

Ministry of Health

National Center for HIV/AIDS, Dermatology and STDs

HIV SENTINEL SURVEYS 2010

Female entertainment workers (FEWs)
Antenatal care clinic (ANC) attendees

Prepared by:

Chhea Chhorvann, MD., MPH., PhD

December 2012





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National Center for HIV/AIDS, Dermatology and STDs (NCHADS) established the HIV surveillance system in response to the HIV/AIDS epidemic in Cambodia. The system consists of HIV Sentinel Survey, Behavioral Sentinel Survey and STI survey. It has been observed that in the past 20 years that the HIV and behavioral sentinel survey has played an important role in providing evidence based information for the development, implementation and evaluation of many HIV/AIDS interventions throughout the country.

The continuation of HIV surveillance in Cambodia would not be possible without commitment and support from all of the Provincial Health Departments, especially the Provincial AIDS Office, and surveillance staff at NCHADS. Similarly, development partners such as US CDC, WHO, UNAIDS and other funding agencies have provided financial and technical support to NCHADS to improve and expand the HIV surveillance system. This continuous collaboration also exists in the conduct of HSS 2010.

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Forward

Strategic information about HIV/AIDS is vital for HIV/AIDS program development, as well as HIV/AIDS program monitoring and evaluation. The National Center for HIV/AIDS Dermatology and STD has collected HIV/AIDS strategic information through its active and passive surveillance systems. Active surveillance systems include; HIV sentinels surveillance (HSS), Behavioral sentinel surveillance (BSS) and STI survey.

In 2010, the 11th round of HSS has been conducted. The study was conducted among female entertainment workers and pregnant women attending antenatal clinics across 22 provinces/cities in Cambodia. Findings from HSS 2010 suggest that HIV prevalence among female sex workers (represented by female entertainment workers who reported having more than 7 clients per week) remained stable compared to the prevalence of 14% in 2006. However, a clear drop in HIV prevalence was observed when looking at the trend among pregnant women attending antenatal clinic, as there has been about a 0.4% point drop from 2006 to 2010.

The findings from HSS 2010 has been used in the HIV/AIDS estimation and project for Cambodia from 2010-2015 and the National Center for HIV/AIDS, Dermatology and STD strongly encourages the use of these information, as instructed in the report, in the context to further improve the response to HIV/AIDS epidemic and to optimally mitigate its impact on the population.

Phnom Penh, December 2012



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INTRODUCTION

HIV prevalence among Cambodia's general population has declined from the peak of 2.4% in 1998 to 0.8% in 2010¹. However, Cambodia maintains high HIV prevalence among high risk groups; HIV prevalence among direct female sex workers was 14.1% in 2006², injecting drug user 24.4% in 2007³, and men who have sex with men (MSM) living in the capital city 8.7%⁴ in 2005.

Cambodia has a generalized HIV epidemic, as HIV prevalence among women attending antenatal clinics is greater than 1%. Heterosexual transmission is the key driver of the epidemic. High HIV prevalence among female sex workers and high risk behaviours among heterosexual men may increase the risk of HIV transmission within the general population. HIV prevalence among women attending antenatal clinics has declined very slowly in the past 7 years (from 2.1% in 1999 to 1.1% in 2006¹).

BACKGROUND TO HIV SENTINEL SURVEILLANCE

Since 1995, Cambodia has conducted active HIV surveillance using unlinked anonymous sero prevalence surveys among different sentinel groups – HIV Sentinel Surveillance (HSS). Findings from HSS are used for monitoring the spread of the epidemic as well as for estimating and projecting HIV prevalence among the general population in Cambodia.

FIGURE 1 SENTINEL GROUPS INCLUDED IN HSS FROM 1994 TO 2006

	HSS 1994	HSS 1995	HSS 1996	HSS 1997	HSS 1998	HSS 1999	HSS 2000	HSS 2002	HSS 2003	HSS 2006
No. of Provinces	5	9	18	22	19	20	21	20	22	22
DSWs	X	X	X	X	X	X	X	X	X	X
IDSWs		X	-	-	x	X	X	X	X	-
POLICE	X	X	X	X	X	X	X	X	X	-
ANC	x	X	X	X	-	x	X	X	X	X

Note: DSWs: direct sex worker, IDSW: indirect sex worker, ANC: pregnant women attending antenatal care

¹ HIV/AIDS estimation and Projection 2010

² HSS report 2006

³ HIV prevalence study among DU in 2007

⁴ STI survey 2005

The sentinel groups included in each round of HSS have been consistent to ensure trends in HIV prevalence among each group are established; however, due to social changes, some groups have been excluded from the system, such as direct and indirect female sex workers. This group was replaced by the Female Entertainment Worker group in 2010.

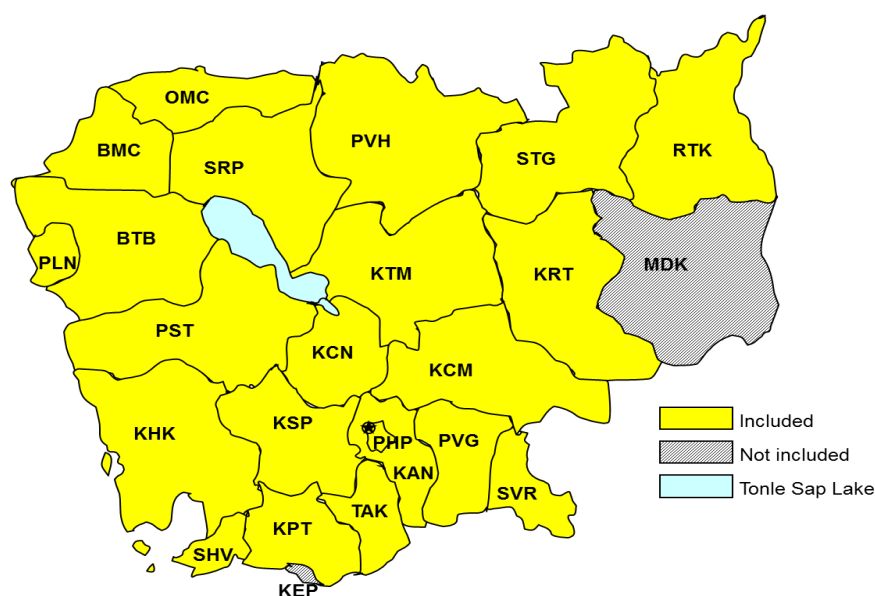
TABLE 1: SENTINEL GROUPS AND SAMPLE SIZE INCLUDED IN HSS FROM 2000 TO 2010

	2000	2002	2003	2006	2010
<i>(Provinces)</i>	<i>(21)</i>	<i>(20)</i>	<i>(22)</i>	<i>(22)</i>	<i>(22)</i>
FEW	--	--	--	--	4,265
DFSW	2,180	2,110	2,411	2,266	--
IDFSW	1,799	1,232	1,633	--	--
Police	4,711	4,379	5,796	--	--
ANC	6,562	9,168	10,867	12,464	17,200
MSM	--	--	--	--	1,000
Total	17,991	19,247	20,707	14,730	22,465

Note: FEW: female entertainment worker, DFSW: direct female sex worker, IDFSW: indirect female sex worker, MSM: men who have sex with men

HIV prevalence among pregnant women attending antenatal clinics (ANC) has been used as the primary data source for estimating HIV prevalence among all adults aged 15 to 49 years old and to monitor trends in HIV prevalence over time since population-based surveys are expensive and logistically difficult.

FIGURE 2: PROVINCES INCLUDED IN HIV SENTINEL SERVIELLANCE



OBJECTIVES

The specific objectives of the HSS 2010 are to:

- Estimate HIV prevalence among selected female sentinel groups
- Provide data required for trend analysis, monitoring and program planning
- Provide data for HIV/AIDS estimation and projection

METHODOLOGY

Study design

A cross-sectional survey was conducted among female entertainment workers and women attending antenatal clinics. HIV testing was unlinked, anonymous (UAT) with informed consent.

Sentinel sites

The survey was conducted in 22 of Cambodia's 24 provinces or municipalities, heretofore referred to as cities/provinces, shown below. Note that the two provinces Mondulkiri and Krong Kep were not included in the survey and these two sites represent only 0.5% of the Cambodian population aged 15-49.

TABLE 2: PROVINCES INCLUDED IN HSS 2010

1.	<i>Banteay Meanchey</i>	12.	<i>Pailin</i>
2.	<i>Battambang</i>	13.	<i>Phnom Penh</i>
3.	<i>Kampong Cham</i>	14.	<i>Preah Vihear</i>
4.	<i>Kampong Chhnang</i>	15.	<i>Prey Veng</i>
5.	<i>Kampong Speu</i>	16.	<i>Pursat</i>
6.	<i>Kampong Thom</i>	17.	<i>Rattanakiri</i>
7.	<i>Kampot</i>	18.	<i>Siemreap</i>
8.	<i>Kandal</i>	19.	<i>Sihanoukville</i>
9.	<i>Koh Kong</i>	20.	<i>Steung Treng</i>
10.	<i>Kratie</i>	21.	<i>Svay Rieng</i>
11.	<i>Oddar Meanchey</i>	22.	<i>Takeo</i>

Sentinel groups

HSS 2010 included three groups; female entertainment workers and women attending antenatal clinics and men who have sex with men. In order to avoid repetition of the study and to reduce costs, men who have sex with men was included in the Bros Khmer study conducted by FHI 360, in collaboration with NCHADS in 2010. The detailed protocol and findings of the study can be

found in the BROS Khmer study report 2010 titled “HIV/AIDS Positive Rate among At-Risk Urban Men in Eight Cambodia Cities.” To avoid duplication of efforts, only the surveys among female entertainment workers and women attending ANC are presented.

Female Entertainment Workers

Female Entertainment Workers (FEW) replaced brothel based female sex workers in the HSS 2010 due to the crackdown of all brothels throughout the country. Although there is no longer a brothel based sex worker surveillance group, the study managed to recruit FEW who worked in former brothels, as well as other entertainment establishments. A more detailed description of female entertainment workers (FEW) is provided in a later section.

In most provinces, FEW were recruited only from the provincial capital; however, in some provinces, FEW from districts outside the capital city were also collected if the remaining district has been known by NCHADS as “hot spots” due to the high concentration of entertainment establishments in the area.

The provinces where FEW were selected, in addition to the provincial town from the remaining district are shown in Table 2. The Ministry of Planning, National Institute of Statistics (NIS) classifies all of these districts as urban areas.

TABLE 3: PROVINCES IN WHICH SAMPLING OF FEMALE ENTERTAINMENT WORKERS WERE CONDUCTED IN BOTH THE PROVINCIAL CAPITAL AND REMAINING DISTRICTS

Province	Remaining districts to be included
Battambang	Kam Reing
Bantey Meanchey	Poipet
Svay Reing	Bavet
Prey Veng	Nak Loeng
Oddar Meanchey	O Smach

Pregnant women attending antenatal care clinics (ANC)

In each selected province, ANC women were selected from the provincial capitals as well as districts outside the capital city (heretofore referred to as remaining districts) in some provinces. All health centers and referral hospitals that provide ANC services in selected provinces were eligible for HSS 2010.

To ensure that sample size could be reached within the survey timeframe of three months without exceeding four sites per provincial stratum, ANC facilities were selected according to the volume of ANC activity (that is the number of women who used ANC services each month). Health centers to be included in HSS 2010 must have sufficient numbers of women seeking ANC, i.e., about 50 women per month in provincial capital health centers and about 20 women per month in remaining district health centers.

Sample size

The Open Epi calculator (www.openepi.com) was used to calculate the sample size required from each group. The assumptions for the sample calculation are: one proportion test, with the power of 80%, alpha of 5% and the design effect of 1.5.

The sample size for FEW recruited from former brothels and FEW recruited from other entertainment establishment was done separately. For FEW recruited from former brothel sites, a minimum number of 1,470, including 2% refusal rate was required. Thus, about 64 women needed from each province and 128 were needed from Phnom Penh. On the other hand, for FEW from other entertainment establishments, a minimum number of 2,795, including 5% refusal rate, was required. Thus about 122 women were required from each province and 244 women were required from Phnom Penh.

Although the sample size was calculated separately, we planned to collect a total of 186 FEWs from each province and 372 FEWs from Phnom Penh in case the FEWs from former brothels could be identified. This total sample would be used for collecting female entertainment workers in provinces where FEW working in former brothels could not be identified.

TABLE 4: SAMPLE SIZES AND CORRESPONDING CONFIDENCE INTERVALS.

Sentinel group	Sample size per province	Expected prevalence	Margin of error
FEW_former brothels	64-128	14.4%	2%
FEW_other establishments	122-244	11.7%	1.6%
ANC	400 (provincial capital) 400 (remaining districts)	1.1%	0.2%

The sample size for ANC was calculated to be representative of the whole country. With the estimated HIV prevalence of 1.1% and the margin of error of 0.2%, the minimum number of subjects needed was 17,200 for the whole country. Thus, 800 pregnant women would be collected from each province.

At the provincial level, 400 women attending ANC would be recruited from the provincial capitals and another 400 from the remaining districts. Experience from previous HSS rounds demonstrated that it would not be possible to reach these targets in all provinces within the specified 3-month timeframe and that inflation of the sample size to account for refusals would not be necessary because women who refused would be replaced sequentially by additional recruits.

Sampling and procedures

Fieldwork was conducted by provincial surveillance teams under the supervision of the Provincial AIDS Office (PAO) Manager. The teams were directly responsible for data and specimen collection from FEWs. ANC staff at each selected health center were responsible for data and specimen collection for the ANC group. Supervision was performed by PAO, with periodic supervision conducted by NCHADS Surveillance Unit. The sampling approach for each of the sentinel groups is summarized below.

FEW Group

Female entertainment workers are defined as those who are currently working in all entertainment establishments; such as ‘brothel like’, former brothels, karaoke, massage parlours, beer gardens etc. Female entertainment workers can be direct or indirect female sex workers. Due to the difficulty of differentiating between brothel based and non-brothel based sex workers, the two groups have been combined in this round of HSS and referred to as FEWs.

Eligibility

All Khmer-speaking women, aged 15-49 years, who work as entertainment workers in selected establishments were eligible to participate in the survey.

Sampling

FEWs were sampled using a two-stage cluster sampling approach.

Two sampling frames were developed for FEWs. One sampling frame was for “FEW from former brothel” although those brothels were no longer considered as “brothel”. A “former brothel” was defined as an entertainment establishment once recognised by the local authority as a brothel before the 2008 crackdown and/or those establishments previously included as brothels in the HSS 2006 sampling frame. However, former brothels that are now out of business were not counted in the sampling frame for HSS 2010.

The second sampling frame included all entertainment establishments such as restaurants, beer gardens, massage parlours and karaoke bars. Small entertainment establishments were combined to make it similar in size to other entertainment establishments. Similarly, very large entertainment establishments were broken down into smaller groups using different working shifts or by time of day.

It was anticipated that the number of “FEW from former brothels” would be very small in each province, therefore, all of the “former brothels” would be included in the study and other entertainment establishments would be randomly selected from the second sampling frame. This site selection would be continued until the total sample size needed for each province was reached.

At the establishment level, all FEW presented at that site were invited to participate in the study. In provinces where there were fewer FEW than the proposed sample size, all female entertainment workers were recruited.

Survey Procedures

The PAO Managers were notified about the survey at least one month before the data collection started and were requested to update their list of all entertainment establishments (former brothels and others entertainment establishments). The cluster selection was performed under the guidance of the NCHADS supervisor teams.

After informed consent had been obtained from eligible study participants, demographic information was collected: participant's age, years of school completed, age at first sex, age at first commercial sex, and the total duration (in months) having worked in the sex trade and other information related to sex work history (former direct sex workers versus indirect sex workers).

In addition, venous whole blood specimen (5 mL) was collected from each study participant. The survey was entirely anonymous and no names or other personal identifying information were collected from study participants.

The process of informed consent, demographic data collection and phlebotomy were conducted in a private place, where each participant could feel comfortable and safe. Potential participants were also informed about their rights to refuse and were assured that their decisions to consent or refuse to participate would be kept confidential.

In the consent process, the purpose of the survey was conveyed to all potential participants, then the informed consent script (Appendix II) was read to each potential participant by a survey team member privately. The informed consent script stated explicitly that the recruit had the right to refuse to participate. Each woman was asked individually whether she consented to participate in the survey and whether she consented to have leftover blood stored for possible future testing.

The survey team member signed a consent form to document that informed consent had been read, and indicated whether the woman consented or refused to participate. If the woman consented, a pre-printed adhesive label with specimen number would be attached to the consent record form, the demographic information form, and a vacutainer tube. If the woman did not consent to participate, no label would be attached to the form, but the case where consent was not obtained was recorded.

In each cluster, the number of women who were eligible and the total number of women who gave consent were recorded on the cluster information sheet to allow principal investigators to calculate a "refusal" rate.

Information about each selected establishment including cluster number, geographic location of the entertainment establishments (province and district), number of female entertainment workers working at the selected location, number of FEW present at the time of the visit, and number who agreed (consented) to participate was recorded. This information is critical to make adjustments in the data analysis.

After their demographic information had been recorded and their blood was drawn, participants received a thank you gift worth about USD \$1.5 to compensate for their time and a voucher for free voluntary counselling and HIV-testing services (VCT). Round-trip transportation fees to the VCT site would be reimbursed if the participants chose to have their blood tested for HIV at the suggested VCT site.

ANC Women

Eligibility

All pregnant women aged 15-49 years who presented at the selected ANC for their first prenatal consultation of their current pregnancy were eligible to participate in the 2010 HSS. The first visit criterion should prevent inter- and intra-site duplication of women who may visit one or more ANCs more than once during the three-month survey period.

Sampling

Pregnant women were sampled consecutively for three months until obtaining, in each province, 400 specimens in the provincial capital and 400 specimens in the remaining districts. This sampling was an unweighted sampling, which requires weights in the analysis stage.

Survey Procedures

Similar to the recruitment of female entertainment workers, the PAO Manager in each province was notified about the survey at least one month before data collection was scheduled. During data collection, after informed consent had been obtained, limited demographic information was collected. In addition, venous whole blood specimen (5 mL) was collected. The survey was entirely anonymous and no names or other personal identifying information was collected.

A survey team member read the informed consent script to each potential participant. The consent stated explicitly that the recruit had the right to refuse to participate and their refusal did not have any negative consequence on the health service they sought. Each woman was asked individually whether she consented to participate in the survey and whether she consented to have leftover blood stored for possible future testing. The survey team member would sign the consent record form documenting that informed consent had been read, and indicating whether the women consented or refused to participate.

If the woman consented, a pre-printed adhesive label with specimen number was attached to the consent form, the demographic information form, and a vacutainer tube. If the woman did not consent, no label would be attached to the form, but the fact that consent was requested but not obtained would still be recorded. For each selected health center, the total number of women who participated in the informed consent process and those who consented were recorded on the ANC information sheet, allowing principal investigators to calculate a “refusal” rate. Survey team members would not be asked to record the number who refused due to the negative connotation of the word “refusal”.

After their demographic information was recorded and their blood was drawn, participants received a thank you gift of USD \$1.5 to compensate for their time and a voucher for free voluntary counselling and HIV-testing services. Round-trip transportation fees to the VCT site would be reimbursed if the participants chose to get their blood tested for HIV at the suggested VCT. However, if the select health center has a preventing mother-to-child-transmission (PMTCT) program or VCT within the same compound, the round-trip fee for having HIV testing at VCT would not be reimbursed.

TABLE 5: SUMMARY OF THE SAMPLING APPROACH.

Sentinel groups	Sampling approach	Number of clusters	Selection of sites or clusters	Number to select per site or cluster
FEW	Cluster sampling	As needed	Take all for “former brothel” and Equal Probability for other entertainment sites	All
ANC	Consecutive	N/A	ANCs that achieve a specified number of attendees	All, until sample size reached

HIV Testing and Quality Control

HSS Testing

The new guidelines for HIV testing in surveillance recommend that a combination of two assays (Strategy II) be used for all sentinel groups, irrespective of HIV prevalence. However, we propose to use a serial (sequential) two-test algorithm for the higher prevalence group (>10%) and a parallel two-test algorithm for the lower prevalence group.

To be consistent with the HSS 2006, the proposed HIV testing strategy for HSS 2010 was based on criteria recommended by WHO and UNAIDS for purposes of surveillance when no test results would be provided to study participants. Selection of test kits for Strategy II and the order in which they would be used (i.e., test algorithm) was based on the WHO recommendation that the first test be highly sensitive in order to detect all positives, and the second test highly specific to ensure that all truly negative specimens are correctly identified as non-reactive.

The performance of rapid tests immediately after specimen collection with results potentially available on site raises concerns about confidentiality and ethical concerns about not providing test results. To resolve these issues, whole blood (vacutainer tube containing EDTA anticoagulant) was collected by venipuncture and rapid tests were conducted at an alternate site or at the same site, but at a time when participants were not present. Collection of the whole

blood would allow for preparation of dried blood spot specimens for centralized quality control and other testing.

Rapid testing was performed and dried blood spots (DBS) were prepared either on site at a time when participants were not present or at an alternate site. Determine HIV-1/2, an immuno-chromatographic rapid assay, was used as the first test in the algorithm. Sensitivity of the Determine assay is reported by the manufacturer to be 100%, and specificity 99.75%. HIV-1/2 Stat-Pak assay was used as the second test in the algorithm. Stat-Pak was used to test FEW specimens that are Determine-reactive and all ANC specimens, irrespective of Determine results. The Stat-Pak assay is reported by the manufacturer to be 100% sensitive and 100% specific.

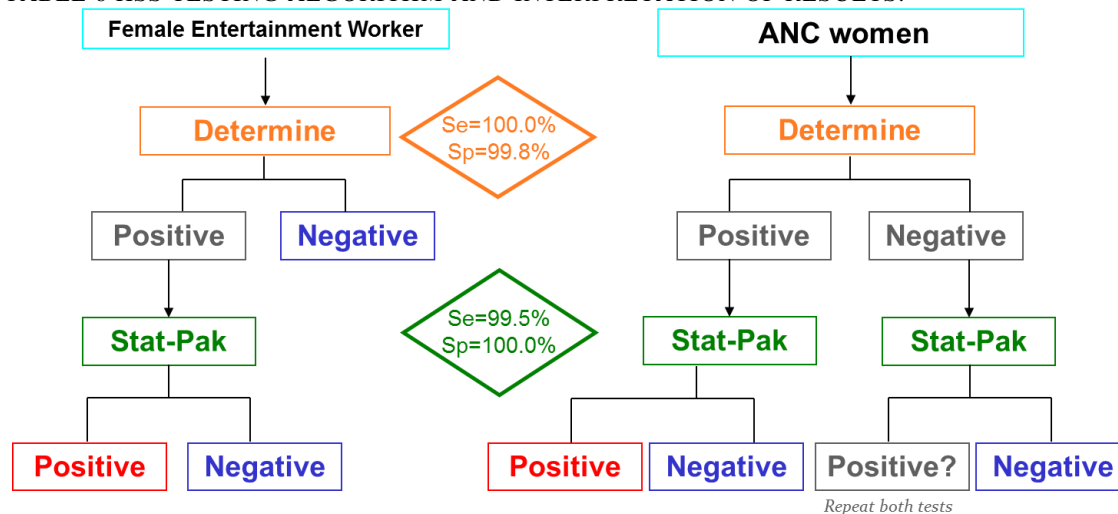
For the FEW group, a serial (sequential) two-test algorithm was used. Specimens non-reactive by Determine would be considered HIV negative. Specimens reactive by Determine would be confirmed with the results of a second rapid assay. The testing algorithm and interpretation of results is shown in Table 6.

For ANC, a parallel two-testing algorithm was used, i.e., all specimens were tested by both assays. Although Determine was shown to be 100% sensitive in the centralized evaluation, experience with HIV testing in the field (HSS 2003) showed much lower sensitivity, resulting in a potentially substantial underestimate of HIV prevalence in the ANC group had quality control testing not been conducted to correct the relatively high proportion of false negative results. In a serial testing algorithm, number of false positives is reduced by retesting all reactive specimens; false negatives, usually not expected when highly sensitive assays are used, may be undetected because nonreactive specimens are not retested. For this reason, we proposed using a parallel testing algorithm for ANC to avoid any significant impact on HIV prevalence estimates from false negatives.

The specimens that were reactive by Determine and non-reactive by Stat-Pak were considered to be HIV negative. If specimens were non-reactive by Determine and reactive by Stat-Pak, both tests would be repeated. Only if two or more results were reactive would the results be considered positive. Because HIV testing is being conducted for purposes of surveillance and not diagnosis, a third test was not used as a tiebreaker. The testing algorithm and interpretation of results is shown in Table 6 .

Survey staff recorded the results of each test performed but were not required to make the final determination of whether a specimen was positive or negative. Survey staff would, however, need to retest Determine-reactive FSW specimens with Stat-Pak and repeat both assays (Determine and Stat-Pak) for ANC specimens that had discordant results. In the latter situation, all four results would be recorded (Determine 1, Stat-Pak 1, Determine 2, and Stat-Pak 2).

TABLE 6 HSS TESTING ALGORITHM AND INTERPRETATION OF RESULTS.



Note: If same results obtained on repeat testing, interpret result as HIV positive.

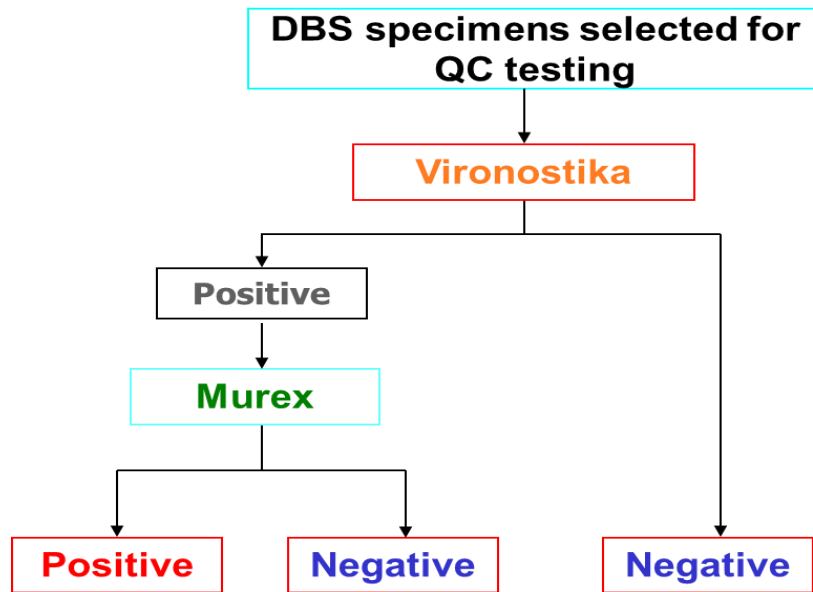
Quality Control Testing

At the time that blood was tested, two 5-spot DBS cards (one each for quality control and storage for future incidence testing) were prepared from all specimens. For those who did not consent to having leftover blood stored for future testing, only one DBS card was prepared for quality control (QC) testing only.

DBS cards were allowed to dry after which they would be properly stored with dessicant and humidity monitoring cards under refrigeration until the Central laboratory picked them up. Specimens were stored at a Central Laboratory at -80° C until processed for routine quality control testing and incidence testing. The National Lab of the National Institute of Public Health is highly qualified for conducting quality control testing.

A subset of the filter paper cards on which DBS were collected were sampled for the reference laboratory to conduct QC testing. No personally identifying information is linked to the specimen, assuring the participants' anonymity. All data was treated as confidential. NCHADS generated a random list of specimen codes for each sentinel group. A 10% random sample of specimens was selected for quality control testing from the FSW sentinel group (expected HIV prevalence greater than 10%). For the ANC group (expected HIV prevalence less than 10%), all of the reactive specimens and 10% of the non-reactive specimens were retested for quality control. Quality control testing included testing with one enzymeimmunoassay (EIA), e.g., Vironostika HIV Uni-Form II Plus O[®] (Organon Teknika), and if positive, retested with Murex HIV-1.2.O EIA (Abbott Diagnostics). Results of QC testing were compared with results of the rapid HIV testing conducted in the field.

FIGURE 3: ALGORITHM FOR QUALITY CONTROL IN HSS 2010



Incidence Testing

DBS specimens will be stored for possible future HIV incidence testing.

HIV Assays

The following HIV test kits were used in HSS 2010:

Simple rapid assays for HSS testing:

- Determine™ HIV-1/HIV-2 Assay (Abbott Diagnostics)
- HIV 1/2 STAT-PAK (Chembio Diagnostics, Inc.)

EIA for DBS Quality Control Testing:

- Vironostika HIV Uni-Form II Plus O® (Organon Teknika)
- Murex HIV-1.2.O EIA (Abbott Diagnostics)

Training

Training of HSS 2010 survey team members was conducted in 2 stages. NCHADS Surveillance Unit staff trained PAO staff and PAO staff were responsible for training their Provincial Survey Teams. The training for Provincial FEW Survey Teams and ANC clinic staff were conducted separately.

- 1) A pre-surveillance training workshop was conducted in Phnom Penh with all PAO Managers and the person responsible for surveillance from all 22 participating provinces. Training was not conducted until all preparations for the survey had been complete to avoid a long delay

between training and implementation, which could result in trained staff forgetting their roles in the survey or the loss of trained staff due to staff turnover.

- 2) Each PAO Manager was responsible for establishing a Provincial Survey Team and conducting a training workshop for their team. The Provincial Survey Team was responsible for conducting the survey among FEW, with NCHADS supervision. Training covered:
 - a) Sampling and sample selection, including mapping and eligibility criteria;
 - b) Informed consent procedures;
 - c) Specimen collection, processing, and transport;
 - d) Rapid HIV test procedures;
 - e) Record keeping and completion of survey forms (cluster information sheet, specimen information sheet) and short questionnaire, which include the consent record form, demographic information and sex work history.
- 3) A separate training was conducted for ANC clinic staff. Training covered:
 - a) Eligibility criteria;
 - b) Consecutive sampling technique for sentinel sites;
 - c) Informed consent procedures;
 - d) Specimen collection, processing, and transport;
 - e) Rapid HIV test procedures;
 - f) Record keeping and completion of forms, which includes the consent record form, demographic information form, ANC information sheet, and specimen information sheet.
- 4) Regional trainings were also conducted to cover laboratory aspects of the survey in more detail. Regional laboratory training covered:
 - a) Phlebotomy and use of vacutainer system;
 - b) Specimen handling;
 - c) HIV rapid test procedures;
 - d) Recording of results;
 - e) Dried blood spot preparation, handling, storage, and transport;
 - f) Record keeping and completion of the specimen information sheet (which includes the specimen identification number and test results).

DATA MANAGEMENT AND ANALYSIS

Data were entered into a computerised database using Epi-data software. Data entry was contracted to data clerk. Double entry was performed by a different data clerk. Data clerks were also responsible for cleaning the dataset before delivery to the Surveillance unit of NCHADS.

ETHICAL CONSIDERATIONS

The protocol was submitted for ethical review to the National Ethics Committee in Cambodia and received approval on 04 December 2009.

Informed Consent

Unlinked anonymous testing (with informed consent) was conducted and no personal identifiers or names were obtained. Coded specimens were linked only to the general demographic information and date of specimen collection.

Participation in the survey was voluntary. Surveillance staff would obtain oral informed consent from participants after reading the consent form (Appendix I) privately to each individual. The consent form emphasized the right to refuse without repercussions. Participants were asked for consent to store leftover specimens for possible further testing. Oral informed consent instead of written informed consent was offered as an additional assurance of confidentiality (i.e., eliminates the potential for a participant's signature on a form to be linked with the survey) and ensured that all participants (not just those who can read) received information about the survey, including risks, benefits, and the right to refuse to participate.

Confidentiality

All survey staff were required to sign a confidentiality agreement (Appendix II) stating that they would be subject to severe administrative and legal consequences if they released test results to anyone or behave in any way that could inadvertently disclose the identity of a participant or their test result.

As a further confidentiality safeguard, one staff member obtained informed consent, recorded a limited amount of demographic information, and collected the blood specimen and a different staff member performed HIV testing and recorded the results, either at a different location or after all survey participants had left the premises.

HIV Test Results

HIV test results were not provided to the study participants, a referral coupon was given to each participant for an HIV test at a VCT center.

There are significant procedural and methodological challenges that do not allow for the private and confidential return of HIV test results to individuals. It is not possible to return HIV test results to participants in a confidential manner, which may violate HIV Voluntary Confidential Counselling and Testing (VCCT) services standards. With respect to protocol and study design, requiring individuals to receive the results of their HIV test may discourage certain individuals or groups from participating and result in significant bias for the survey.

Cultural norms and health policy in Cambodia allow individuals to refuse to know their HIV status. National policies for voluntary confidential counselling and testing require a guarantee of privacy and receipt of HIV results in a confidential manner. In the survey setting, and given the short time frame in which the survey needed to be completed to minimize duplication, it was not possible to meet these national principles and standards. For these reasons, the Cambodia Ministry of Health does not recommend or support an initiative to require that participants receive the result of their HIV test in the context of HSS.

FINDINGS

The results from HSS 2010 are divided into 2 sections, female entertainment worker and pregnant women attending ANC.

Female Entertainment worker

Demographic Characteristics

FEW included in the HSS 2010 had a mean age of 24.6 years old. Up to 19% reported having no formal education and among those who had received schooling, the mean number of years attending school was 5.7 years.

As expected, HSS 2010 revealed that not all FEW included in the study had ever had sex or sold sex. It was found that 4% of FEW reported never having sex, while among those who have had sex, 3.4% reported never having sold sex (having sex in exchange for money or gift).

The varying levels of sexual activities among FEW made this group non-homogenous and consequently, the analysis of HIV prevalence for FEW as a single group is not informative. Detailed analysis was conducted by stratifying FEW into two strata; those who reported having 7 or fewer clients per week and those who have more than 7 clients per week. It was found that 11.3% and 88.7% reported having more than 7 clients per week and 7 or fewer clients per week, respectively.

TABLE 7: DEMOGRAPHIC CHARACTERISTICS OF FEW

EW Characteristic	%	n
Mean age in year (median)	24.6	(24)
No education	19.2	757
Mean year of education (median)	5.7	(6)
Never have sex	4.4	173
Mean age of having sex	19	(19)
Never sold sex among those ever have sex	3.4	126
Mean age of sold sex	21.2	(21)

Duration of work		
Less than 1 year	53.1	2083
1-2 years	27.7	1085
More than 2 years	19.3	755
Number of Clients per week		
Mean number of clients in the past week	3.4 (1)	
Having more than 7 clients in the past week	11.3	432
Having 7 clients or less in the past week	88.7	3390

Characteristics of FEW who reported having more than 7 clients per week were quite different from FEW who reported having 7 or less clients per week – for example, up to 34.8% of the former reported having no education while only 17.2% of the latter reported so.

In addition, a high proportion of FEW with more than 7 clients per week reported having worked as FEW for more than 2 years and having an average of 19 clients per week (about 2-3 clients per day). It has been observed that these characteristics are very similar to the direct female sex workers included into the previous rounds of HSS. Consequently, in HSS 2010, FEW who reported having 7 or more clients per week are used as a proxy for direct female sex workers when establishing trends of HIV prevalence over the years.

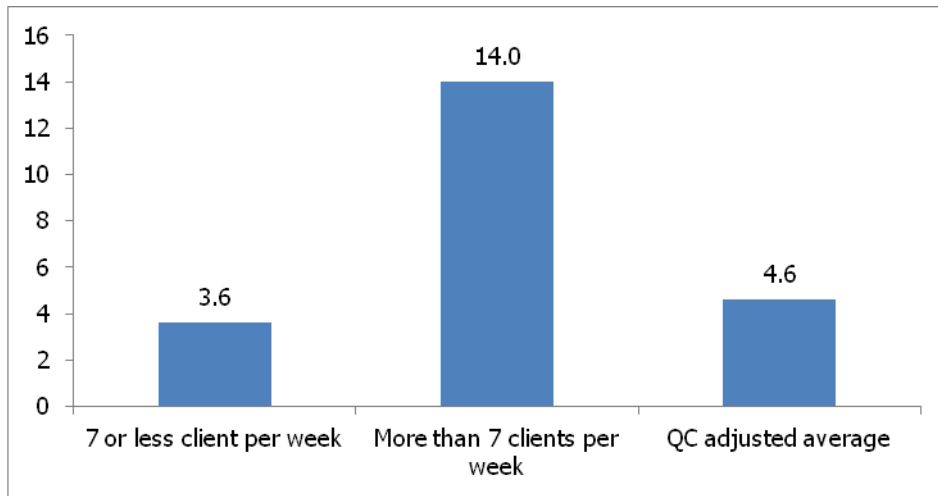
TABLE 8: CHARACTERISTICS OF FEW, BY NUMBER OF SEXUAL PARTNERS

Characteristics	More than 7 clients/week		7 or fewer clients/ week	
	%	n=432	%	n=3390
Mean age	25.9	(25)	24.4	(23)
No education	34.8	(150)	17.2	(584)
Mean year at school	4.9	(5)	5.8	(6)
Mean age at first sex	18.3	(18)	19	(19)
Mean age at first sold sex	21.5	(20)	21.9	(21)
Duration of work				
Less than 1 year	31.9	138	55.2	1869
1-2 years	27.3	118	27.8	941
More than 2 years	40.7	176	17	574
Mean number of client per week	19.3	(15)	1.4	(1)

HIV Prevalence

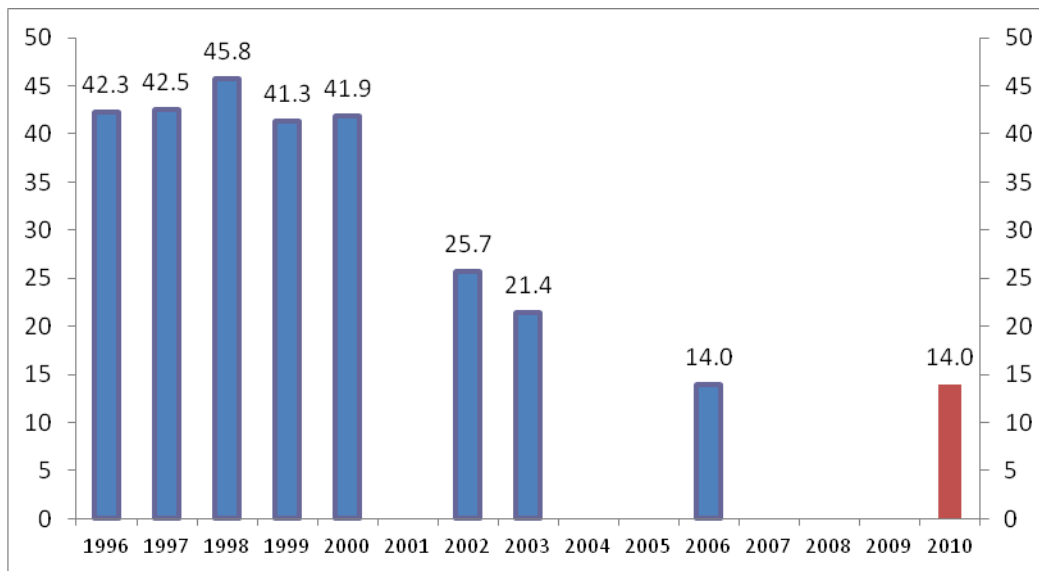
HIV prevalence was estimated for all FEW and for the two strata of FEW and adjusted for quality control. The overall HIV prevalence among FEW was 4.6%. However, due to the heterogeneity of the group, the group-specific HIV prevalence is more informative – FEW who had more than 7 clients per week had higher HIV prevalence (14%) compared to those who reported 7 or fewer clients per week (3.6%).

FIGURE 4 HIV PREVALENCE AMONG FEW, BY NUMBER OF SEXUAL PARTNER



The trend of HIV prevalence among direct female sex workers from 1996 to 2010 reveals that the HIV prevalence among direct female sex worker has been declining; however, there has been no change in HIV prevalence between 2006 and 2010.

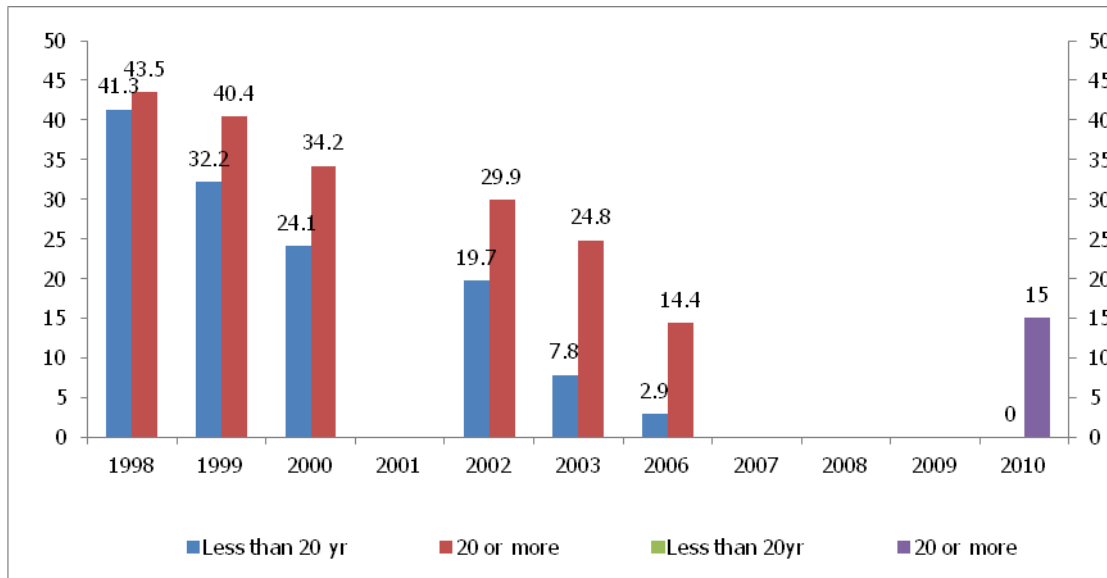
FIGURE 5: TREND OF HIV PREVALENCE AMONG DIRECT SEX WORKERS



Note: in 2010, FEW who had more than 7 clients/week was used as a proxy of DFSW

Further analysis confirmed the drop of HIV prevalence, as it was found that in 2010 the prevalence of FEW who reported having more than 7 clients per week and aged less than 20 years old was 0% indicating that the HIV prevalence among young female sex worker was very low in 2010. Note that this zero prevalence does not mean that the prevalence was actually 0% but it was due to the fact that the number of the FEW in this specific group (n=28 out of 432) was too small.

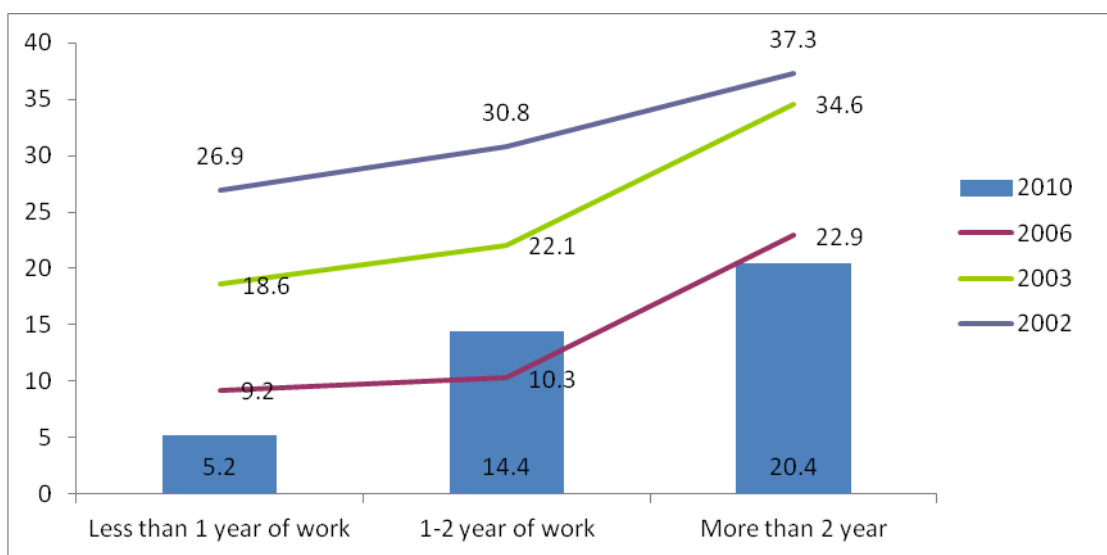
FIGURE 6 HIV PREVALENCE AMONG DIRECT FEMALE SEX WORKERS, BY AGE GROUP AND SURVEY YEARS



Note: for 2010 only FEW who had more than 7 clients/week was used

Again, the drop in HIV prevalence among direct female sex workers (or FEW who had more than 7 clients in the past week) was also seen in those reporting having worked in the entertainment establishment for less than 1 year. This reassures that new HIV infections among this group are fewer than before.

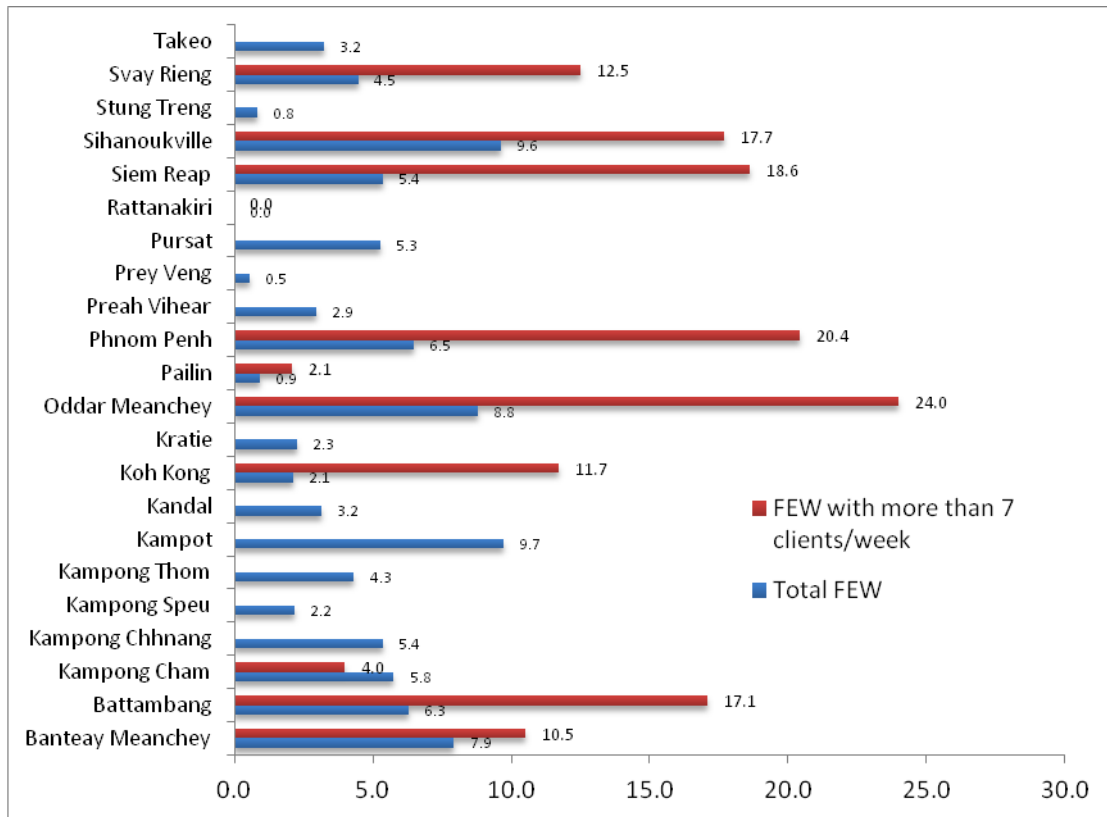
FIGURE 7: HIV PREVALENCE AMONG DIRECT FEMALE SEX WORKER BY DURATION OF WORK



Note: in 2010 FEW who had more than 7 clients per week was used

HIV prevalence among female entertainment workers who reported having more than 7 clients per week was also estimated for each province. Although HSS does not aim to provide provincial specific HIV prevalence data, this information has proven very useful for program implementers (both government and non-government) at the provincial level.

FIGURE 8: HIV PREVALENCE AMONG FEW IN 2010, BY PROVINCES



Note that due to the small number of FEW with more than 7 clients per week, the HIV province specific prevalence was not calculated if this number was less than 10.

ANC

Demographic Characteristics

Pregnant women included in HSS 2010 had a mean age of 26.2 years. About 10% of ANC women did not receive any education and among those who received formal education, the mean number of years at school was 6.8.

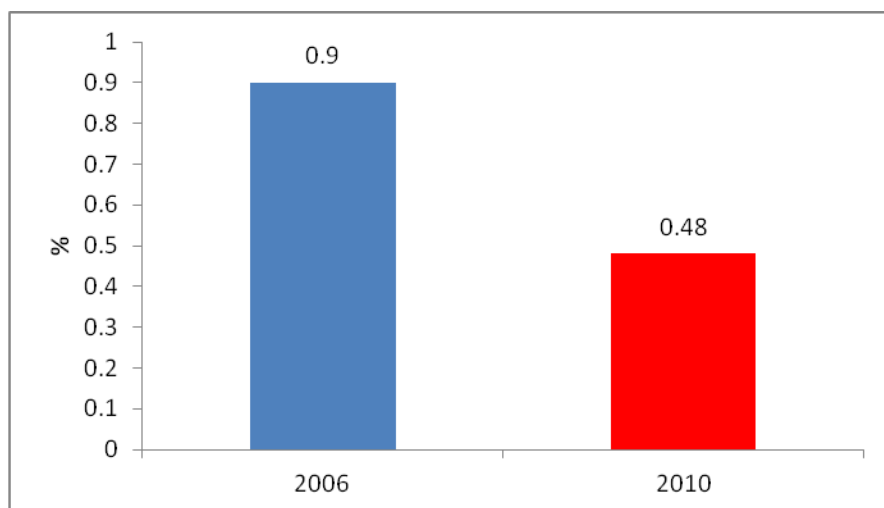
TABLE 9: CHARACTERISTICS OF ANC

Characteristics	%	n
Mean age in year (median)	26.2	(25)
No education	10.3	(1813)
Mean year of education (median)	6.8	(7)
Mean age at first sexual intercourse	21.3	(20)

HIV prevalence

HIV prevalence among ANC women in 2010, adjusted for quality control and weighted using female population in each province, was 0.48%. It has been a significant drop of HIV prevalence if compared to the prevalence reported 4 years ago.

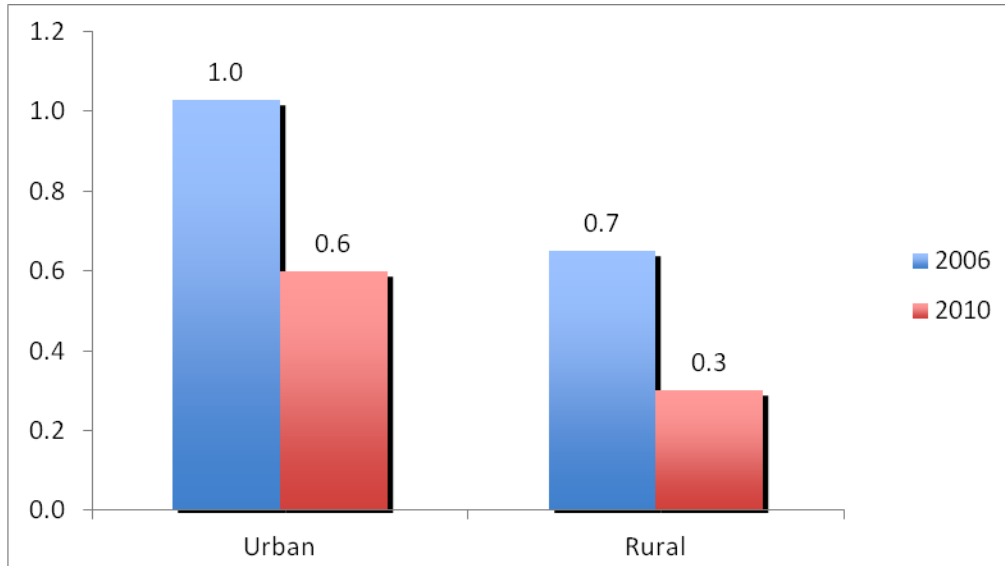
FIGURE 9: HIV PREVALENCE AMONG ANC IN 2006 & 2010



HIV prevalence among women attending ANC varied across the location of the ANC included in the survey; it was found that pregnant women who used ANC services at a health center located in a provincial town had higher HIV prevalence than pregnant women who used a health center in the remaining districts.

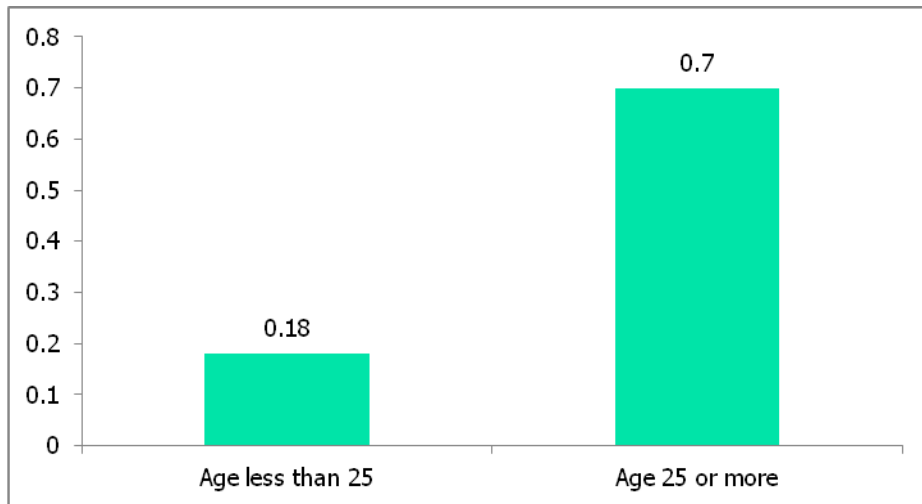
In 2010, HIV prevalence of women attending ANC in urban areas was 0.7% while only 0.3% of pregnant women attending ANC service in rural areas were infected with HIV.

FIGURE 10: HIV PREVALENCE AMONG ANC WOMEN IN URBAN AND RURAL AREAS



Further analysis revealed that the HIV prevalence among ANC women less than 25 years old was 0.2% compared to 0.7% of those who were 25 years old or older.

FIGURE 11: HIV PREVALENCE AMONG ANC WOMEN IN 2010, BY AGE GROUPS



The trend of HIV prevalence among women attending ANC has declined sharply from 0.9% in 2006 to about 0.5% in 2010.

FIGURE 12: TREND OF HIV PREVALENCE AMONG ANC FROM 1995 TO 2010

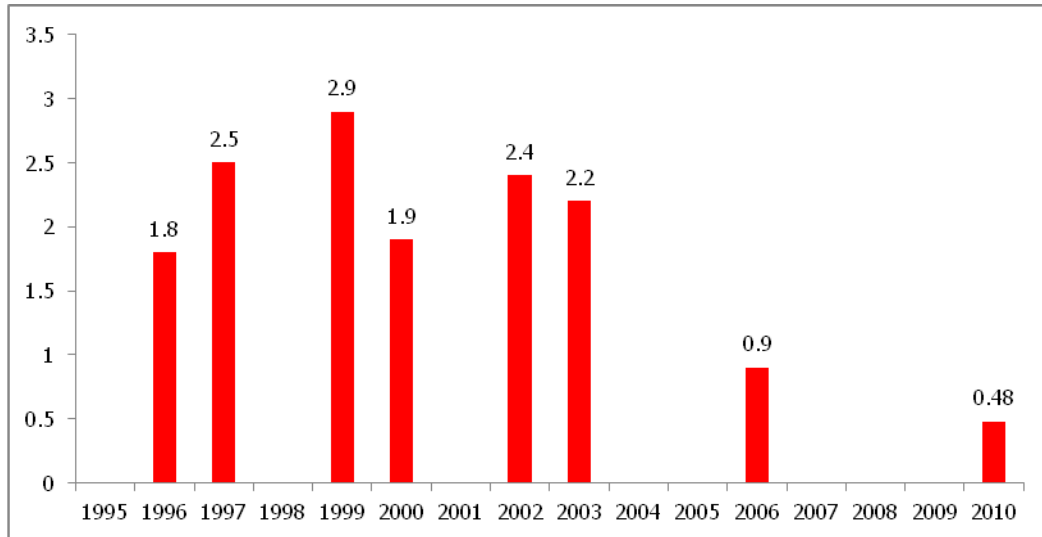
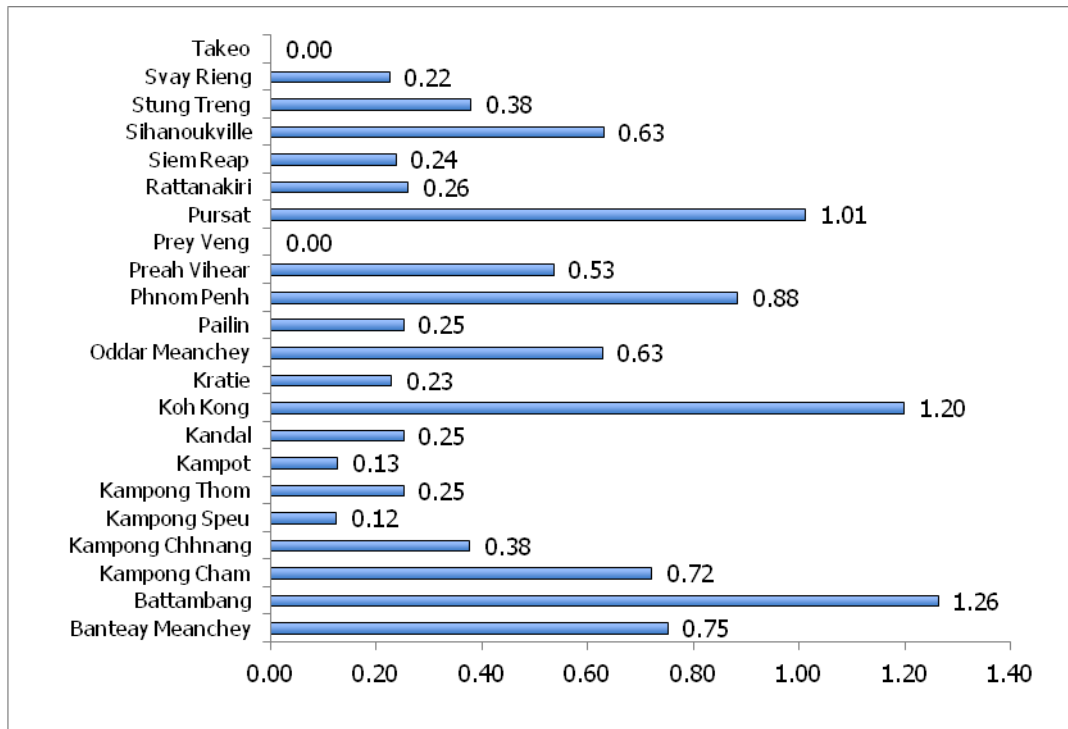


Figure 13 below presents HIV prevalence by province. Note that the prevalence among pregnant women attending ANC in some provinces has a value of 0%, perhaps because the number of pregnant women included in those provinces is not large enough to detect HIV prevalence among ANC women.

FIGURE 13: HIV PREVALENCE AMONG ANC, BY PROVINCES



CONCLUSIONS

Findings from HSS 2010 suggest that HIV prevalence among female sex workers (represented by female entertainment workers who reported having more than 7 clients per week) remained stable compared to the prevalence of 14% in 2006. The data also suggests that the number of HIV infections among young female entertainment workers and among female entertainment workers who have just started working in the field are relatively low.

A clear drop in HIV prevalence was observed when looking at the trend among pregnant women attending ANC, as there has been about a 0.4% point drop from 2006 to 2010. This declining prevalence has been confirmed by the fact that a very low proportion of pregnant women attending ANC aged less than 25 years old are HIV positive.

HSS 2010 also discovered that the demographic characteristics of female entertainment workers are heterogeneous and that using one HIV prevalence figure to represent all FEW may not be valid. Consequently, it has been recommended that in 2010 FEW should be divided into two strata, the first with FEW having 7 or fewer clients per week and the second FEW with more than 7 clients per weeks. The survey found HIV prevalence among FEW with 7 or fewer clients per week to be 3.6% and 14% among FEW with more than 7 clients per week.

The quality control adjusted and population based weighted HIV prevalence among pregnant women attending ANC in 2010 was 0.48%. Furthermore, the HIV prevalence among pregnant women who attend health centers located in provincial capitals (urban ANCs) has been consistently higher than among those who attend health centers located in the remaining districts (rural ANCs).

Based on the fact that HIV prevalence is low among FEW who just started working at entertainment establishments and among younger FEW, it can be assumed that the rate of new HIV infections among this group is low. Similar conclusions can also be made for women attending ANC since HIV prevalence among women aged less than 25 years old was low.

ANNEX: Details of HIV Prevalence by groups; province and HSS rounds

TABLE 10: HIV SEROPREVALENCE AMONG FEMALE ENTERTAINMENT WORKERS IN CAMBODIA 2010, BY PROVINCES

No.	Province/Ville	FEW with 7 more clients per weeks		FEW with 7or less clients per week		Total FEW	
		No. tested	Prev. %	No. tested	Pre.%	No. tested	Prev.%
1	Banteay Meanchey	38	10.5	149	7.4	187	8.0
2	Battambang	41	17.1	150	3.3	191	6.3
3	Kampong Cham	25	4.0	166	6.0	191	5.8
4	Kampong Chhnang	0	0.0	185	5.4	185	5.4
5	Kampong Speu	0	0.0	79	2.5	79	2.5
6	Kampong Thom	1	0.0	184	4.4	185	4.3
7	Kampot	4	25.0	99	9.1	103	9.7
8	Kandal	0	0.0	190	3.2	190	3.2
9	Koh Kong	17	11.8	170	1.2	187	2.1
10	Kratie	1	0.0	131	2.3	132	2.3
11	Oddar Meanchey	25	24.0	123	5.7	135	8.8
12	Pailin	48	2.1	62	0.0	110	0.9
13	Phnom Penh	98	20.4	289	1.7	387	6.5
14	Preah Vihear	0	0.0	170	2.9	170	2.9
15	Prey Veng	0	0.0	186	0.5	186	0.5
16	Pursat	8	12.5	181	5.0	189	5.3
17	Ratanak Kiri	17	0.0	101	0.0	118	0.0
18	Siem Reap	43	18.6	143	1.4	186	5.4
19	Sihanouk Ville	34	17.7	163	8.0	197	9.6
20	Stung Treng	5	0.0	117	0.9	122	0.8
21	Svay Rieng	24	12.5	155	3.2	179	4.5
22	Takeo	0	0.0	186	3.2	186	3.2
Total		429	14.0	3379	3.6	3808	4.7

TABLE 11: HIV PREVALENCE AMONG PREGNANT WOMEN ATTENDING ANC IN 2010, BY PROVINCES

No.	Province/Ville	ANC					
		PC		RD		PC + RD	
		No. tested	Prev. %	No. tested	Prev. %	No. tested	Prev. %
1	Banteay Meanchey	401	1.00	405	0.49	806	0.74
2	Battambang	402	2.24	401	0.25	803	1.25
3	Kampong Cham	416	0.72	425	0.71	841	0.70
4	Kampong Chhnang	400	0.75	402	0.00	802	0.37
5	Kampong Speu	414	0.00	401	0.25	815	0.12
6	Kampong Thom	400	0.25	400	0.25	800	0.25
7	Kampot	400	0.00	399	0.25	799	0.13
8	Kandal	399	0.25	403	0.25	802	0.25
9	Koh Kong	390	1.54	372	0.81	762	1.18
10	Kratie	434	0.23	449	0.22	883	0.23
11	Oddar Meanchey	400	1.00	403	0.25	798	0.62
12	Pailin	396	0.51	406	0.00	800	0.25
13	Phnom Penh	800	0.87	--	--	801	0.87
14	Preah Vihear	353	0.57	400	0.50	753	0.53
15	Prey Veng	341	0.00	400	0.00	741	0.00
16	Pursat	400	1.25	400	0.75	800	1.00
17	Ratanak Kiri	376	0.53	399	0.00	773	0.26
18	Siem Reap	426	0.23	425	0.24	851	0.24
19	Sihanouk Ville	309	0.32	491	0.81	800	0.63
20	Stung Treng	396	0.51	401	0.25	797	0.38
21	Svay Rieng	449	0.45	447	0.00	896	0.22
22	Takeo	287	0.00	419	0.00	706	0.00
Total		8990	0.62	8648	0.30	17638	0.46

¹Adjusted for quality control²PC: Provincial Capital³RD: Remaining District

TABLE 12: HIV PREVALENCE AMONG DIFFERENT SENTINELGROUPS, BY HSS ROUNDS

Sentinel group	1996		1997		1998		1999		2000		2002		2003		2006		2010	
	No. Tested	% Pos.	No. Tested	% Pos.	No. Tested	% Pos.	No. Tested	% Pos.	No. Tested	% Pos.	No. Tested	% Pos.	No. Tested	% Pos.	No. Tested	% Pos.	No. Tested	% Pos.
FSW	1,859	44.7	1,132	42.6	2,284	39.9	2,259	36.8	2,180	33.6	2,109	26.8	2,411	23.4	2,230	14.7	429	13.9
IFSW					1,358	18.4	1,488	19.3	1,799	15.6	1,232	14.3	1,633	11.7			3379	3.55
Policemen	1,775	4.9	1,325	3.9	2,650	4.8	4,141	3.7	4,711	3.7	4,375	2.5	5,796	2.5				
ANC attendees	3,429	1.5	5,003	1.9			5,397	2.1	6,562	2.1	9,166	1.8	10,867	1.6	12370	1.1	17638	0.46
Military personnel	1,429	5.9	1,249	7.1														
Tuberculosis patients	1,826	3.9	1,035	5.0			2,166	7.9	2,739	6.0	2,356	8.4						
Hospital inpatients			1,155	6.0	1,173	12.2	1,061	11.0	1,016	10.0								
MWRA					8,879	2.4												
Household men							3,069	1.8										
Household women							3,066	1.2										

Data from 1998-2006: FSW data were adjusted for quality control (QC), weighted for province-specific population size and EPP smoothed; IFSW data were QC-adjusted; police and ANC data were QC-adjusted, weighted for province-specific population size and EPP-smoothed; data for other sentinel groups were not adjusted, weighted, or smoothed

MWRA=married women of reproductive age

FSW and IFSW was replaced by Female Entertainment workers who report having 7 or more clients per day and FEW with more than 7 clients per week, respectively

TABLE 13: HIV PREVALENCE AMONG ANC WOMEN, BY YEAR AND PROVINCES

Province/Ville	HIV Sero-prevalence among ANC																			
	15-24										25 +									
	1996	1997	1998	1999	2000	2001	2002	2003	2006	2010	1996	1997	1998	1999	2000	2001	2002	2003	2006	2010
Banteay Meanchey	2.0	2.1	2.1	2.0	1.9	1.8	1.8	1.7	0.6	0.3	2.4	3.1	3.3	3.3	3.1	2.9	2.6	2.3	2.1	1.1
Battambang	0.9	1.5	1.9	2.0	2.0	1.9	1.8	1.6	1.2	0.3	1.3	2.0	2.2	2.2	2.2	2.1	2.1	2.0	1.8	1.8
Kampong Cham	0.8	1.1	1.3	1.4	1.3	1.2	1.2	1.1	0.8	0.0	1.0	1.8	2.7	3.1	3.1	3.0	2.8	2.5	0.8	1.3
Kampong Chhnang	0.8	1.3	1.6	1.7	1.7	1.5	1.4	1.2	0.0	0.0	0.9	1.5	2.0	2.2	2.2	2.1	1.9	1.7	1.6	0.6
Kampong Speu	0.5	1.0	1.6	2.2	2.6	2.7	2.7	2.7	0.0	0.0	0.7	1.3	2.1	2.7	3.0	3.2	3.2	3.1	1.2	0.2
Kampong Thom	0.3	0.6	1.0	1.5	1.9	2.1	2.1	2.0	0.0	0.3	0.8	1.5	2.1	2.4	2.5	2.4	2.4	2.3	1.1	0.2
Kampot	0.1	0.2	0.4	0.6	0.9	1.2	1.4	1.5	0.0	0.0	1.0	1.6	2.0	2.1	2.1	2.1	2.1	2.0	1.6	0.3
Kandal	1.9	1.9	1.8	1.6	1.4	1.2	1.0	0.9	0.0	0.0	2.8	2.7	2.6	2.5	2.4	2.2	2.1	1.9	1.2	0.4
Koh Kong	4.4	4.6	4.4	4.1	3.7	3.3	2.8	2.4	0.9	0.8	5.0	5.0	4.8	4.5	4.1	3.6	3.1	2.6	2.2	1.5
Kratie	0.9	0.9	0.8	0.7	0.6	0.5	0.4	0.3	0.9	0.0	1.5	1.5	1.4	1.3	1.2	1.0	0.9	0.7	0.3	0.4
Odor Meanchey									0.0	0.5									0.3	0.8
Pailin	1.3	2.4	2.9	3.0	2.9	2.8	2.7	2.5	0.8	0.0	2.2	3.2	3.6	3.6	3.5	3.3	3.1	2.8	3.5	0.5
Phnom Penh	2.4	2.7	2.6	2.4	2.2	1.9	1.7	1.4	0.7	0.0	3.3	3.6	3.5	3.3	3.0	2.7	2.4	2.0	0.9	1.4
Preah Vihear	0.1	0.1	0.2	0.4	0.6	0.7	0.8	0.8	0.0	0.3	0.2	0.3	0.6	0.9	1.2	1.4	1.4	1.4	0.8	0.7
Prey Veng	1.3	1.7	1.8	1.8	1.7	1.5	1.3	1.1	0.0	0.0	1.8	2.5	2.7	2.7	2.6	2.4	2.2	2.0	1.3	0.0
Pursat	1.8	2.1	2.1	2.0	1.9	1.7	1.4	1.2	0.8	0.9	2.7	2.6	2.5	2.3	2.1	1.9	1.6	1.4	0.7	1.1
Ratanak Kiri	1.7	1.8	1.7	1.6	1.4	1.3	1.1	0.9	0.0	0.3	2.7	2.9	2.8	2.7	2.4	2.1	1.8	1.5	0.4	0.3
Siem Reap	2.4	3.6	4.1	4.1	3.8	3.5	3.1	2.7	0.4	0.0	2.8	3.9	4.3	4.3	4.1	3.8	3.4	3.0	0.9	0.4
Sihanoukville	2.2	3.1	3.4	3.4	3.3	3.1	2.9	2.6	0.7	0.0	2.4	3.6	4.1	4.1	3.9	3.6	3.2	2.8	2.8	1.2
Stung Treng	1.3	1.9	2.1	2.1	2.0	1.8	1.7	1.5	0.6	0.0	1.8	2.5	2.7	2.7	2.5	2.4	2.2	2.0	0.5	0.7
Svay Rieng	1.7	2.1	2.2	2.1	2.0	1.8	1.5	1.3	0.0	0.3	3.0	3.3	3.3	3.1	2.8	2.5	2.1	1.8	0.9	0.2
Takeo	0.6	1.0	1.2	1.3	1.2	1.1	1.0	0.9	0.8	0.0	1.3	2.2	2.7	2.8	2.7	2.5	2.3	2.0	0.6	0.0

TABLE 14: HIV PREVALNECE AMONG DIFFERENT SENTINEL GROUPS IN BANTEY MEANCHEY PROVINCE

Province Banteay Meanchey	HIV prevalence percent, by year (Sample size)									
	1996	1997	1998	1999	2000	2001	2002	2003	2006	2010
Sentinel Group										
Female sex workers	53.1 (156)	56.2 (198)	52.7 (202)	52.5 (148)	37.8 (150)		35.4 (171)	26.7 (150)	30.7 (153)	10.53 38
<i>Data weighted for size of provincial female sex worker population Note: data in 2010 was not weighted</i>										
Age <20 years			48.8	45.5	26.3		28.2	7.7	0.0	
Age ≥ 20 years			56.8	54.0	40.8		36.5	28.5	31.8	
Indirect female sex workers			21.1 (94)	11.4 (126)	13.2 (150)		18.9 (45)	5.3 (150)		7.38 149
<i>Data not weighted</i>										
Age <20 years										0
Age ≥20 years										8.03
Sentinel Group										
<i>Data weighted for size of provincial population and smoothed with EPP</i>										
Policemen	10.6 (68)	9.6 No Survey ⁵	8.6 (160)	7.5 (150)	6.4 (150)	5.3 No Survey ⁵	4.2 (170)	3.3 (300)		
ANC PC	2.6	3.1	3.2	3.2	3.0	2.7	2.5	2.2	1.3	1.00
ANC RD	2.0	2.7	2.9	2.9	2.7	2.5	2.2	1.9	1.3	0.49
Total ANC (PC+RD)	2.2	2.9	3.2	3.1	2.9	2.6	2.3	2.0	1.3	0.74
Sample size	(178)	(263)	(420) ⁴	(106)	(150)	No Survey ⁵	(250)	(600)	(600)	(806)

¹All data adjusted for results of laboratory quality control

²PC=Provincial capital,

³RD=Remaining district,

⁴Women at reproductive age, includes pregnant and non pregnant women

⁵Group not surveyed, prevalence estimate obtained by modeling with EPP

HSS 2010 FSW and IFSW was replaced by Female Entertainment workers who report having 7 or more clients per day and FEW with more than 7 clients per week, respectively

TABLE 15: HIV PREVALENCE AMONG DIFFERENT SENTINEL GROUPS IN BATAMBANG

Province Battambang	HIV prevalence percent, by year (Sample size)									
	1996	1997	1998	1999	2000	2001	2002	2003	2006	2010
Sentinel Group										
Female sex workers	56.5	46.7	52.1	40.0	31.0		11.9	29.5	14.2	17.10
<i>Data weighted for size of provincial female sex worker population</i>	(156)	(102)	(150)	(161)	(147)		(159)	(149)	(148)	41
Age <20 years			47.1	19.5	25.7		5.9	14.6	0.0	
Age ≥ 20 years			54.0	44.9	32.9		13.2	35.2	16.0	
Indirect female sex workers			19.5	20.2	23.1		11.5	9.3		3.33
<i>Data not weighted</i>			(103)	(101)	(150)		(130)	(150)		150
Age <20 years										0
Age ≥ 20 years										4
Sentinel Group										
<i>Data weighted for size of provincial population and smoothed with EPP</i>	1996	1997	1998	1999	2000	2001	2002	2003	2006	2010
Policemen	9.5	8.8	7.9	7.0	6.0	5.0	4.1	3.3		
	(86)	(126)	(152)	(160)	(298)	No Survey ⁵	(298)	(311)		
ANC PC² = 1 site in 2006	1.2	1.9	2.2	2.2	2.2	2.1	2.0	1.9	1.7	2.24
ANC RD³ = 3 sites in 2006	1.0	1.7	2.0	2.0	2.0	1.9	1.8	1.7	1.3	0.25
Total ANC (PC+RD)	1.1	1.8	2.1	2.1	2.1	2.0	1.9	1.8	1.5	1.25
	(180)	(253)	(800) ⁴	(374)	(401)	No Survey ⁵	(600)	(600)	(600)	(803)

TABLE 16: HIV PREVALENCE AMONG DIFERENT SENTINEL GROUP IN KAMPONG CHAM PROVINCE

Province Kampong Cham	HIV prevalence percent, by year (Sample size)									
	1996	1997	1998	1999	2000	2001	2002	2003	2006	2010
Sentinel Group										
Female sex workers <i>Data weighted for size of provincial female sex worker population</i>	30.1 (154)		30.1 (150)	34.0 (157)	30.4 (150)		23.3 (133)	17.3 (150)	11.1 (126)	4.0 (25)
Age <20 years			32.0	24.1	19.1		26.3	12.1	0.0	
Age ≥ 20 years			28.8	37.9	33.0		22.4	18.8	12.1	
Indirect female sex workers <i>Data not weighted</i>			9.0 (100)	26.9 (200)	14.8 (152)		13.9 (98)	14.7 (150)		6.02 166
Age <20 years										0
Age ≥ 20 years										7.3
Sentinel Group <i>Data weighted for size of provincial population and smoothed with EPP</i>	1996	1997	1998	1999	2000	2001	2002	2003	2006	2010
Policemen	2.7 (161)	3.0 (112)	3.0 (150)	2.9 (301)	2.7 (299)	2.5 No Survey ⁵	2.3 (307)	2.2 (300)		
ANC PC² = 2 site in 2006	0.9	1.7	2.3	2.5	2.6	2.5	2.4	2.2	0.7	0.72
ANC RD³ = 3 sites in 2006	0.6	1.2	1.9	2.3	2.3	2.2	2.1	1.8	0.8	0.71
Total ANC (PC+RD)	0.8 (232)	1.5 (268)	2.1 (600) ⁴	2.4 (566)	2.5 (487)	2.4 No Survey ⁵	2.3 (715)	2.1 (600)	0.8 (600)	0.70 (841)

TABLE 17: HIV PREVALENCE AMONG SENTINEL GROUPS IN KAMPONG CHHNANG

Province Kampong Chhnang	HIV prevalence percent, by year (Sample size)									
	1996	1997	1998	1999	2000	2001	2002	2003	2006	2010
Sentinel Group										
Female sex workers <i>Data weighted for size of provincial female sex worker population</i>	39.5 (116)	43.9 (130)	40.0 (150)	45.7 (130)	42.9 (112)		34.8 (68)	24.0 (96)	12.5 (72)	0.0 0
Age <20 years			49.2	34.2	20.5		13.9	5.3	0.0	
Age ≥ 20 years			37.5	47.5	46.6		37.5	28.6	13.0	
Indirect female sex workers <i>Data not weighted</i>			13.7 (88)	24.0 (47)	13.0 (38)		22.4 (29)	10.0 (40)		5.43 184
Age <20 years										0
Age ≥20 years										6.2
Sentinel Group <i>Data weighted for size of provincial population and smoothed with EPP</i>	1996	1997	1998	1999	2000	2001	2002	2003	2006	2010
Policemen	3.2 (171)	3.1 No Survey ⁵	2.9 (150)	2.8 (298)	2.6 (300)	2.4 No Survey ⁵	2.2 (285)	2.0 (300)		
ANC PC² = 2 site in 2006	0.9	1.9	2.8	3.1	3.1	2.9	2.6	2.3	1.4	0.75
ANC RD³ = 3 sites in 2006	0.6	1.0	1.4	1.6	1.7	1.6	1.5	1.4	0.7	0.0
Total ANC (PC+RD)	0.7 (258)	1.4 (222)	1.8 (400) ⁴	2.0 (301)	2.0 (300)	1.9 No Survey ⁵	1.7 (500)	1.5 (599)	1.0 (596)	0.37 (802)

TABLE 18: HIV PREVALENCE AMONG DIFFERENT SENTINEL GROUP IN KAMPONG SPEU

Province Kampong Speu	HIV prevalence percent, by year (Sample size)									
	1996	1997	1998	1999	2000	2001	2002	2003	2006	2010
Sentinel Group										
Female sex workers <i>Data weighted for size of provincial female sex worker population</i>	49.6 (115)		46.7 (119)	35.7 (96)	37.3 (117)		31.4 (119)	20.4 (108)	11.6 (112)	0 0
Age <20 years			34.8	37.6	46.8		9.8	11.8	0.0	
Age ≥ 20 years			49.2	34.7	35.6		34.0	23.1	12.2	
Indirect female sex workers <i>Data not weighted</i>			9.0 (25)	11.4 (20)	29.3 (22)		1.6 (20)	- (11)		2.54 79
Age <20 years										0
Age ≥ 20 years										3.08
Sentinel Group <i>Data weighted for size of provincial population and smoothed with EPP</i>	1996	1997	1998	1999	2000	2001	2002	2003	2006	2010
Policemen	2.3 92	2.8 No Survey ⁵	3.0 150	2.9 300	2.7 300	2.5 No Survey ⁵	2.2 (285)	1.9 (300)		
ANC PC² = 2 site in 2006	0.7	1.4	2.1	2.6	2.9	2.9	2.9	2.9	1.0	0.0
ANC RD³ = 3 sites in 2006	0.5	1.1	1.8	2.3	2.6	2.7	2.7	2.7	0.3	0.25
Total ANC (PC+RD)	0.6 (210)	1.2 (250)	1.9 (400) ⁴	2.4 (265)	2.7 (300)	2.8 No Survey ⁵	2.8 (498)	2.8 (500)	0.7 (594)	0.12 (815)

TABLE 19: HIV PREVALENCE AMONG DIFFERENT SENTINEL GROUP IN KAMPONG THOM PROVINCE

Province Kampong Thom	HIV prevalence percent, by year (Sample size)									
	1996	1997	1998	1999	2000	2001	2002	2003	2006	2010
Sentinel Group										
Female sex workers <i>Data weighted for size of provincial female sex worker population</i>			34.2 (95)	35.2 (78)	29.2 (82)		20.6 (84)	26.7 (90)	10.1 (89)	0.0 1
Age <20 years			30.0	35.2	34.0		3.2	-	5.9	
Age ≥ 20 years			35.1	34.1	28.0		22.4	31.2	11.1	
Indirect female sex workers <i>Data not weighted</i>			31.2 (79)	23.6 (51)	15.0 (52)		9.7 (53)	14.0 (50)		4.35 184
Age <20 years										0
Age ≥20 years										5.03
Sentinel Group <i>Data weighted for size of provincial population and smoothed with EPP</i>										
Policemen	2.5 No Survey ⁵	2.4 (105)	2.3 (146)	2.1 (294)	1.9 (300)	1.7 No Survey ⁵	1.5 (285)	1.2 (299)		
ANC PC² = 2 site in 2006	0.6	1.1	1.8	2.2	2.4	2.4	2.4	2.3	0.7	0.25
ANC RD³ = 3 sites in 2006	0.3	0.7	1.2	1.6	1.9	2.0	2.0	1.9	0.7	0.25
Total ANC (PC+RD)	0.5 No Survey ⁵	1.0 (248)	1.6 (395) ⁴	2.0 (250)	2.2 (300)	2.2 No Survey ⁵	2.2 (473)	2.1 (600)	0.7 (595)	0.25 (800)

TABLE 20: HIV PREVALENCE AMONG SENTINEL GROUP IN KAMPOT PROVINCE

Province Kampot	HIV prevalence percent, by year (Sample size)									
	1996	1997	1998	1999	2000	2001	2002	2003	2006	2010
Sentinel Group										
Female sex workers <i>Data weighted for size of provincial female sex worker population</i>	41.9 (77)		58.9 (67)	53.4 (56)	42.3 (57)		32.4 (53)	19.5 (77)	5.6 (54)	25.0 4
Age <20 years			59.2	47.7	31.7		27.7	-	0.0	
Age ≥ 20 years			58.9	54.2	45.3		33.1	20.8	5.9	
Indirect female sex workers <i>Data not weighted</i>			22.7 (62)	11.9 (47)	30.2 (64)		8.4 (38)	16.9 (59)		9.09 99
Age <20 years										0
Age ≥ 20 years										9.57
Sentinel Group <i>Data weighted for size of provincial population and smoothed with EPP</i>										
Policemen	4.3 (105)	3.9 (118)	3.5 (147)	3.0 (155)	2.5 (302)	2.0 No Survey ⁵	1.6 (297)	1.2 (303)		
ANC PC² = 1 site in 2006	0.6	1.1	1.5	1.6	1.7	1.7	1.7	1.7	1.7	0.0
ANC RD³ = 3 sites in 2006	0.3	0.6	1.1	1.4	1.5	1.6	1.5	1.5	0.0	0.25
Total ANC (PC+RD)	0.4 (208)	0.8 (275)	1.2 (407) ⁴	1.5 (255)	1.6 (306)	1.6 No Survey ⁵	1.6 (500)	1.6 (600)	0.8 (592)	0.13 (799)

TABLE 21: HIV PREVALENCE AMONG SENTINEL GROUP IN KANDAL PROVINCE

Province Kandal	HIV prevalence percent, by year (Sample size)									
	1996	1997	1998	1999	2000	2001	2002	2003	2006	2010
Sentinel Group										
Female sex workers <i>Data weighted for size of provincial female sex worker population</i>	17.4 (105)	22.4 (115)	24.4 (103)	37.0 (104)	27.0 (78)		23.0 (100)	16.8 (130)	3.1 (130)	0.0 0
Age <20 years			36.5	36.0	7.5		13.1	-	0.0	
Age ≥ 20 years			22.0	36.4	34.0		26.4	11.8	4.1	
Indirect female sex workers <i>Data not weighted</i>			9.8 (100)	17.3 (100)	25.7 (65)		12.4 (40)	12.4 (98)		3.26 190
Age <20 years										0
Age ≥20 years										3.8
Sentinel Group <i>Data weighted for size of provincial population and smoothed with EPP</i>	1996	1997	1998	1999	2000	2001	2002	2003	2006	2010
Policemen	6.8 (97)	6.4 (162)	6.0 (150)	5.4 (150)	4.7 (150)	4.1 No Survey ⁵	3.4 (142)	2.8 (169)		
ANC PC² = 1 site in 2006	2.7	3.3	3.4	3.2	3.0	2.7	2.3	2.0	0.7	0.25
ANC RD³ = 4 sites in 2006	1.8	1.6	1.4	1.2	1.1	0.9	0.7	0.6	0.7	0.25
Total ANC (PC+RD)	2.5 (200)	2.5 (208)	2.4 (400) ⁴	2.2 (300)	2.1 (300)	1.9 No Survey ⁵	1.8 (495)	1.6 (397)	0.7 (574)	0.25 (802)

TABLE 22: HIV PREVALENCE AMONG SENTINEL GROUP IN KOH KONG PROVINCES

Province: Koh Kong	HIV prevalence percent, by year (Sample size)									
	1996	1997	1998	1999	2000	2001	2002	2003	2006	2010
Sentinel Group										
Female sex workers <i>Data weighted for size of provincial female sex worker population</i>	51.1 (119)	51.0 (100)	41.5 (134)	45.2 (151)	52.9 (140)		47.0 (112)	29.0 (100)	20.7 (82)	11.80 17
Age <20 years			40.0	50.4	32.6		32.6	-	0.0	
Age ≥ 20 years			44.9	42.4	56.6		53.4	36.7	23.9	
Indirect female sex workers <i>Data not weighted</i>			17.1 (74)		15.2 (83)		12.5 (71)	2.4 (123)		1.18 170
Age <20 years										0
Age ≥20 years										1.54
Sentinel Group <i>Data weighted for size of provincial population and smoothed with EPP</i>										
Policemen	16.0 (7)	19.7 (100)	20.5 (151)	19.8 (150)	18.4 (149)	16.7 No Survey ⁵	14.8 (107)	12.8 (167)		
ANC PC² = 2 site in 2006	5.0	4.9	4.7	4.4	4.0	3.7	3.2	2.8	1.6	1.54
ANC RD³ = 0 sites in 2006	4.5	4.4	4.1	3.7	3.3	2.9	2.5	2.1		0.81
Total ANC (PC+RD)	4.7 (38)	4.8 (82)	4.6 (252) ⁴	4.3 (100)	3.9 (159)	3.4 No Survey ⁵	3.0 (211)	2.5 (134)	1.6 (249)	1.18 (762)

TABLE 23: HIV PREVALENCE AMONG SENTINEL GROUP IN KRATIE PROVINCE

Province Kratie	HIV prevalence percent, by year (Sample size)									
	1996	1997	1998	1999	2000	2001	2002	2003	2006	2010
Sentinel Group										
Female sex workers <i>Data weighted for size of provincial female sex worker population</i>	30.6 (77)		27.5 (100)	29.5 (102)	33.0 (81)		24.2 (90)	11.1 (81)	9.1 (44)	0.0 1
Age <20 years			27.5	21.8	38.4		3.2	-	0.0	
Age ≥ 20 years			27.5	30.5	30.9		27.4	13.0	10.5	
Indirect female sex workers <i>Data not weighted</i>			9.7 (56)	21.9 (35)	16.9 (57)		13.1 (45)	1.6 (61)		2.29 131
Age <20 years										0
Age ≥ 20 years										2.56
Sentinel Group <i>Data weighted for size of provincial population and smoothed with EPP</i>	1996	1997	1998	1999	2000	2001	2002	2003	2006	2010
Policemen	2.2 (108)	2.1 No Survey ⁵	2.0 (137)	1.8 (303)	1.7 (300)	1.5 No Survey ⁵	1.4 (300)	1.2 (301)		
ANC PC² = 2 site in 2006	1.3	1.3	1.3	1.2	1.1	0.9	0.8	0.7	1.0	0.23
ANC RD³ = 3 sites in 2006	0.9	0.8	0.8	0.7	0.6	0.6	0.5	0.4	0.0	0.22
Total ANC (PC+RD)	1.2 (350)	1.1 (270)	1.0 (810) ⁴	0.9 (200)	0.8 (254)	0.7 No Survey ⁵	0.6 (419)	0.5 (498)	0.5 (593)	0.23 (883)

TABLE 24: HIV PREVALENCE AMONG SENTINEL GROUP IN ODDAR MEAN CHEY PROVINCE

Province Oddar Meanchey	HIV prevalence percent, by year (Sample size)								
	1996	1997	1998	1999	2000	2002	2003	2006	2010
Sentinel Group									
Female sex workers <i>Data weighted for size of provincial female sex worker population</i>							25.5 (110)	12.6 (119)	24.0 25
Age <20 years							29	4.2	
Age ≥ 20 years							31.1	14.7	
Indirect female sex workers <i>Data not weighted</i>							21.1 (19)		5.69 123
Age <20 years									6.36
Age ≥20 years									0
Sentinel Group <i>Data weighted for size of provincial population and smoothed with EPP</i>	1996	1997	1998	1999	2000	2002	2003	2006	2010
Policemen							(300)		
ANC PC² = 1 site in 2006								0.0	1.00
ANC RD³ = 4 sites in 2006								0.3	0.25
Total ANC (PC+RD)							(471)	(598)	(798)

TABLE 25: HIV PREVALENCE AMONG SENTINELS GROUP IN PAILIN

Province Pailin	HIV prevalence percent, by year (Sample size)									
	1996	1997	1998	1999	2000	2001	2002	2003	2006	2010
Sentinel Group										
Female sex workers <i>Data weighted for size of provincial female sex worker population</i>				37.1 (110)	45.8 (124)		29.2 (109)	29.0 (131)	10.5 (76)	2.1 48
Age <20 years				17.1	30.2		20.3	14.3	0.0	
Age ≥ 20 years				19.9	40.2		31.2	31.8	12.7	
Indirect female sex workers <i>Data not weighted</i>				13.4 (69)	9.0 (70)		5.2 (24)	9.1 (44)		0 62
Age <20 years										0
Age ≥ 20 years										0
Sentinel Group <i>Data weighted for size of provincial population and smoothed with EPP</i>	1996	1997	1998	1999	2000	2001	2002	2003	2006	2010
Policemen	2.6 No Survey ⁵	4.1 No Survey ⁵	5.4 No Survey ⁵	6.1 (162)	6.4 (61)	6.3 No Survey ⁵	6.1 (93)	5.8 (121)		
ANC PC² = 1 site in 2006	2.3	3.1	3.4	3.4	3.4	3.3	3.3	3.2	2.3	0.51
ANC RD³ = 2 sites in 2006	1.4	2.4	3.0	3.2	3.1	2.9	2.6	2.3	1.8	0.00
Total ANC (PC+RD)	1.8 No Survey ⁵	2.6 No Survey ⁵	3.1 No Survey ⁵	3.3 (181)	3.3 (182)	3.1 No Survey ⁵	2.9 (341)	2.7 (99)	2.1 (470)	0.25 (800)

TABLE 26: HIV PREVALENCE AMONG SENTINEL GROUP IN PHNOM PENH

Province Phnom Penh	HIV prevalence percent, by year (Sample size)									
	1996	1997	1998	1999	2000	2001	2002	2003	2006	2010
Sentinel Group										
Female sex workers <i>Data weighted for size of provincial female sex worker population</i>	42.0 (173)	44.4 (162)	59.1 (150)	49.8 (154)	27.6 (152)		19.2 (162)	23.8 (147)	11.3 (142)	20.4 98
Age <20 years			54.3	46.8	29.2		13.9	11.6	3.8	
Age ≥ 20 years			60.5	52.0	26.6		20.8	28.8	15.7	
Indirect female sex workers <i>Data not weighted</i>			8.1 (100)	8.4 (210)	10.7 (153)		13.5 (145)	14.0 (136)		1.73 289
Age <20 years										0
Age ≥ 20 years										2.09
Sentinel Group <i>Data weighted for size of provincial population and smoothed with EPP</i>	1996	1997	1998	1999	2000	2001	2002	2003	2006	2010
Policemen	7.5 (153)	7.5 No Survey ⁵	7.2 (150)	6.7 (153)	6.1 (166)	5.5 No Survey ⁵	4.7 (169)	4.0 (258)		
ANC PC² = 2 site in 2006	3.0 (186)	2.9 (248)	2.7 (400) ⁴	2.5 (511)	2.3 (600)	2.1 No Survey ⁵	1.9 (696)	1.7 (572)	0.8 (599)	0.87 (801)

TABLE 27: HIV PREVALENCE AMONG SENTINEL GROUP IN PREAH VIHEAR PROVINCE

Province Preah Vihear	HIV prevalence percent, by year (Sample size)									
	1996	1997	1998	1999	2000	2001	2002	2003	2006	2010
Sentinel Group										
Female sex workers		25.0			15.4		29.0	19.6	4.4	0.0
<i>Data weighted for size of provincial female sex worker population</i>		(20)			(46)		(50)	(46)	(135)	0
Age <20 years					10.9		3.2	-	0.0	
Age ≥ 20 years					16.8		32.5	22.5	13.2	
Indirect female sex workers					8.3		1.6	10.3		2.96
<i>Data not weighted</i>					(39)		(17)	(29)		169
Age <20 years										3.33
Age ≥20 years										0
Sentinel Group										
<i>Data weighted for size of provincial population and smoothed with EPP</i>										
Policemen	1.6	1.8	1.8	1.7	1.6	1.5	1.4	1.2		
	No Survey ⁵	101	No Survey ⁵	No Survey ⁵	(277)	No Survey ⁵	(227)	(300)		
ANC PC² = 2 site in 2006									0.4	0.57
ANC RD³ = 4 sites in 2006									0.8	0.50
Total ANC (PC+RD)	0.1	0.2	0.4	0.7	0.9	1.1	1.1	1.1	0.6	0.53
	No Survey ⁵	183	No Survey ⁵	No Survey ⁵	296	No Survey ⁵	432	(568)	(539)	(753)

TABLE 28: HIV PREVALENCE AMONG SENTINEL GROUP IN PREY VENG PROVINCE

Province Prey Veng	HIV prevalence percent, by year (Sample size)									
	1996	1997	1998	1999	2000	2001	2002	2003	2006	2010
Sentinel Group										
Female sex workers <i>Data weighted for size of provincial female sex worker population</i>	31.6 (91)		31.3 (150)	17.0 (150)	19.4 (149)		18.0 (151)	13.8 (130)	11.1 (63)	0 0
Age <20 years			42.7	14.5	3.1		21.1	5.6	0.0	
Age ≥ 20 years			27.1	17.5	21.5		16.5	15.2	5.9	
Indirect female sex workers <i>Data not weighted</i>			31.1 (100)	28.5 (100)	11.5 (149)		12.4 (32)	9.5 (63)		0.54 186
Age <20 years										0
Age ≥20 years										0.6
Sentinel Group <i>Data weighted for size of provincial population and smoothed with EPP</i>	1996	1997	1998	1999	2000	2001	2002	2003	2006	2010
Policemen	3.5 (133)	3.6 No Survey ⁵	3.5 (150)	3.2 (150)	3.0 (150)	2.7 No Survey ⁵	2.4 (157)	2.0 (286)		
ANC PC² = 2 site in 2006	1.9	2.4	2.5	2.5	2.4	2.4	2.3	2.3	0.7	0.0
ANC RD³ = 3 sites in 2006	1.4	1.6	1.7	1.6	1.6	1.5	1.5	1.4	0.9	0.0
Total ANC (PC+RD)	1.5 (452)	2.1 (230)	2.3 (400) ⁴	2.3 (190)	2.3 (300)	2.1 No Survey ⁵	2.0 (500)	1.8 (582)	0.8 (599)	0.0 (741)

TABLE 29: HIV PREVALENCE AMONG SENTINEL GROUP IN PURSAT PROVINCE

Province Pursat	HIV prevalence percent, by year (Sample size)									
	1996	1997	1998	1999	2000	2001	2002	2003	2006	2010
Sentinel Group										
Female sex workers <i>Data weighted for size of provincial female sex worker population</i>	48.8 (103)		61.5 (131)	53.6 (100)	57.5 (70)		57.7 (71)	23.4 (128)	9.6 (115)	12.5 8
Age <20 years			56.5	30.7	30.9		46.1	7.4	6.3	
Age ≥ 20 years			62.6	57.4	61.8		60.5	27.7	10.1	
Indirect female sex workers <i>Data not weighted</i>			26.0 (25)	22.4 (17)	10.9 (75)		13.4 (66)	14.8 (27)		4.97 181
Age <20 years										0
Age ≥20 years										5.96
Sentinel Group <i>Data weighted for size of provincial population and smoothed with EPP</i>	1996	1997	1998	1999	2000	2001	2002	2003	2006	2010
Policemen	3.2 (58)	3.5 (137)	3.5 (153)	3.3 (299)	3.0 (303)	2.7 No Survey ⁵	2.3 (302)	2.0 (300)		
ANC PC² = 2 site in 2006	3.3	3.2	3.0	2.7	2.4	2.1	1.8	1.5	1.0	1.25
ANC RD³ = 4 sites in 2006	1.2	1.6	1.8	1.8	1.7	1.5	1.3	1.2	0.5	0.75
Total ANC (PC+RD)	2.2 (174)	2.4 (279)	2.4 (404) ⁴	2.2 (103)	2.0 (400)	1.8 No Survey ⁵	1.5 (500)	1.3 (601)	0.8 (669)	1.00 (800)

TABLE 30: HIV PREVALENCE AMONG SENTINEL GROUP IN RATANAKIRI PROVINCE

Province Ratanak Kiri	HIV prevalence percent, by year (Sample size)									
	1996	1997	1998	1999	2000	2001	2002	2003	2006	2010
Sentinel Group										
Female sex workers	36.2	35.5	24.3	49.4	23.4		14.3	21.6	5.3	0.0
<i>Data weighted for size of provincial female sex worker population</i>	(20)	(38)	(33)	(32)	(23)		(31)	(37)	(57)	17
Age <20 years			18.2	51.4	18.6		3.2	16.7	9.4	
Age ≥ 20 years			25.9	48.5	24.9		18.8	22.6	0.0	
Indirect female sex workers			22.0	16.0	27.7		5.9	-		0
<i>Data not weighted</i>			(30)	(32)	(40)		(20)	(9)		101
Age <20 years										0
Age ≥20 years										0
Sentinel Group										
<i>Data weighted for size of provincial population and smoothed with EPP</i>										
Policemen	0.5	1.1	1.8	2.3	2.5	2.5	2.4	2.2		
	(74)	(111)	No Survey ⁵	(98)	(96)	No Survey ⁵	(140)	(147)		
ANC PC² = 2 site in 2006	2.5	2.5	2.3	2.2	2.0	1.7	1.5	1.3	0.3	0.53
ANC RD³ = 4 sites in 2006	1.5	1.7	1.6	1.5	1.4	1.2	1.1	0.9	0.0	0.00
Total ANC (PC+RD)	2.2	2.2	2.1	1.9	1.7	1.5	1.3	1.1	0.2	0.26
	(113)	(201)	(386) ⁴	(183)	(310)	No Survey ⁵	(399)	(411)	(559)	(773)

TABLE 31: HIV PREVALENCE AMONG SENTINEL GROUPS IN SIEM REAP PROVINCE

Province Siem Reap	HIV prevalence percent, by year (Sample size)									
	1996	1997	1998	1999	2000	2001	2002	2003	2006	2010
Sentinel Group										
Female sex workers <i>Data weighted for size of provincial female sex worker population</i>	48.4 (100)		38.8 (150)	24.1 (150)	28.6 (150)		34.9 (160)	24.5 (151)	20.4 (98)	18.6 43
Age <20 years			25.9	17.2	22.5		23.4	6.7	0.0	
Age ≥ 20 years			46.1	28.3	32.6		37.9	32.1	21.7	
Indirect female sex workers <i>Data not weighted</i>			30.2 (100)	22.2 (100)	19.0 (150)		20.6 (150)	18.0 (151)		1.4 143
Age <20 years										0
Age ≥20 years										1.63
Sentinel Group <i>Data weighted for size of provincial population and smoothed with EPP</i>	1996	1997	1998	1999	2000	2001	2002	2003	2006	2010
Policemen	8.3 (100)	7.7 No Survey ⁵	7.0 (150)	6.2 (150)	5.3 (140)	4.4 No Survey ⁵	3.6 (169)	2.9 (301)		
ANC PC² = 3 site in 2006	2.8	4.7	5.7	5.9	5.7	5.3	4.8	4.2	0.3	0.23
ANC RD³ = 4 sites in 2006	2.4	2.8	2.9	2.7	2.5	2.2	1.9	1.7	1.0	0.24
Total ANC (PC+RD)	2.6 (248)	3.7 (204)	4.2 (400) ⁴	4.2 (300)	3.9 (300)	3.6 No Survey ⁵	3.3 (500)	2.9 (600)	0.7 (600)	0.24 (851)

TABLE 32: HIV PREVALENCE AMONG SENTINEL GROUPS IN PREAH SIHANOUK PROVINCE

Province Sihanoukville	HIV prevalence percent, by year (Sample size)									
	1996	1997	1998	1999	2000	2001	2002	2003	2006	2010
Sentinel Group										
Female sex workers <i>Data weighted for size of provincial female sex worker population</i>	50.5 (99)		55.6 (150)	46.7 (150)	23.6 (150)		25.9 (148)	15.3 (150)	22.8 (149)	17.7 34
Age <20 years			45.9	36.7	12.9		7.9	3.6	0.0	
Age ≥ 20 years			60.7	46.9	25.1		28.3	18.0	24.1	
Indirect female sex workers <i>Data not weighted</i>			22.6 (100)	18.1 (15)	10.3 (150)		15.8 (152)	19.2 (152)		7.98 163
Age <20 years										0
Age ≥ 20 years										9.29
Sentinel Group <i>Data weighted for size of provincial population and smoothed with EPP</i>	1996	1997	1998	1999	2000	2001	2002	2003	2006	2010
Policemen	11.5 (51)	10.7 No Survey ⁵	9.7 (153)	8.5 (150)	7.3 (155)	6.2 No Survey ⁵	5.0 (150)	4.0 (309)		
ANC PC² = 2 site in 2006	2.8	4.0	4.3	4.2	4.1	3.8	3.5	3.2	1.7	0.32
ANC RD³ = 3 sites in 2006	2.2	2.4	2.4	2.3	2.2	2.1	2.1	2.0	1.7	0.81
Total ANC (PC+RD)	2.3 (95)	3.5 (278)	4.0 (400) ⁴	4.0 (200)	3.8 (257)	3.5 No Survey ⁵	3.1 (222)	2.7 (347)	1.7 (596)	0.63 (800)

TABLE 33: HIV PREVALENCE AMONG SENTINEL GROUPS IN STUNG TRENG PROVINCE

Province Stung Treng	HIV prevalence percent, by year (Sample size)									
	1996	1997	1998	1999	2000	2001	2002	2003	2006	2010
Sentinel Group										
Female sex workers <i>Data weighted for size of provincial female sex worker population</i>	20.3 (60)	25.5 (53)	34.8 (51)	34.8 (55)	38.5 (50)		28.4 (65)	24.1 (58)	11.5 (61)	0.0 5
Age <20 years			54.1	39.6	36.2		9.8	-	0.0	
Age ≥ 20 years			30.6	32.2	39.2		32.9	30.4	12.5	
Indirect female sex workers <i>Data not weighted</i>			10.7 (20)	3.3 (14)	27.7 (20)		27.5 (10)	- (6)		0.85 117
Age <20 years										0
Age ≥ 20 years										1.01
Sentinel Group <i>Data weighted for size of provincial population and smoothed with EPP</i>	1996	1997	1998	1999	2000	2001	2002	2003	2006	2010
Policemen	0.2 (77)	0.4 (113)	0.7 (129)	1.0 (152)	1.2 (216)	1.4 No Survey ⁵	1.5 (192)	1.6 (191)		
ANC PC² = 1 site in 2006	2.6	2.6	2.6	2.5	2.5	2.4	2.4	2.4	1.2	0.51
ANC RD³ = 4 sites in 2006	0.6	1.0	1.4	1.6	1.6	1.6	1.5	1.4	0.0	0.25
Total ANC (PC+RD)	1.6 (264)	2.2 (172)	2.3 (405) ⁴	2.3 (163)	2.2 (271)	2.1 No Survey ⁵	2.0 (316)	1.9 (355)	0.5 (368)	0.38 (797)

TABLE 34: HIV PREVALENCE AMONG SENTINEL GROUPS IN SVAY RIENG PROVINCE

Province Svay Rieng	HIV prevalence percent, by year (Sample size)									
	1996	1997	1998	1999	2000	2001	2002	2003	2006	2010
Sentinel Group										
Female sex workers	37.3	26.6	27.5	32.4	9.9		33.8	9.1	10.0	12.5
<i>Data weighted for size of provincial female sex worker population</i>	(69)	(88)	(100)	(92)	(56)		(73)	(66)	(60)	24
Age <20 years			24.8	34.4	10.3		41.8	-	0.0	
Age ≥ 20 years			28.8	31.0	9.6		30.7	10.3	10.7	
Indirect female sex workers			17.1	14.9	6.1		23.7	15.4		3.23
<i>Data not weighted</i>			(57)	(61)	(58)		(47)	(39)		135
Age <20 years										0
Age ≥20 years										3.7
Sentinel Group										
<i>Data weighted for size of provincial population and smoothed with EPP</i>										
Policemen	0.4	0.6	0.8	1.1	1.4	1.8	2.0	2.2		
	(106)	(140)	(150)	(266)	(300)	No Survey ⁵	(300)	(288)		
ANC PC² = 3 site in 2006	4.6	4.3	3.9	3.5	3.0	2.6	2.1	1.7	1.0	0.45
ANC RD³ = 4 sites in 2006	1.1	1.5	1.6	1.6	1.5	1.3	1.2	1.0	0.0	0.00
Total ANC (PC+RD)	2.8	2.8	2.6	2.5	2.2	2.0	1.7	1.4	0.5	0.22
	(325)	(223)	(400) ⁴	(349)	(399)	No Survey ⁵	(599)	(580)	(599)	(896)

TABLE 35: HIV PREVALENCE AMONG SENTINEL GROUPS IN TAKEO PROVINCE

Province Takeo	HIV prevalence percent, by year (Sample size)									
	1996	1997	1998	1999	2000	2001	2002	2003	2006	2010
Sentinel Group										
Female sex workers	27.2	26.8	41.8	37.6	13.9			29.2	4.2	0.0
<i>Data weighted for size of provincial female sex worker population</i>	(69)	(58)	(99)	(83)	(96)			(126)	(144)	0
Age <20 years			44.9	30.7	15.7			-	5.4	
Age ≥ 20 years			39.7	38.5	12.6			18.3	3.7	
Indirect female sex workers			7.8	24.8	18.4			11.9		3.23
<i>Data not weighted</i>			(45)	(53)	(62)			(67)		186
Age <20 years										0
Age ≥20 years										3.97
Sentinel Group										
<i>Data weighted for size of provincial population and smoothed with EPP</i>										
Policemen	2.2	2.8	3.0	3.0	2.9	2.6	2.4	2.1		
	(128)	No Survey ⁵	(122)	(300)	(299)	No Survey ⁵	No Survey ⁶	(251)		
ANC PC² = 2 site in 2006	1.3	1.5	1.5	1.5	1.4	1.4	1.3	1.3	1.4	0.0
ANC RD³ = 4 sites in 2006	0.4	0.7	1.0	1.2	1.2	1.2	1.1	1.0	0.0	0.0
Total ANC (PC+RD)	0.8	1.2	1.4	1.4	1.3	1.3	1.2	1.1	0.7	0.0
	(218)	No Survey ⁵	(800) ⁴	(300)	(290)	No Survey ⁵	No Survey ⁵	(558)	(581)	(706)

APPENDIX I

National Center for HIV/AIDS, Dermatology, and STDs

HIV Sentinel Surveillance 2010

Informed Consent

[This text has been translated from the Khmer script that will be read aloud to each potential survey participant. The purpose of this script is to provide each potential participant with information about the survey and where they may go for free, voluntary counseling and testing services; to assure them that information collected will remain anonymous and confidential; and to inform them of the risks of participation and their rights to refuse. All HSS staff who read the script to participants, and collect, process, and test blood, will be required to sign a confidentiality agreement (Protocol Appendix II). HSS staff will document whether oral consent was obtained from each potential survey participant by checking the appropriate box on the Specimen Information Sheet. The number of refusals will be tallied to calculate cluster-specific refusal rates.]

The National Center for HIV/AIDS, Dermatology, and STDs, or NCHADS of the Ministry of Health, in collaboration with Provincial Health Departments, is conducting a survey called HIV Sentinel Surveillance, or HSS, in 22 provinces and cities in Cambodia. The purpose of the survey is to provide information needed to estimate the number of people living with HIV (AIDS virus) infection in Cambodia in 2009-2010 and to improve our ability to plan programs for prevention, care, and treatment.

This survey does not record your name. If you choose to participate, we will ask only a few questions, such as age, marital status, and number of years of school you completed etc. [*For sex worker surveys, add: number of years doing this work and sex work history*] We will ask you for a small amount of blood which will be taken from a vein in your arm. In total, it will take about 15 minutes. Your participation is totally voluntary. You have the right to refuse to provide information or to give blood.

The blood we collect will be tested for HIV. Because your name will not be recorded, nobody can learn the results of your test. According to NCHADS policy, we cannot provide the test results to you. However, we will provide a list of Voluntary Counselling and Testing (VCT) sites where you may go to be tested, free of charge, to learn whether you have HIV or not. Your transportation fees will be paid when you arrive at the site. We encourage you to visit a testing site in your province or in a nearby province where professional counselors can provide you information about HIV/AIDS and help you decide whether you should have an HIV test.

The risks to you, if you choose to take part in this survey, include the minor inconvenience on your time, the discomfort of having a small amount of blood drawn, and the possibility of having a slight bruise where blood was taken. The benefit of taking part in this survey is that your participation will help improve our ability to plan programs for HIV prevention, care, and

treatment and you will receive a small gift and a voucher for free HIV testing which you may redeem from a VCT site.

The results of this survey will be made public, the same way it has been made public almost every year since 1994. Results are grouped and no individual results are presented. Because your name is not being recorded, you will not be identified.

Do you understand the information that I have just read to you?
Do you have any questions or concerns about the survey?
Do you consent to take part in the survey?

1. Yes
2. No

Some of the blood that you give may be left over after the HIV test. We would like to store that left over blood confidentially at the laboratory for possible future testing. Future tests might include HIV and other health or disease-related factors such as infectious agents, chemicals or your body's response to these factors. You will not be informed of those results.

Again, you can say yes or you can say no; it is up to you. If you say yes, it may help the country later to develop programs to fight HIV/AIDS and other health problems.

Will you agree that we store your blood for possible future testing?

1. Yes
2. No

[Please note that participant may accept HIV testing but may not consent to storage of blood for future testing.]

If you have a problem that you think might be related to taking part in this survey, please call

NCHADS: Dr. Chhea Chhorvann 012 503844
NCHADS: Dr. Mun Phalkun 012.888.093
National Ethics Committee: Dr. Saphonn Vonthanak 012.280.790

APPENDIX II

Confidentiality Agreement

The Ministry of Health, National Center for HIV/AIDS, Dermatology, and STDs, in collaboration with Provincial Health Departments conducts periodic HIV sentinel surveillance (HSS) in Cambodia. In 2009-2010, HSS will be conducted in 22 provinces, including the provincial capitals and in some remaining districts.

As surveillance staff, I may be responsible for obtaining informed consent or taking blood from participants or testing the blood for HIV antibodies. I understand that participants have the right to refuse to provide demographic or other information or give blood. Although blood will be tested for HIV, names and other personal identifiers will not be recorded. Test results cannot be linked to individual participants.

I understand that I will not provide test results to the participant or to anyone. Participants will be encouraged to visit the nearest Voluntary Counselling and Testing (VCT) site to learn their HIV status free of charge. Because we will use rapid tests (Determine HIV1/2 and STAT-PAK) to test specimens in the field, the result can be known in 15 minutes. It is mandatory that I maintain strict confidentiality of the participants' test results as well as their participation in HSS. I will take extra precaution to make sure that confidentiality is highly secured.

Cambodia's law on the prevention and control of HIV/AIDS, enacted in 2002, states that, "The confidentiality of all persons who have HIV/AIDS shall be maintained. All health professionals, workers, employers, recruitment agencies, insurance companies, data encoders, custodians of medical records related to HIV/AIDS, and those who have the relevant duties shall be instructed to pay attention to the maintenance of confidentiality in handling medical information, especially the identity and personal status of persons with HIV/AIDS. Any person who violates this article of the law shall be punished with a penalty of fine of fifty thousand (50,000) to two hundred thousand (200,000) Riel, and with a penalty of imprisonment for one (1) month to six (6) months. In case of repeated offences, the punishment shall be double. For civil servants, administrative sanctions shall be added."

It is possible that I will know the participant and their name from the community. However, I will not ever reveal the results of the test to anyone. I will be the only link between that individual and the test result. I understand that if I disclose information about an individual's test results or survey participation, by law, my employment will be subject to severe administrative consequences, and I will be subject to a penalty of fine and imprisonment.

My signature below indicates that, according to the professional code and HIV/AIDS law, I will assume full responsibility if my actions result in a breach of confidentiality that results in inadvertent or intentional disclosure of individual's test results or survey participation.

Province: _____

Date: _____

Surveillance staff name (printed): _____

Surveillance staff signature: _____

APPENDIX III

National Center for HIV/AIDS Dermatology and STD

HIV Sentinel Surveillance 2010

Questionnaire for Female Entertainment Workers

1. Study code:
2. Province:
3. Characteristic of the selected site:
 - a. Former brothel
 - b. Beer garden
 - c. Restaurants
 - d. Massage
 - e. Karaoke
 - f. Other, please specify.....
2. How old are you?.....years old
3. How many years have you been at school?.....years
4. How long have you been working in your current job?.....years
5. What is your main job, currently?
 - a. Selling sex
 - b. Waitress
 - c. Hostess/escort (at restaurant)
 - d. Karaoke
 - e. Beer promoter
 - f. Other, please specify.....
6. Have you been working in any brothel during the period 2005-2008?
 - a. Yes
 - b. No
7. Age at first sex?.....years old
8. Do girls currently working with you sell sex?
 - a. Yes
 - b. No
9. Age at first sell sex in exchange for gift or money? (0- if never sell sex)
10. Have you ever sold sex in the past 5 years?
 - a. Yes
 - b. No
11. If yes, how many clients do you have in one regular week?.....clients
12. If a girl working with you agrees to have sex with a man, can they have sex in the working establishment?
 - a. Yes
 - b. No

Thanks you for your participation.

