly health centers are offering STI services for MSM in Phnom Penh and Siem Reap.

The recent National Sentinel STI Surveillance Survey was the first to do STI testing on MSM and was undertaken in Battambang, Phnom Penh and Siem Reap (NCHADS *et al*, 2006). The findings show that HIV-related risk behavior is similar in the three provinces and the prevalence of HIV (9%) is lower than the 14% found in an earlier study undertaken in Phnom Penh in 2000 (Girault *et al*, 2004).

STI drugs

There appears to be no shortage of STI

drugs in Cambodia. Cefixime was placed on the essential drugs list in 1998 and azithromycin is also available cheaply. A pilot project to use a prepackaged preparation for urethritis containing azithromycin and cefixime has been undertaken in special licensed pharmacies and the private medical sector in Phnom Penh and the results are pending. However, unlicensed drug sellers often dispense packets of pills for STI symptoms in the community at very low prices and this can only reflect the quality of the drugs.

STI surveillance

Passive. Passive surveillance for STIs is undertaken by Health Centers and reports sent to the Ministry of Information and Statistics. Although the annual health reports up to 1999 contained information about STIs, the latest reports for 2002-2004 make no mention of STIs. The conditions reported from the health centers on the standard HC1 reporting forms include urethral discharge, vaginal discharge, lower abdominal pain, genital ulcers and warts with age classifications of 0-4, 5-14, 15-49 and >50, not divided by sex. The project baseline survey found that 7.4% of attendances at Health Centers were STI related (Sano *et al*, 2004). The STI clinics also report routine data to NCHADS including the number of FSWs treated for cervicitis.

High-risk groups. STI surveys were undertaken in high-risk groups in 1996, 2001 and 2005 (Ryan *et al*, 1998; NCHADS, 2002b; NCHADS *et al*, 2006). Amongst DFSWs, the prevalence of gonorrhoea and/or chlamydia decreased from 1996 to 2001 but similar levels were detected in 2005 when the prevalence of gonorrhoea was 13% and chlamydia 14%. Whilst STI rates in IDFSW are lower, they are still at significantly high levels (Kim *et al*, 2005).

Lower risk groups-women and heterosexual men. STI tests were done in some low risk groups in a 2001 survey which detected low STI rates (NCHADS, 2002b). Although the first

STI survey in 1996 detected quite high levels of gonorrhea and chlamydia in military recruits, subsequent tests in the police detected low levels in both 2001 and 2005 (Ryan *et al*, 1998; NCHADS, 2002b; NCHADS *et al*, 2006).

Lao PDR

Currently Lao PDR has no designated public STI clinics. In the public sector women with STI symptoms usually attend hospital gynecology clinics whilst men occasionally go to general outpatient services. In Vientiane, a small number of men with STIs attend the local dermatology unit. To some extent this lack of STI services mirrors the situation in China in the 1960s where STIs were thought to have been virtually eradicated (Cohen *et al*, 1996). However, China has recently seen an upsurge in STIs and it is clear that STIs in Lao PDR are also increasing.

Given the lack of designated STI services, it is not surprising that most individuals self-treat through pharmacies. However, many drugs obtained over the counter in Lao PDR, for example, ampicillin, chloramphenicol, kanamycin, urfamycin and tetracycline, are not officially recommended and have limited efficacy for curing most STIs. The use of oral kanamycin is notable in that whilst it is widely available and very cheap, oral absorption is minimal.

Lao PDR has both a national policy on HIV/AIDS/STD and a national strategy in place but neither of these makes specific comments about service women or FSW (Ministry of Health, Lao PDR, 2001a, 2005). At the start of the project, National STI Guidelines were in place but required updating to take into account altered antibiotic sensitivities to *Neisseria gonorrhoeae*. These guidelines are now used by many of the smaller health centers but in the project baseline survey it was clear that some of the larger district hospital gynecology units were reluctant to use them with the result that few cases of cervicitis were di-

agnosed or treated in these units. Instead, the same outmoded drugs already mentioned were often used. The vaginal discharge algorithm uses a combination of behavioral and clinical indicators for a diagnosis of cervicitis (Table 2).

User-friendly clinics for FSW and MSM

There is a need to deliver innovative STI services to service women who do not go to public clinics. A periodic presumptive treatment (PPT) strategy was adopted and proved highly successful in reducing gonorrhea and/or chlamydia levels in FSWs, in three provinces initially (O'Farrell *et al*, 2006a), and subsequently in a further three (Phimphachanh, 2006). Recently new "Wellness" clinics specifically for service women have opened in Vientiane, Savannakhet and Luang Prabang supported by FHI. These clinics treat on the basis of clinical findings but are expensive and unlikely to be sustainable in their current format.

Currently, there are no designated STI clinical services for MSM. However, there are considerable numbers of MSM in Lao PDR, many of whom are bisexual but do not readily identify themselves as such (Toole *et al*, 2006).

STI drugs

At the start of the project a lack of effective STI drugs nationally was identified. Although ceftriaxone was produced in Vientiane, its distribution was limited. The 1 g injection was preferred to the 250 mg dose suggesting a possible problem in quality control with this product. As an injectable, many doctors appeared reluctant to use ceftriaxone because of the risk of possible allergy. Applications were made to get azithromycin and cefixime passed by the Lao PDR regulatory authorities and when this was accomplished, the price of these drugs reduced considerably through market forces. By the end of the project, 1 g of azithromycin and 400 mg of cefixime cost US\$3. A pilot study of a prepackaged kit for

urethritis containing these drugs is underway. In the community self medication using inappropriate drugs from private pharmacies and drug sellers is common (Sihavong *et al*, 2006).

STI surveillance

Passive. In the past, STI cases were reported sporadically through the Health Information System. Official reports to the Lao PDR MOH identified 2,624 STI cases nationally in 2001 (Ministry of Health, Lao PDR, 2001b). By contrast, the JFPR-9006 project, in which only a limited number of districts were supported, reported more than 5,000 cases in 2004 from the three provinces covered (Oula, 2005). Following the JFPR 9006 project, the Global Fund has supported HIV prevention in a number of provinces and from January to June 2005, 5,597 STI cases were reported in eight provinces (Manivong S, personal communication). Currently the MOH STI/HIV surveillance unit in Vientiane also doubles as a counseling unit, a situation that clearly justifies increased capacity.

High risk groups. STI prevalence surveys in Lao PDR have detected very high prevalences in service women. In 2001, the HIV Sentinel Surveillance and Sexually Transmitted Infection Periodic Prevalence Survey (HSS-SPPS) detected prevalences of gonorrhoea and chlamydia in Vientiane, Luang Prabang and Savannakhet, of 14 and 16%, 13 and 35%, and 32 and 23%, respectively (FHI, 2003), whilst even higher rates were found in Luang Prabang in 2003 where the baseline prevalence of chlamydia was 46% and gonorrhoea was 34%, which were detected in a presumptive treatment study amongst FSW (NCCAB and FHI, 2004). The latest provisional results of the second-generation surveillance in 2004 detected very high levels of gonorrhoea and/or chlamydia with prevalences of service women in the five provinces of Bokeo, Luang Namtha, Vientiane, Savannakhet and Champassack of 43.6, 36.2, 46.0, 19.9 and 27.9%, respectively

(FHI, 2005).

These high levels have to be viewed against a background whereby service women have relatively few numbers of sexual partners compared with neighboring Cambodia and Vietnam and are open to a number of explanations. First, service women may underestimate their number of partners. Second, condom use may be low. Third, the likelihood of their sexual contacts having a STI may be very high. The cross-sectional STI surveys have shown very high STI levels in men. In most countries in Asia symptomatic men seek care through pharmacies or the private sector. In Lao PDR it is likely healthcare seeking behavior is similar, though obtaining a cure for STIs is unlikely because of the limited drugs available, however relief from overt symptoms may be possible.

Lower risk groups-women and men. There is little information about low risk female groups in Lao PDR. One study in ANC attenders in Vientiane detected chlamydia prevalences of 9.6% for chlamydia by polymerase chain reaction testing and 0.8% for gonorrhoea (Thammalangsy *et al*, 2006). In men, the last sentinel survey detected quite high gonorrhoea and/or chlamydia levels of 17.3% in truckers in Luang Namtha and 6% in Vientiane (FHI, 2005). This supports the view that men with STIs in Lao PDR have poor levels of treatment and are infectious for long periods despite relatively low numbers of sexual partners.

Vietnam

All provinces have designated STI clinics that may be in departments of dermatovenereology, preventive medicine or social diseases. Most of these clinics perform basic laboratory tests. A Gram stain is usually performed to diagnose gonorrhoea but non-gonococcal urethritis (NGU) cases that should be diagnosed on direct microscopy may go untreated. This has meant that chlamydia is rarely diagnosed or treated correctly. Indeed some centers only treat for chlamydia if gonorrhoea

is diagnosed (Thuong *et al*, 2004).

National updated STI guidelines were produced in 2003. These guidelines support the use of syndromic management but do not include an algorithm for high-risk women (Table 2). Nationally there is a policy to test women working in the entertainment industry on a monthly basis using Gram-stain smears although this method is not included in the National Guidelines for diagnosing gonorrhea in women (Table 2).

Following an STI prevalence study in FSW in five provinces (Thuong *et al*, 2005), further draft guidelines were drawn up for FSWs in situations where there were either laboratory facilities with speculums, speculum/bimanual examinations only or no speculums (Thuong *et al*, 2003). The acceptance of these guidelines has yet to be approved nationally. Many Vietnamese STI doctors appear reluctant to use risk assessment in the vaginal discharge syndromic algorithm as an aid to diagnosing cervicitis because it may require treating uninfected cases and is unscientific. Also, many STI specialists regard FSWs as sources of private income and prefer not to use risk assessment when they can charge higher fees for laboratory tests and longer consultations after hours when clients are seen privately. Despite this, a significant number of FSWs are still seen by private doctors and STI specialists.

The recent National Strategy on HIV/AIDS (National Committee for AIDS, Drug and Prostitution, Prevention and Control, 2004) makes no mention of targeted services for FSWs although it does suggest setting up mobile teams that are accessible to high-risk groups.

User-friendly clinics for FSW and MSM

These clinics can be divided into those supported by NGOs and those in the public sector that remain outside the day-to-day influence of the dermatovenereology clinics. Some commune level clinics operate excel-

lent STI services, often in conjunction with peer educators. Treatment of cervicitis is usually based on clinical findings rather than laboratory tests.

The national STI guidelines make no mention of STIs in MSM. However, some MSM user-friendly NGO clinics have provided clinical training and proctoscopes in some larger cities. A recent review of MSM in Vietnam discussed high levels of hepatitis B surface antigen but made no mention of interventions to promote hepatitis B vaccination (Colby *et al*, 2004).

STI drugs

Vietnam has no shortage of recommended STI drugs. Azithromycin, cefixime and ceftriaxone are available cheaply. Private pharmacies are often accessed first for health care by many; and although they offer a cheaper service, incorrect medication is often given (Chalker *et al*, 2000).

STI surveillance

Passive. A national passive STI reporting system is in place and 60/64 provinces report STI cases from STI clinics. In 2001-2004, 156,262, 147,940, 142,956 and 143,880 cases of STI were reported, respectively (Hung ND, personal communication). However, the accuracy of these reports has yet to be validated. The numbers of NGU cases in men varied between 4,894 in 2002 and 13,731 in 2003 (Ministry of Health, Vietnam, 2002-2004). A new national passive computerized STI system was piloted in 2003 using STI classifications of vaginitis, cervicitis, urethral discharge, genital ulcers, warts and other STIs but is not yet fully operational.

High-risk groups. The JFPR-9006 project undertook STI surveys in FSWs in 5 provinces at baseline in 2002 and at the end of the project in 2004 (Thuong *et al*, 2003, 2004, 2005; O'Farrell *et al*, 2006b). Significant reductions in gonorrhea/chlamydia were achieved. A national STI testing surveillance program was

approved in 2003 that involves testing FSWs and lower risk groups. However, the tests used have low sensitivities making the results of limited value.

Lower risk groups- women and men. STI clinic attenders, military recruits, injecting drug users and antenatal clinic attenders are tested as part of the National STI testing surveillance program. No official results have been published yet. Low STI rates are reported in family planning clinic attenders and women in the general population (Lien *et al*, 2002; Anh *et al*, 2003; Go *et al*, 2006).

In conclusion, all three countries have significant STI prevalences in FSWs that justify targeted interventions. Only Cambodia mentions FSWs for specific targeting as part of its National HIV/AIDS prevention strategy (Table 1).

The pattern of sex work in Cambodia differs from Vietnam and Lao PDR because of the large number of brothel-based FSWs, although this is changing as the authorities close more brothels.

FSWs are stigmatized in all three countries and this is unlikely to change in the near future. In Lao PDR, services targeted towards reducing the burden of HIV/STI in FSW/service women are probably best delivered through NGO led clinics whilst in Vietnam, commune based district health centers appear to offer better services for FSW than STI clinics.

Male clients of FSW are an important group to target but reaching such a heterogeneous group is difficult. Provision of quality STI drugs to those places where men present with STI symptoms should be a priority.

The optimal way to manage STIs in FSWs in these countries is still unclear. Vietnam and Lao PDR have no specific FSW STI treatment algorithms. Clinical and laboratory specialists are keen to promote laboratory tests for STIs but there is an over reliance on direct staining techniques for diagnosing both gonorrhoea and

chlamydia. In areas with high STI prevalences, PPT may offer an effective option to reduce STI levels in high-risk groups until syndromic management algorithms are evaluated at the local level. Social patterns of sex work are changing continually and will require close monitoring in the future.

ACKNOWLEDGEMENTS

The assistance of the following is gratefully acknowledged: Dr Lon Say Heng and Dr Phal Sano of NCHADS, MOH, Phnom Penh, Cambodia; Dr Nguyen Duy Hung, NIDV, MOH Hanoi, Vietnam; Dr Khanthanouvieng Sayabounthavong and Dr Ratthiphnone Oula of CHAS, MOH Vientiane, Lao PDR; Dr Francois Crabbe, NCHADS, Phnom Penh, Cambodia; Dr Guy Morineau, FHI, Phnom Penh, Cambodia; Dr Mary Kamb, CDC, Hanoi, Vietnam; and Peter Godwin, Indu Bhushan and Dr Vincent de Wit of the Asian Development Bank.

REFERENCES

- Anh PK, Khanh NT, Chien DT, *et al*. Prevalence of lower genital tract infection among women attending maternal and child health and family planning clinics in Hanoi, Vietnam. *Southeast Asian J Trop Med Public Health* 2003; 34: 367-73.
- Cambodia Working Group on HIV/AIDS projection. Projections for HIV/AIDS in Cambodia: 2000-2010. Phnom Penh: Cambodia Working Group on HIV/AIDS Projection, 2002.
- Chalker J, Chuc NT, Falkenberg T, Do NT, Tomson G. STD management by private pharmacies in Hanoi: practice and knowledge of drug sellers. *Sex Trans Infect* 2000; 76: 299-302.
- Cohen MS, Henderson GE, Aiello P, Zheng H. Successful eradication of sexually transmitted diseases in the People's Republic of China: implications for the 21st century. *J Infect Dis* 1996; 174 (suppl 2): S223-229.
- Colby D, Cao NH, Doussantousse S. Men who have sex with men and HIV in Vietnam: a review.

- AIDS Educ Prev* 2004; 16: 45-54.
- FHI. HIV surveillance survey and sexually transmitted infection periodic prevalence survey, Lao People's Democratic Republic 2001. Vientiane: FHI, 2003. [Cited 2006 Oct 20]. Available from: URL: www.fhi.org/en/hivaids/pub/survreports/hssspss
- FHI. Second HIV surveillance survey and sexually transmitted infection periodic prevalence survey, Lao People's Democratic Republic 2004. Final report, 2005. [Cited 2007 Feb 5]. Available from: URL: www.fhi.org/en/HIV_AIDS/pub/survreports/res_2ndGenSurvLAOS.htm
- Girault P, Sidel T, Song N, *et al.* HIV, STIs and sexual behaviours among men who have sex with men in Phnom Penh, Cambodia. *AIDS Educ Prev* 2004;16: 31-44.
- Go VF, Quan VU, Cellentano DD, Moulton LH, Zenilman JM. Prevalence and risk factors for reproductive tract infections among women in rural Vietnam. *Southeast Asian J Trop Med Public Health* 2006; 37: 185-9.
- Gorbach PM, Sopheab H, Chhorvann C, Weiss RE, Yun MC. Changing behaviors and patterns among Cambodian sex workers: 1997-2003. *J AIDS* 2006; 42: 242-7.
- Hien NT, Long NT, Huan TQ. HIV/AIDS epidemics in Vietnam: evolution and responses. *AIDS Educ Prev* 2004; 16 (suppl A): 137-54.
- Kim AA, Sun LP, Chhorvann C, *et al.* High prevalence of HIV and sexually transmitted infections among indirect sex workers in Cambodia. *Sex Transm Dis* 2005; 32: 745-51.
- Lien PT, Elias C, Loi NT, Chi BT, Phuc NH, Gardner M. The prevalence of reproductive tract infections in Hue, Vietnam. *Stud Fam Plann* 2002; 33: 217-26.
- Ministry of Health, Lao PDR. National policy on HIV/AIDS/STD. Vientiane: NCCAB, December 2001a.
- Ministry of Health, Lao PDR. National statistics, 2001b.
- Ministry of Health, Lao PDR. National strategic and action plan on HIV/AIDS/ST1 for 2006-2010. Vientiane: NCCA, 2005.
- Ministry of Health, Vietnam. Annual STI reports. Hanoi: National Institute of Dermatovenereology, 2002-2004.
- National Committee for AIDS, Drug and Prostitution, Prevention and Control. The national strategy on HIV/AIDS control in Vietnam till 2010 with a vision to 2020. Hanoi: National Committee for AIDS, Drug and Prostitution, Prevention and Control, 2004.
- NCCAB/FHI. Luang Prabang STI intervention, monitoring and evaluation findings. Luang Prabang: Dissemination Meeting, 23 September, 2004.
- NCHADS. Policy for HIV/AIDS and STI prevention and care. July 2001a.
- NCHADS. Guidelines for the implementation of STI services. August 2001b.
- NCHADS. Report on HIV sentinel surveillance in Cambodia, 2002a. [Cited 2006 Nov 2]. Available from: URL: www.nchads.org/docs/publication/HSS/final%20HSS%202002.pdf
- NCHADS. Low prevalence of sexually transmitted infections in Cambodia supports recent behavioural and HIV prevalence trends. 2001 Cambodia STI prevalence survey, 2002b. [Cited 2006 Nov 2]. Available from: URL: www.nchads.org/docs/publication/SSS/cambodiastibook.pdf
- NCHADS, FHI, ADB, CDC Gap. Cambodia STI survey 2005. Key risk behaviours and STI prevalence, Sept 12, 2006. [Cited 2006 Nov 2]. Available from: URL: www.nchads.org/docs/publications/dissemination/SSS%202005%20ENG.pdf
- NIHE and FHI. National Workshop on Sentinel Surveillance of HIV/AIDS/STI. Hanoi: NIHE and FHI, 21-22 April 2005.
- O'Farrell N, Anh MH, Thuong NV, Nhung VT, Tuan NG, Long NT. Variation in HIV prevalence in female sex workers in An Giang, Vietnam: what is a representative sample? [Abstract WePeC6186]. Bangkok: XV International Conference on AIDS, July 11-16, 2004.
- O'Farrell N. STI control strategies in female sex workers in three Mekong countries. Chiang Mai: 13th International Union against Sexually Transmitted Infections Asia Pacific Conference. July 6-9 2004.

- O'Farrell N, Oula R, Morison L Van CT. Periodic presumptive treatment for cervical infections in service women in three border provinces of Lao PDR. *Sex Transm Dis* 2006a; 33: 558-64.
- O'Farrell N, Thuong NV, Nghia KV, Tram LT, Long NT. HSV-2 antibodies in female sex workers in Vietnam. *Int J STD AIDS* 2006b; 17: 755-8.
- Oula R. Inter-country Meeting, JFPR-9006. Siem Reap, Cambodia. 14-17 March 2005.
- Phimphachanh C. Periodic presumptive treatment in Lao PDR. [Abstract MOPE0595]. Toronto: Sixteenth International AIDS Conference, 13-18 August 2006.
- Rekart ML. Sex in the city: sexual behaviour, societal change and STDs in Saigon. *Sex Transm Infect* 2002; 78 (suppl 1): i47-i54.
- Ryan CA, Vathiny OV, Gorbach PM, *et al.* Cambodia: explosive spread of HIV-1 and sexually transmitted diseases. *Lancet* 1998; 351: 1175.
- Sano P, Sopheap S, Sun LP, Vun MC, Godwin P, O'Farrell N. An evaluation of STI case management in health facilities in four border provinces of Cambodia. *Sex Transm Dis* 2004; 31: 713-8.
- Sihavong A, Lundborg CS, Syhakhang L, Akkhavong K, Tomson G, Wahlstrom R. Antimicrobial self medication for reproductive tract infections in two provinces in Lao People's Democratic Republic. *Sex Transm Infect* 2006; 82: 182-6.
- Thammalangsy S, Sihavong A, Phouthavane T, *et al.* The prevalence of lower genital tract infections among antenatal care (ANC) clinic patients in two central hospitals, Vientiane, Lao People's Democratic Republic. *Southeast Asian Journal of Trop Med Public Health* 2006; 37: 190-9.
- Thuong NV, Long NT, Hung ND, *et al.* Sexually transmitted infections in female sex workers in five border provinces of Vietnam. *Sex Transm Dis* 2005; 32: 550-6.
- Thuong NV, Nghia KV, Hau TP, *et al.* STI exit survey among female sex workers in 5 border provinces, Vietnam. 2004. [Cited 2006 Nov 10]. Available from: URL: www.jfpr-hiv.org/STIHIV_Exit_Survey_2004.pdf
- Thuong NV, Nhung VT, Nghia KV, *et al.* STI/HIV survey among female sex workers in 5 border provinces, Vietnam. Project Community Action for preventing HIV/AIDS (JFPR: Reg 9006). Hanoi: Medical Publishing House, 2003. [Cited 2006 Nov 5]. Available from: URL: www.jfpr-hiv.org/stihiv_survey_sw_vn.pdf
- Thuy NTT, Nhung VT, Thuc NV, Lien TX, Khiem HB. HIV infection and risk factors among female sex workers in southern Vietnam. *AIDS* 1998; 12: 425-32.
- Toole MJ, Coghlan B, Xeuatvongsa A, Holmes WR, Pheualavong S, Chanlivong N. Understanding male sexual behaviour in planning HIV prevention programs: lessons from Lao PDR, a low prevalence country. *Sex Transm Infect* 2006; 82: 135-8.
- Tuan NA, Fylkesnes K, Thang BD, *et al.* HIV infection patterns and risk behaviours in different population groups and provinces in Vietnam. *Bull World Health Organ* 2007; 85: 35-41.