Ministry of Health

National Center for HIV/AIDS, Dermatology and STD

NATIONAL HIV SENTINEL SURVEY AMONG WOMEN ATTENDING ANTENATAL CARE CLINICS IN CAMBODIA IN 2014

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ACKNOWLEDGMENTS

National Center for HIV/AIDS, Dermatology and STD (NCHADS) established the HIV surveillance system (HSS) in response to the HIV epidemic in Cambodia. The system consists of HIV Sentinel Survey, Behavioral Sentinel Survey and STI survey. It has been observed in the past 20 years that the HIV and behavioral sentinel surveys have played an important role in providing evidence based information for the development, implementation and evaluation of many HIV and 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 and STI Program, and staff from the surveillance unit at NCHADS. Similarly, development partners such as GFATM, US-CDC, WHO, UNAIDS, USAID and other funding agencies have provided financial and technical support to NCHADS to improve and expand the HIV surveillance system.

NCHADS would like to also acknowledge the support from KHANA and National Institute of Public Health for providing support for the project.

Last but not least, NCHADS would like to thank all the study participants who provided consent for participation in the study and useful information and blood sample for HIV testing; without their involvement, this survey would have been impossible.

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ACRONYMS AND **ABBREVIATION**

ANC	Antenatal Care
ART	Antiretroviral therapy
DSW	Direct sex workers
EIA	Enzyme immunoassays
FEW	Female entertainment workers
HSS	HIV sentinel surveillance
IDSW	Indirect sex workers
KP	Key populations
MSM	Men who have sex with men
MTCT	Mother to child transmission
NCHADS	National Center for HIV/AIDS, Dermatology and STD
PASP	Provincial AIDS and STI Program
PC	Provincial capitals
PMTCT	Prevention of mother to child transmission
PWID	People who inject drugs
RD	Remaining districts
TG	Transgender
UAT	Unlinked anonymous testing
WHO	World Health Organization

EXECUTIVE **SUMMARY**

Background

Over the past seven years, attending antenatal care (ANC) clinics have seen a steady decline in HIV prevalence among pregnant women, decreasing from 2.1% in 1999 to 0.6% in 2012 (Ministry of Health, 2012). HIV sentinel surveillance (HSS) among women attending ANC clinics is recommended by the World Health Organization (WHO) to represent the prevalence of HIV among the general adult population in settings with generalized HIV epidemic (WHO & UNAIDS, 2000). Population-based surveys are expensive and logistically difficult and are therefore only conducted approximately every five years in countries with generalized epidemics. HIV prevalence among pregnant women attending ANC clinics can be used as the central source for monitoring and estimating HIV prevalence amongst the general adult population. The objective of this study is to estimate HIV prevalence in a sentinel group of women attending ANC in Cambodia.

Methods

A cross-sectional survey was conducted from September to November 2014 among pregnant women attending ANC clinics in 22 provinces and municipality in Cambodia.

The participants were consecutively selected, and the sample was weighted during the analysis stage. In total, 880 pregnant women attending ANC clinics were selected for the study from each province and the capital city (440 from urban areas and 440 from remaining districts).

Results

This HSS included 19,042 pregnant women attending ANC clinics. Among these women, the average age was 26 (SD=5.3). Over half of the participants (59.7%) were aware of their HIV status prior to the current pregnancy. Among women who knew their HIV status, 0.15% reported that they were HIV positive, and of whom 82.4% were on antiretroviral therapy (ART). The overall HIV prevalence in this study was 0.28%. The prevalence in urban and rural areas dropped from 0.62% and 0.30% in 2010 to 0.36% and 0.19%, respectively in 2014. HIV prevalence among women in the age group of 15-24 years was 0.12%, compared to 0.38% among those who were 25 years or older.

Conclusions

Findings from this survey exhibited a reduced HIV prevalence among women attending ANC clinics in Cambodia compared to that reported in the HSS conducted in 2010. After being weighted for the difference between urban/rural, HIV prevalence among this population was 0.28%. Consistently, HIV prevalence among women living in urban areas remained higher than that among those living in rural districts. Province specific programs should be designed to address the obstacles hindering HIV transmission and education efforts. Further, program challenges should be discussed and managed in order to increase and sustain HIV status awareness among pregnant women, and target geographic regions that have a high HIV prevalence.

Keywords: HIV Sentinel Survey, pregnant women, antenatal care, Cambodia.

1. BACKGROUND

In Cambodia, HIV prevalence has dwindled from the 1998 height of 1.7% to 0.6% in 2012 (NCHADS, 2012). Yet, the epidemic has shifted from the general population to be concentrated in key populations (KP) including female entertainment workers (FEW, 2.6% in 2011), people who inject drugs (PWID, 24.8% in 2012), men who have sex with men (MSM, 2.2% in 2010), and transgender women (TG, 4.2% in 2012) (NCHADS, 2012).

For monitoring purposes, the World Health Organization (WHO) recommends periodic bio-behavioral surveys of key high-risk populations as well as sentinel surveillances among women attending antenatal care (ANC) clinics every one to two years even in the settings with a concentrated epidemic (WHO & UNAIDS, 2000). Since 1995, Cambodia has conducted HIV surveillance among selected populations using unlinked anonymous sero-prevalence surveys – HIV Sentinel Surveillance (HSS). Data collected from the HSS have been used for estimating and predicting the HIV prevalence in addition to monitoring the dispersion of the epidemic in Cambodia. In turn, findings from the HSS can assist with further strategic planning for HIV and AIDS programs in the country.

Over the past seven years, ANC clinics have seen a steady decline in HIV prevalence among pregnant women, from 2.1% in 1999 to 0.6% in 2012 (Ministry of Health, 2012). HIV prevalence among pregnant women attending ANC clinics, as measured by HSS, has been used as a proxy measure to estimate HIV prevalence among the general adult population aged 15 to 49 years and to monitor the trends in HIV prevalence over time.

ANC visits are vital to expecting women in resource-poor settings such as Cambodia. Attending ANC clinics throughout the gestation period will allow women and trained healthcare providers to discuss healthy behaviors during pregnancy, possible complications, and provide further support (WHO, 2006). In facilities where a high proportion of pregnant women attending ANC clinics receive HIV testing, a comparison between results from unlinked anonymous testing (UAT) and prevention of mother to child transmission (PMTCT) programmatic data is recommended to determine whether PMTCT programmatic data can be used instead of HSS (Ministry of Health, 2012).

PMTCT is the effort to stop HIV transmission between mother and child during pregnancy, delivery and breastfeeding. Over half of the world's HIV cases are among women of childbearing age (WHO, 2015). About 90% of children diagnosed with HIV are infected through MTCT (AIDSinfo, 2015). Nonetheless, with antiretroviral therapy (ART), the risk of MTCT can be reduced to as low as 5% (Padian et al., 2011). Furthermore, PMTCT data are less expensive to collect and are readily available from routine monitoring without requiring any additional costs.

Population-based surveys are expensive and logistically difficult and are therefore only conducted approximately every five years in countries with generalized epidemics.

2. STUDY OBJECTIVE

The objective of this study is to estimate HIV prevalence in sentinel group of women attending ANC in Cambodia.

3. METHODS

3.1. Study design

A cross-sectional survey was conducted from September to November 2014 amongst pregnant women attending ANC clinics in 22 provinces and municipality. HIV testing was unlinked, anonymous with informed consent. A retrospective review of PMTCT records was conducted covering the same time period of the ANC survey to assess completeness and legibility of routine PMTCT registers, HIV testing practice, and coverage among ANC attendees, as well as testing uptake and proportion of HIV positive cases.

3.2. Sentinel sites

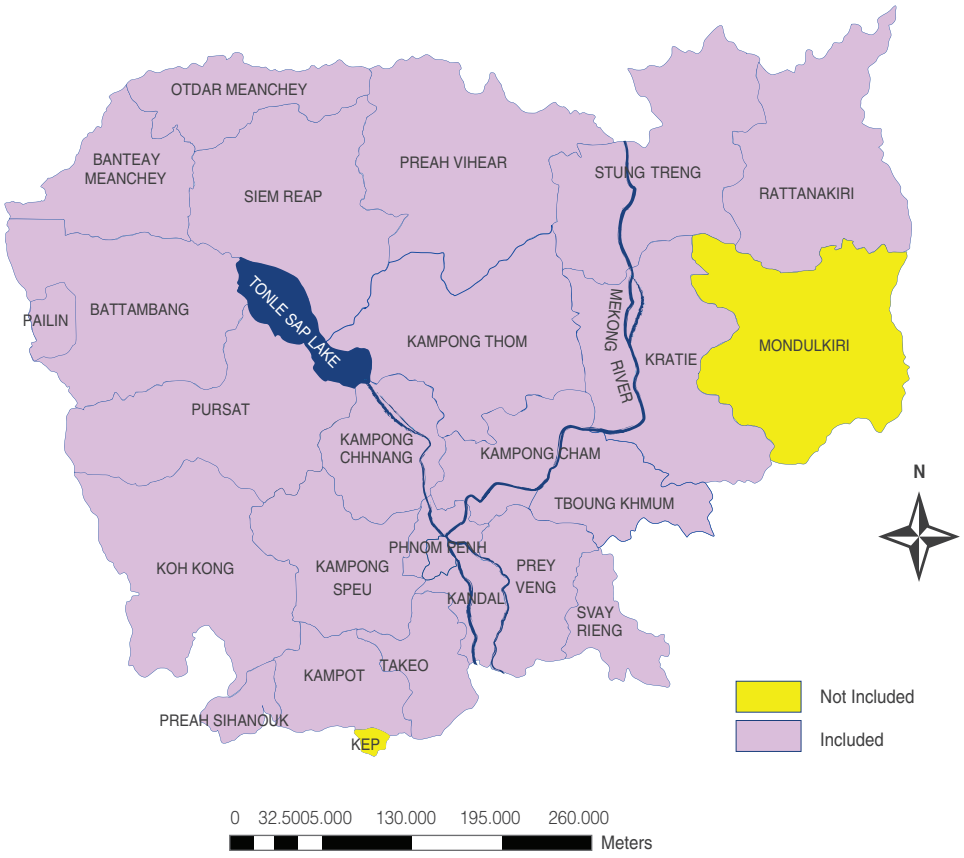
The same as in the 2006 and 2010 , this survey was conducted in 22 out of 24 provinces and municipality (provincial capital and remaining districts) as shown in Table 1.

Table 1: Summary Sample size in Provincial Capital (urban) and Remaining District (rural)

Study province	Provincial capital (urban)	Remaining district (rural)	Total Selected Sample Size
Banteay Meanchey	422	420	842
Battambang	440	440	880
Kampong Cham	440	440	880
Kampong Chhnang	440	440	880
Kampong Speu	440	440	880
Kampong Thom	440	440	880
Kampot	440	440	880
Kandal	440	440	880
Koh Kong	440	415	855
Kratie	521	359	880
Oddar Meanchey	440	289	729
Pailin	470	410	880
Phnom Penh	878	0	878
Preah Vihear	440	440	880
Prey Veng	438	440	878
Pursat	440	440	880
Rattanakiri	440	440	880
Siem Reap	440	440	880
Preah Sihanouk	440	440	880
Steung Treng	440	440	880
Svay Rieng	440	440	880
Takeo	340	440	780
Total	**10,109**	**8,933**	**19,042**

The two provinces (Mondulkiri and Kep) that were not covered by the survey represented only an estimated 0.8% of the total 2013 Cambodian population (Figure 1).

Figure 1: Provinces Included in HIV Sentinel Surveillance



All participants were selected from the capital city of Phnom Penh and provincial towns as well as from the districts outside the capital city and provincial towns (heretofore referred to as remaining districts). The capital city and provincial towns were considered urban areas, and the remaining districts were considered rural areas. Data were stratified by geographical areas – urban and rural districts.

ANC sentinel sites from both urban areas and the remaining districts were purposively selected based on the availability of ANC services. Health centers and referral hospitals that provided ANC services were eligible. To ensure that the sample size was reached within the survey timeframe of three months without exceeding four sites per provincial stratum, ANC facilities were selected according to volume of ANC activity. ANC clinics included in this survey were systematically selected if the current estimated number of pregnant women presenting was sufficient, i.e., about 50 women per month in urban health centers and about 20 women per month in remaining district health centers. Sampled health centers that did not meet these criteria were replaced by health centers selected from a list of ANC clinics with sufficient number of patients in a given provincial stratum. Few replacements were anticipated; therefore, the sample of this study should be comparable with previous HSS rounds.

3.3. Sample size

The target sample size for this survey was slightly larger than that in the HSS 2010. In total, 880 pregnant women attending ANC clinics were selected from each province/city. Women were selected sequentially from specific ANC clinics. Approximately, 440 women were selected from urban areas and 440 women from remaining districts of each province. Experience from previous HSS rounds shows that it was not possible to reach these targets in all provinces within the specified 3-month timeframe. Inflation of the sample size to account for refusals was not necessary because women who refused participation were replaced sequentially with additional recruits.

The Open Epi calculator version 2.3.1 (http://www.openepi.com) was used to calculate the sample size. The assumptions for the sample calculation were the following: expected prevalence of 0.35% and margin of error of + 0.1%, alpha of 5%, finite population size of 350,000 for women attending ANC clinics, and the design effect of 1.5. The minimum number of subjects required for this survey was 19,357 women representing pregnant women attending ANC clinics in the whole country.

3.4. Participants and sampling

3.4.1. Eligibility

All pregnant women who were present to the selected ANC clinics for the first prenatal consultation of their current pregnancy were eligible to participate. The inclusion of only women attending the ANC clinics for the first visit should prevent inter- and intra-site duplication of women who may visit one or more ANC clinics more than once during the three-month survey period.

Inclusion criteria included:

- Pregnant women
- Present at the selected ANC clinics for the first prenatal consultation of their current pregnancy
- Aged 15-49 years
- Able to speak Khmer
- Able to give informed consent

3.4.2. Sampling

Pregnant women were sampled consecutively for three months until obtaining, in each province, 440 specimens in the urban areas and 440 specimens in the remaining districts. This sampling is an unweighted and was weighted during the analysis stage.

3.5. Training and data collection

3.5.1. Training

Training was conducted independently in two stages:

- A pre-surveillance training workshop was conducted in Phnom Penh with PASP Managers who were responsible for the surveillance for all 22 participating city and provinces. The training was not conducted until all preparations for the survey were completed to avoid a long delay between training and data collection, which could result in trained staff forgetting procedures or loss of trained staff because of staff turnover.
- PASP Manager of each province was responsible for training the ANC clinic staff team. Staff from each selected ANC clinic and health center were

responsible for data and specimen collection, and for conducting the survey among the selected women. Supervision was assured locally, with periodic supervision conducted by NCHADS Surveillance Unit.

The national training covered:

a. Eligibility criteria

b. Consecutive sampling technique for sentinel sites

c. Informed consent procedures

d. Specimen collection, processing, and transfer

e. Record keeping and completion of forms, which include the consent record form, demographic information form, ANC information sheet, and specimen information sheet

Provincial laboratory training covered:

Trainings at the provincial level were also conducted to cover laboratory aspects of the survey in more details.

a. Phlebotomy and use of vacationer system

b. Dried blood spot preparation

c. Specimen handling, storage, and transport

d. Record keeping and completion of the specimen information sheet (which includes the specimen identification number and test results)

3.5.2. Data collection process

The survey teams received informed consent, for both blood testing and questionnaire survey, from participants. The survey consisted of short questions on demographic information. For HIV rapid testing, 5-10 ml of whole blood was collected at the clinics or health centers and sent to provincial laboratories, then transferred to and stored at NCHADS laboratories for quality assurance. At the end of the interview and blood sample collection, participants received a thank-you gift equivalent to US$2.

3.5.3. HIV testing and quality assurance

HIV tests were performed at the provincial laboratories. Two rapid tests (Determine HIV 1/2 & Stat-Pak) were used to decipher between a positive and negative HIV results. Following these two tests if the result remains positive, a serial two-test algorithm (Vironostika & Murex) was used for quality assurance.

3.5.4. HIV testing and algorithm

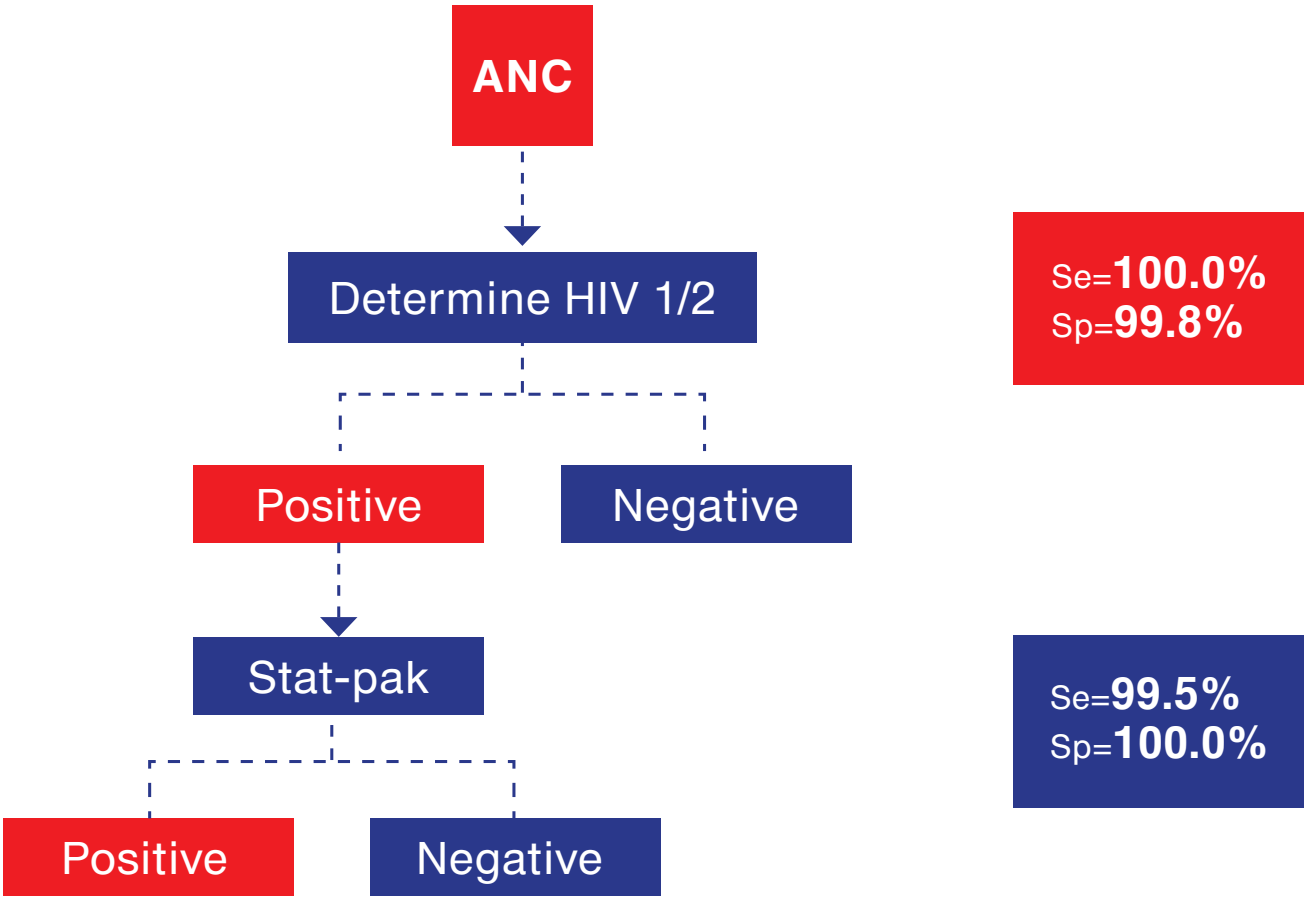
The 2009 WHO Guidelines of HIV testing in unlinked anonymous surveillance recommend that a combination of two assays be used for all sentinel groups, irrespective of HIV prevalence in a serial (sequential), two-test algorithm. Two rapid tests (Determine HIV 1/2 & Stat-Pak) were used to determine a positive and negative HIV result, as seen in Table 2 & Figure 2.

The HIV testing strategy was based on criteria recommended by WHO and UNAIDS for the purposes of surveillance when no test results are provided. Selection of test kits and the order in which they were used (i.e., test algorithm) was based on the WHO/ UNAIDS recommendation that the first test be highly sensitive, to detect all positives, and the second test, highly specific, to ensure that all truly negative specimens are correctly identified as non-reactive.

Table 2: HIV Rapid Testing

Specimen was tested with:		
Determine HIV 1/2	Stat-Pak	Interpret as HIV:
Nonreactive	N/A	Negative
Reactive	Nonreactive	Negative
Reactive	Reactive	Positive

Figure 2: HIV Rapid Testing Algorithm



** Sensitivity (Se) and specificity (Sp) data from phase 1 validation of 5 rapid HIV tests conducted in Cambodia in 2004. The combined algorithm was found to be 99.5% sensitive and 100% specific.*

3.5.5. Quality assurance of HIV testing

A quality assurance process was established to ensure accuracy and reliability of the HIV testing results. Standard operating procedures were followed, and training was conducted for specimen collection, labeling and storage of samples, and conducting the HIV tests. The use of pre-printed labels was expected to reduce transcription errors. In addition, each of the enzyme immunoassays (EIA) test kits contains internal quality controls.

Two EIAs, Vironostika HIV Uni-Form II Plus O® (Organon Teknika) and Murex HIV-1.2.O (Abbott Diagnostics), have been used in prior HSS surveys (as both initial tests and quality assurance) and for HIV testing in blood banks in Cambodia. The Vironostika EIA is an extremely sensitive test for HIV type 1 antibodies including type O. The Murex EIA is a highly specific test for antibodies to HIV-1 and HIV-2 (specificity of over 99.5%) see figure 3 for quality control testing algorism

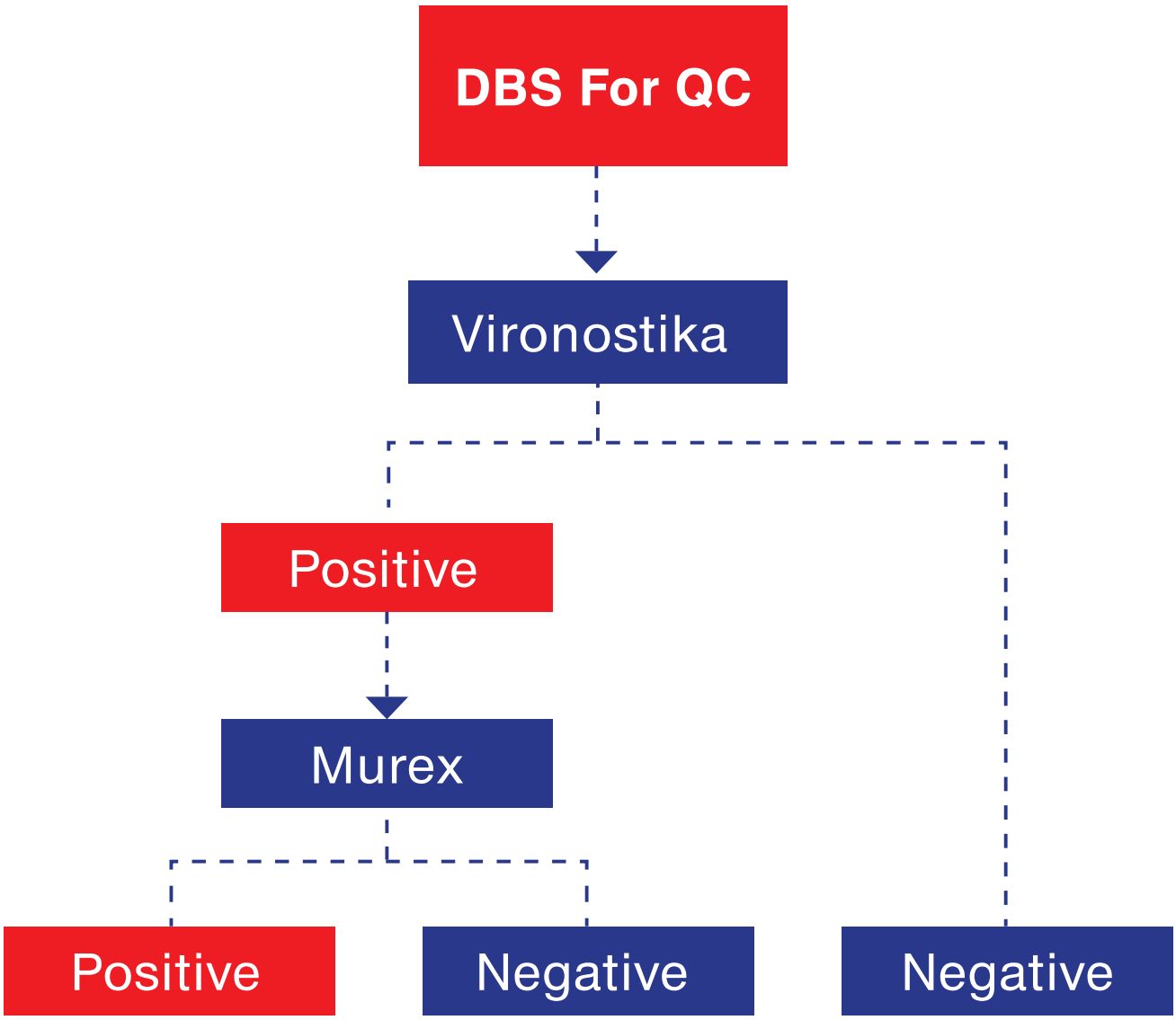
The first test in the serial algorithm was Vironostika. If the Vironostika test was nonreactive, the test result would be reported as negative. Vironostika reactive tests were confirmed by Murex. If both tests were reactive, the result would be considered reactive. If the Murex was non-reactive, the algorithm test result would be considered negative. The testing algorithm and interpretation of results are shown in Table3.

Blood samples were obtained onto a 5-spot Drive Blood Sample (DBS) card by finger-stick. In the rare cases when blood cannot be obtained by finger-stick, the participants were consented for venipuncture. DBS cards were allowed to dry after which they would be properly stored with desiccant and humidity monitoring cards under refrigeration until they were picked up for transport to the NCHADS central laboratory. Specimens were stored at the NCHADS laboratory at -80° C until being processed for HIV testing. No personally identifying information was linked to the specimens, thereby assuring the anonymity of the participants.

Table 3: HSS Testing Algorithm and Interpretation of Results

Specimens that are:			Interpret as HIV:
Vironostika	Murex		
Nonreactive	N/A	→	Negative
Reactive	Nonreactive	→	Negative
Reactive	Reactive	→	Positive

Figure 3: Quality Control Testing Algorithm



3.6. Data management and analyses

Data were entered into a computerized database using Epi-data software. The data entry staff signed a confidentiality agreement (Appendix 2). Double data entry was performed. Data were checked, cleaned, and analyzed by the NCHADS Surveillance Unit staff using STATA statistical software package, version 12. Descriptive analyses were performed. The analyses were weighted to adjust for quality control and population.

3.7. Ethical considerations

The study protocol was approved by the National Ethics Committee for Health Research, Ministry of Health in Cambodia.

3.7.1. Informed Consent

Participation in the survey was voluntary. Surveillance staff obtained oral informed consent from participants after reading the consent form (Appendix 1) privately to each individual. The consent form emphasized the rights to refuse the participation without repercussion. Participants also were asked for consent to store leftover specimens for possible further testing. Oral informed consent instead of written informed consent offered 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) were provided information about the survey, including risks, benefits, and the rights to refuse the participation.

3.7.2. Confidentiality

Participation was anonymous and results were not linked to any individual by name. To ensure protection of privacy, specimens and forms did not contain any personal identifying information, and test results could never be traced back to an individual. All survey staff were required to sign a confidentiality agreement (Appendix 2) stating that they were subject to severe administrative and legal consequences if they released test results to anyone or behaved in any way that could inadvertently disclose an individual's identity, participation in HSS, or test results.

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

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

3.7.3. HIV test results

The HIV test results were not provided to the study participants. There were significant procedural and methodological challenges that did not allow for the private and confidential return of HIV test results to individuals. 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 bias in the survey.

National policies for voluntary confidential counseling and testing require a guarantee of privacy and receipt of HIV results in a confidential manner. In the survey settings, and given the short time frame in which the survey needs to be completed to minimize duplication, it was not possible to meet these national principles and standards. For these reasons, the Cambodian 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.

4. RESULTS

4.1. Socio-demographic Characteristics

This HSS included 19,042 pregnant women attending ANC clinics. Among these women, the average age was 26 (SD=5.3). According to the findings, women with some form of schooling had a mean of 7 years (SD=3.4) of formal education. On average, women in the study reported their first sexual intercourse at the age of 21.7 (SD=3.8). Over half of the pregnant women (59.7%) were aware of their HIV status prior to current pregnancy. Among women who knew their HIV status, 0.15% reported that they were HIV (+), of whom 82.4% were on ART.

Table 4: Socio-Demographic Characteristics

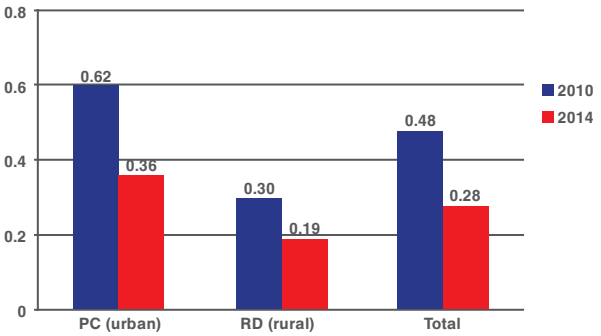
Characteristics	n (%)
Mean age in year (SD)	26 (5.3)
Mean year of education (SD)	7 (3.4)
Mean age of first sex (SD)	21.7 (3.8)
PMTCT	
Aware of HIV status before pregnancy, N=18,847	11,248 (59.7)
HIV (+) among women knowing their HIV status before pregnancy, N = 11,248	17 (0.15)
HIV (+) women on ART (N= 17)	14 (82.4)
HIV test offered among PMTCT women, (N =17)	16 (94.1)
HIV (+) result among PMTCT women, (N = 15) (1 missing)	14 (93.3)

SD: Standard Deviation

4.2. HIV Prevalence

Figure 4 displays the HIV prevalence among women attending ANC clinics in 2010 survey compared to that in this survey. In 2010, the HIV prevalence in urban and rural areas was 0.62% and 0.30%, respectively. On the other hand, in 2014 the HIV prevalence decreased to 0.36% in urban and 0.19% in rural areas. The overall HIV prevalence was 0.28% in this survey compared to 0.48% in 2010.

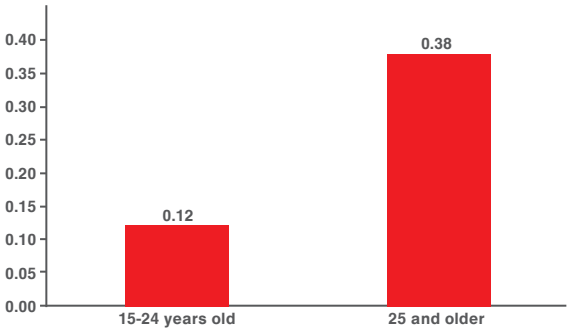
Figure 4: Comparisons of HIV Prevalence among Women Attending ANC Clinics in 2010 & 2014



** HIV prevalence was weighted for female population in each province*

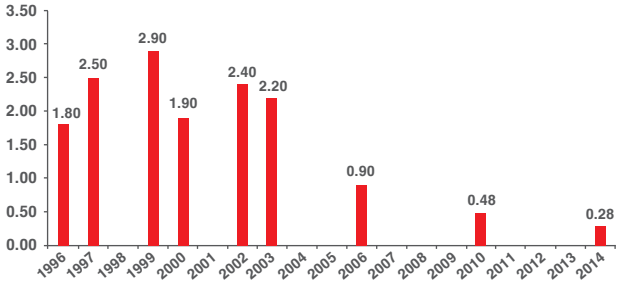
HIV prevalence among participants in this study varied according to age subgroups. As displayed in Figure 5, the HIV prevalence among women in the age group of 15-24 years was 0.12%, compared to 0.38% among those who were 25 years or older. Women in the older subgroup had more than 3 times the HIV prevalence compared to those 15-24 years old.

Figure 5: HIV Prevalence among ANC by Age Groups



Since the peak in 1999 (2.9%), the HIV prevalence has dropped drastically. Particularly, in 2006, 2010, and 2014 the prevalence dropped to a rate below 1.0% as seen in Figure 6.

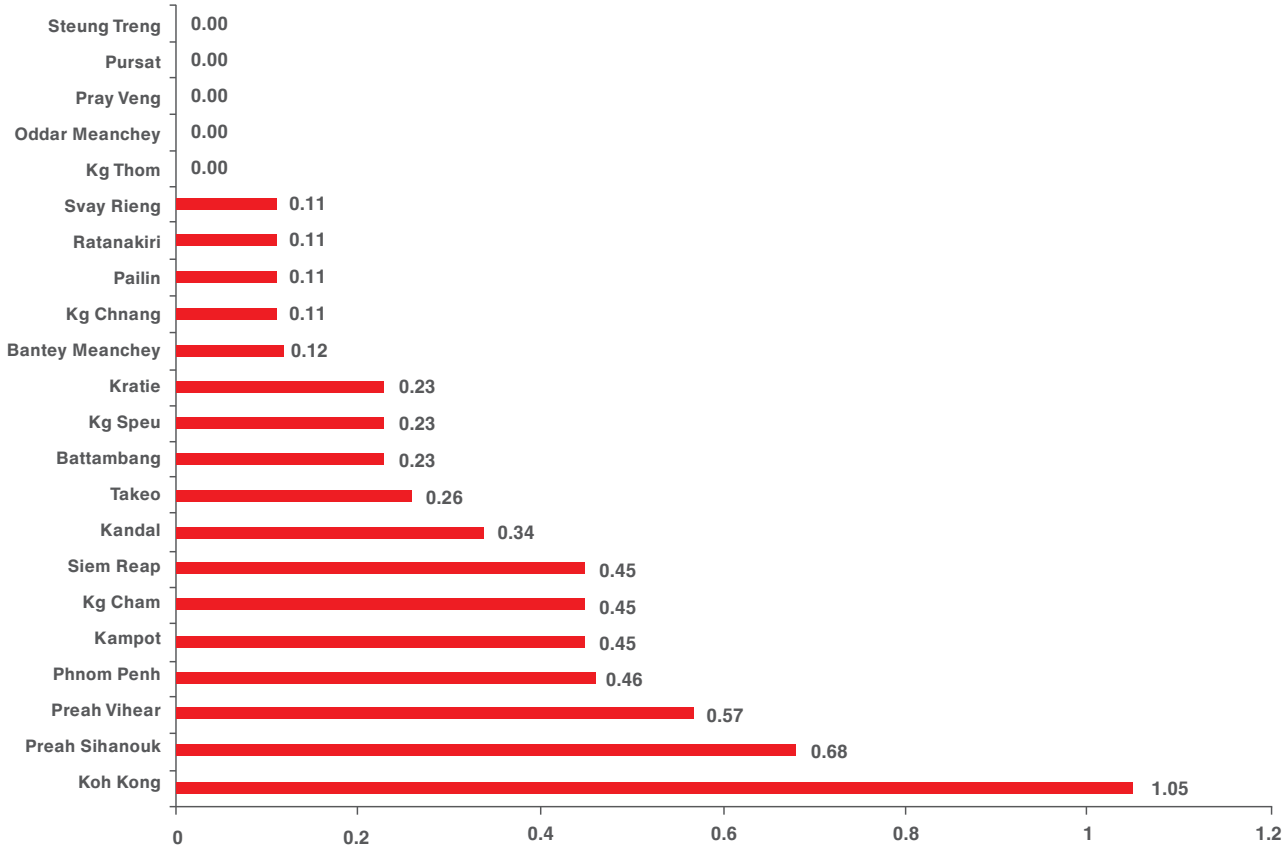
Figure 6: HIV Prevalence among ANC by Survey Year



** HIV prevalence adjusted for QC and weighted (2006, 2010, 2014) by provincial population*

HIV prevalence by provinces is shown in Figure 7. In this survey, no HIV case was detected in five provinces including Steung Treng, Pursat, Prey Veng, Oddar Meanchey, and Kampong Thom, while a prevalence of 0.11% to 0.12% were found in five provinces including Svay Rieng, Rattanakiri, Pailin, Kampong Chhnang, and Banteay Meanchey. In the majority of the city and provinces, the HIV prevalence ranged from 0.23% to 0.46%. The top three provinces with the highest HIV prevalence rate were Preah Vihear (0.57%), Preah Sihanouk (0.68%), and Koh Kong (1.05%).

Figure 7: HIV Prevalence among ANC Provinces, 2014



5. CONCLUSIONS

Findings from this 2014 HSS exhibited a reduced HIV prevalence among women attending ANC clinics in Cambodia compared to those reported in previous HSS survey in 2010. After being weighted for the difference between urban/rural, HIV prevalence among this population was 0.28%. Consistently, HIV prevalence among women living in urban areas remained higher than that among those living in rural districts.

Over half of the pregnant women (59.7%) were aware of their HIV status prior to current pregnancy; of them only a few were HIV positive. This could be due to great strides in HIV education, community outreach testing and other prevention campaigns. Similarly, the high rate of ART uptake (82.4%) among HIV (+) women of which 58 in this study corresponds with other study findings (AVERT, 2015).

Future intervention programs should focus on the three provinces of Koh Kong, Preah Sihanouk, and Preah Vihear, due to their high rates of HIV among women attending ANC clinics. Province specific programs should be designed to address the obstacles hindering HIV transmission and education efforts. By implementing programs that emphasize the necessity of ANC services and the monitoring of pregnant women living with HIV, women can have access to resources and support during the gestation period (AVERT, 2015).

Further, program challenges should be discussed and managed in order to increase and sustain HIV status awareness among pregnant women, and target geographic regions that have a high HIV prevalence. PMTCT initiatives have seen barriers regarding HIV stigma and discrimination when accessing available sources (International Center for Research on Women, 2014).

It is essential to evaluate factors influencing effectiveness of program services.

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APPENDICES

APPENDIX I: Informed Consent

[There will be two versions of this Informed Consent form: one for ANC women and another for MSM. This text will be 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 (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 for called HIV Sentinel Surveillance, or HSS, [for ANC] in 22 provinces and cities in Cambodia [for MSM] eight 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 2013 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 few questions, such as age and number of years of school you completed etc. We will ask you for a small amount of blood which will be taken from [for ANC] a vein in your arm [for MSM] your finger. 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. [for ANC] However, you can receive free HIV testing and counseling today at this antenatal care clinic. [for MSM] However, we will provide a list of Voluntary Counseling 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 [for MSM 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. Mun Phalkun** **012 888 093**
NCHADS:	**Dr. Chann Navy** **016 615 874**
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 2013, HSS will be conducted in 22 provinces, including the provincial capitals and in some remaining districts for ANC and in eight cities for MSM.

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:
Questionnaire for pregnant women attending ANC clinics

Study code……..……

Province……

How old are you?.....……..…….....years old

How many years of school have you completed?.....……..…….....years

Did you know your HIV status before pregnancy?.....……..…….....

If yes, what is your HIV status?.....……..…….....

If HIV positive, are you currently on anti-retroviral treatment (ART)?.....……..…….....

Thank you for your participation!

APPENDIX IV:
HIV prevalence by province and by year

Province	Year										
	1996	1997	1998	1999	2000	2001	2002	2003	2006	2010	2014
Banteay Meanchey											
Provincial Capital (Urban)	2.6	3.1	3.2	3.2	3.0	2.7	2.5	2.2	1.3	1.00	0.24
Remaining District (Rural)	2.0	2.7	2.9	2.9	2.7	2.5	2.2	1.9	1.3	0.49	0.00
Total	**2.2**	**2.9**	**3.2**	**3.1**	**2.9**	**2.6**	**2.3**	**2.0**	**1.3**	**0.74**	**0.12**
Battambang											
Provincial Capital (Urban)	1.2	1.9	2.2	2.2	2.2	2.1	2.0	1.9	1.7	2.24	0.23
Remaining District (Rural)	1.0	1.7	2.0	2.0	2.0	1.9	1.8	1.7	1.3	0.25	0.23
Total	**1.1**	**1.8**	**2.1**	**2.1**	**2.1**	**2.0**	**1.9**	**1.8**	**1.5**	**1.25**	**0.23**
Kampong Cham											
Provincial Capital (Urban)	0.9	1.7	2.3	2.5	2.6	2.5	2.4	2.2	0.7	0.72	0.68
Remaining District (Rural)	0.6	1.2	1.9	2.3	2.3	2.2	2.1	1.8	0.8	0.71	0.23
Total	**0.8**	**1.5**	**2.1**	**2.4**	**2.5**	**2.4**	**2.3**	**2.1**	**0.8**	**0.70**	**0.45**
Kampong Chhnang											
Provincial Capital (Urban)	0.9	1.9	2.8	3.1	3.1	2.9	2.6	2.3	1.4	0.75	0.23
Remaining District (Rural)	0.6	1.0	1.4	1.6	1.7	1.6	1.5	1.4	0.7	0.0	0.00
Total	**0.7**	**1.4**	**1.8**	**2.0**	**2.0**	**1.9**	**1.7**	**1.5**	**1.0**	**0.37**	**0.11**
Kampong Speu											
Provincial Capital (Urban)	0.7	1.4	2.1	2.6	2.9	2.9	2.9	2.9	1.0	0.0	0.45
Remaining District (Rural)	0.5	1.1	1.8	2.3	2.6	2.7	2.7	2.7	0.3	0.25	0.00
Total	**0.6**	**1.2**	**1.9**	**2.4**	**2.7**	**2.8**	**2.8**	**2.8**	**0.7**	**0.12**	**0.23**

Province	Year										
	1996	1997	1998	1999	2000	2001	2002	2003	2006	2010	2014
Kampong Thom											
Provincial Capital (Urban)	0.6	1.1	1.8	2.2	2.4	2.4	2.4	2.3	0.7	0.25	0.00
Remaining District (Rural)	0.3	0.7	1.2	1.6	1.9	2.0	2.0	1.9	0.7	0.25	0.00
Total	**0.5**	**1.0**	**1.6**	**2.0**	**2.2**	**2.2**	**2.2**	**2.1**	**0.7**	**0.25**	**0.00**
Kampot											
Provincial Capital (Urban)	0.6	1.1	1.5	1.6	1.7	1.7	1.7	1.7	1.7	0.00	0.00
Remaining District (Rural)	0.3	0.6	1.1	1.4	1.5	1.6	1.5	1.5	0.0	0.25	0.91
Total	**0.4**	**0.8**	**1.2**	**1.5**	**1.6**	**1.6**	**1.6**	**1.6**	**0.8**	**0.13**	**0.45**
Kandal											
Provincial Capital (Urban)	2.7	3.3	3.4	3.2	3.0	2.7	2.3	2.0	0.7	0.25	0.45
Remaining District (Rural)	1.8	1.6	1.4	1.2	1.1	0.9	0.7	0.6	0.7	0.25	0.23
Total	**2.5**	**2.5**	**2.4**	**2.2**	**2.1**	**1.9**	**1.8**	**1.6**	**0.7**	**0.25**	**0.34**
Koh Kong											
Provincial Capital (Urban)	5.0	4.9	4.7	4.4	4.0	3.7	3.2	2.8	1.6	1.54	1.14
Remaining District (Rural)	4.5	4.4	4.1	3.7	3.3	2.9	2.5	2.1		0.81	0.96
Total	**4.7**	**4.8**	**4.6**	**4.3**	**3.9**	**3.4**	**3.0**	**2.5**	**1.6**	**1.18**	**1.05**
Kratie											
Provincial Capital (Urban)	1.3	1.3	1.3	1.2	1.1	0.9	0.8	0.7	1.0	0.23	0.38
Remaining District (Rural)	0.9	0.8	0.8	0.7	0.6	0.6	0.5	0.4	0.0	0.22	0.00
Total	**1.2**	**1.1**	**1.0**	**0.9**	**0.8**	**0.7**	**0.6**	**0.5**	**0.5**	**0.23**	**0.23**
Oddar Meanchey											
Provincial Capital (Urban)									0.0	1.00	0.00
Remaining District (Rural)									0.3	0.25	0.00
Total									**0.2**	**0.63**	**0.00**

Province	Year										
	1996	1997	1998	1999	2000	2001	2002	2003	2006	2010	2014
Pailin											
Provincial Capital (Urban)	2.3	3.1	3.4	3.4	3.4	3.3	3.3	3.2	2.3	0.51	0.21
Remaining District (Rural)	1.4	2.4	3.0	3.2	3.1	2.9	2.6	2.3	1.8	0.00	0.00
Total	**1.8**	**2.6**	**3.1**	**3.3**	**3.3**	**3.1**	**2.9**	**2.7**	**2.1**	**0.25**	**0.11**
Phnom Penh											
Provincial Capital (Urban)	3.0	2.9	2.7	2.5	2.3	2.1	1.9	1.7	0.8	0.87	0.46
Preah Vihear											
Provincial Capital (Urban)									0.4	0.57	0.45
Remaining District (Rural)									0.8	0.50	0.68
Total	**0.1**	**0.2**	**0.4**	**0.7**	**0.9**	**1.1**	**1.1**	**1.1**	**0.6**	**0.53**	**0.57**
Prey Veng											
Provincial Capital (Urban)	1.9	2.4	2.5	2.5	2.4	2.4	2.3	2.3	0.7	0.00	0.00
Remaining District (Rural)	1.4	1.6	1.7	1.6	1.6	1.5	1.5	1.4	0.9	0.00	0.00
Total	**1.5**	**2.1**	**2.3**	**2.3**	**2.3**	**2.1**	**2.0**	**1.8**	**0.8**	**0.00**	**0.00**
Pursat											
Provincial Capital (Urban)	3.3	3.2	3.0	2.7	2.4	2.1	1.8	1.5	1.0	1.25	0.00
Remaining District (Rural)	1.2	1.6	1.8	1.8	1.7	1.5	1.3	1.2	0.5	0.75	0.00
Total	**2.2**	**2.4**	**2.4**	**2.2**	**2.0**	**1.8**	**1.5**	**1.3**	**0.8**	**1.00**	**0.00**
Ratanak Kiri											
Provincial Capital (Urban)	2.5	2.5	2.3	2.2	2.0	1.7	1.5	1.3	0.3	0.53	0.23
Remaining District (Rural)	1.5	1.7	1.6	1.5	1.4	1.2	1.1	0.9	0.0	0.00	0.00
Total	**2.2**	**2.2**	**2.1**	**1.9**	**1.7**	**1.5**	**1.3**	**1.1**	**0.2**	**0.26**	**0.11**

Province	Year										
	1996	1997	1998	1999	2000	2001	2002	2003	2006	2010	2014
Siem Reap											
Provincial Capital (Urban)	2.8	4.7	5.7	5.9	5.7	5.3	4.8	4.2	0.3	0.23	0.91
Remaining District (Rural)	2.4	2.8	2.9	2.7	2.5	2.2	1.9	1.7	1.0	0.24	0.00
Total	**2.6**	**3.7**	**4.2**	**4.2**	**3.9**	**3.6**	**3.3**	**2.9**	**0.7**	**0.24**	**0.45**
Preah Sihanouk											
Provincial Capital (Urban)	2.8	4.0	4.3	4.2	4.1	3.8	3.5	3.2	1.7	0.32	0.45
Remaining District (Rural)	2.2	2.4	2.4	2.3	2.2	2.1	2.1	2.0	1.7	0.81	0.91
Total	**2.3**	**3.5**	**4.0**	**4.0**	**3.8**	**3.5**	**3.1**	**2.7**	**1.7**	**0.63**	**0.68**
Stung Treng											
Provincial Capital (Urban)	2.6	2.6	2.6	2.5	2.5	2.4	2.4	2.4	1.2	0.51	0.00
Remaining District (Rural)	0.6	1.0	1.4	1.6	1.6	1.6	1.5	1.4	0.0	0.25	0.00
Total	**1.6**	**2.2**	**2.3**	**2.3**	**2.2**	**2.1**	**2.0**	**1.9**	**0.5**	**0.38**	**0.00**
Svay Rieng											
Provincial Capital (Urban)	4.6	4.3	3.9	3.5	3.0	2.6	2.1	1.7	1.0	0.45	0.00
Remaining District (Rural)	1.1	1.5	1.6	1.6	1.5	1.3	1.2	1.0	0.0	0.00	0.23
Total	**2.8**	**2.8**	**2.6**	**2.5**	**2.2**	**2.0**	**1.7**	**1.4**	**0.5**	**0.22**	**0.11**
Takeo											
Provincial Capital (Urban)	1.3	1.5	1.5	1.5	1.4	1.4	1.3	1.3	1.4	0.0	0.29
Remaining District (Rural)	0.4	0.7	1.0	1.2	1.2	1.2	1.1	1.0	0.0	0.0	0.23
Total	**0.8**	**1.2**	**1.4**	**1.4**	**1.3**	**1.3**	**1.2**	**1.1**	**0.7**	**0.0**	**0.26**

APPENDIX V:
NCHADS's Surveillance Unit:

Dr. **Mun Phalkun**:	Chief of Surveillance Unit
Dr. **Chann Navy**:	Deputy-chief of Surveillance Unit
Dr. **Lay Panhavorn**:	Surveillance Unit
Dr. **Theng Thithara**:	Surveillance Unit
Mrs. **Seng Sopheata**:	Surveillance Unit
Mrs. **Kao Chantha**:	Surveillance Unit

Contact Details:

National Center for HIV/AIDS, Dermatology and STD

Surveillance Unit

#245H, Sreet 6A, Phum Kean Khlang,
Sangkat Prekleap Russey Keo, Phnom Penh, Cambodia
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