HIV

SENTINEL SURVEILLANCE (ANC)
Kerala State Report

2014-15

**ICMR-NATIONAL
INSTITUTE OF EPIDEMIOLOGY**
Chennai

**NATIONAL
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Foreword

HIV Sentinel surveillance among ANC attendees is one of the most important national level activities, as it helps the programme managers in framing health policies towards controlling HIV infection in the state and the country as well. The objectives of HIV sentinel surveillance are to understand the trends, assess spread and distribution of HIV infection among geographical areas across the state. In order to have uniform geographical coverage, the number of sentinel sites in the state has been increased over a period of years by keeping at least one site in each district.

The National Institute of Epidemiology, Chennai, one of the Regional Institutes for 8 southern states, is involved in the HIV surveillance activities since 2006. This report is prepared based on the data collected during the 14th round of surveillance, in conjunction with the post years data to analyze the trend and to have an insight of epidemiological factors. I hope this report will serve as a very useful tool for the policy makers, scholars, researchers and other stakeholders in formulating guidelines in controlling HIV and enhancing their knowledge of HIV in their state.

I take this opportunity to thank Dr. S. Venkatesh, Deputy Director General, NACO and Dr. Pradeep Kumar, Consultant (surveillance) & his team for entrusting this activity to NIE and also for providing technical support in implementing the surveillance. I also wish to thank the Project Director and nodal officer of State AIDS Control Society for their help in completing the surveillance activities in a timely manner. I express my gratitude to all the State Referral Laboratories, National Referral Laboratories, State Surveillance Team members, Sentinel sites personnel and other National and International partners who helped us in completing the surveillance successfully.

Dr. Manoj V Murhekar

WHO Collaborating Centre for Leprosy Research and Epidemiology

Dr Ramesh R
Project Director,
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Preface

Sentinel Surveillance (HSS) Programme provides essential information to understand the trends and dynamics of HIV epidemic among different risk groups in the state. HIV estimates of the prevalence and incidence based on findings from HIV Sentinel Surveillance will help to assess the programme and to strengthen strategies for prevention, care and treatment interventions.
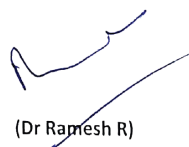
In Kerala Sentinel Surveillance was started in 1998 with 3 ANC sites. In the 2014-15 rounds, the number of ANC sites have been scaled up to 14, covering the 14 districts in the state.

Under HSS, an antenatal clinic in government or private hospitals is designated as an ANC sentinel site where 400 pregnant women (ANC attendees) are recruited. Surveillance is carried out over a period of three months. National Institute of Epidemiology (NIE), Chennai is Regional Institute in charge of HSS in the state.

I would like to take this opportunity to sincerely thank all the sentinel sites, testing labs, SST Members, NIE, KSACS staff and also give special thanks to the clients who have given their serum samples for this surveillance and whole heartedly supported this huge exercise.

The findings of HSS 2014-15 shows an encouraging steady decrease in ANC prevalence rate from 0.03 in 2012-13 to 0.05 in 2014-15.

The data presented in this report will provide us an evident base and also to understand the trends in HIV prevalence which in turn will lead to frame strategies for effective implementation of the program and HIV related service provisioning.

(Dr Ramesh R)

CONTENTS

CHAPTER 1

Introduction

Acquired immune deficiency syndrome or acquired immuno deficiency syndrome (AIDS) is a disease of the human immune system caused by the human immunodeficiency virus (HIV). This condition progressively reduces the effectiveness of the immune system and leaves individuals susceptible to opportunistic infections. The first HIV infection was reported in the year 1981 in the United States of America. Afterwards the epidemic spread rapidly throughout the globe.

In India it was in 1986, the first HIV infection reported from Chennai, Tamil Nadu. In the last two decades the awful disease spread throughout the country.

Surveillance is a vital component of any disease control programme. The purpose of surveillance is to actually look for evidence of disease risk, to predict the pattern and to plan appropriate action for control and prevention. Providing meaningful insights for action at policy, strategy, planning, or implementation levels at the appropriate time is the key objective of surveillance. The HIV epidemic in India is concentrated, with high prevalence among high-risk groups, moderate prevalence among bridge populations, and low prevalence among general population. Unprotected sex with female sex workers (FSW), injecting drug users (IDU), and unprotected anal sex between men are the three primary routes of HIV transmission in India. HIV sentinel surveillance measures the prevalence of HIV in a specific risk group in a specific region at a specific time point. The HIV sentinel surveillance system in India is based on the HIV transmission dynamics mentioned above and monitors the HIV epidemic patterns among the following groups:

1. **High-risk groups**
    a. Female sex workers
    b. Men who have sex with men (MSM)
    c. Injecting drug users
    d. People who are TG (transgender)/eunuchs

2. **Bridge populations**
    a. Single male migrants
    b. Long-distance Truckers (LDTs)
    c. People attending STI or gynaecology clinics (currently discontinued)

3. General population

Pregnant women attending the ANC clinics in urban and rural areas and the ANC clinic attendees were considered proxy for general population, STI patients were considered proxy for people with high-risk behaviour (high-risk and bridge populations and their partners).

1.1. Objectives and Application of HIV Sentinel Surveillance

The key objectives of HIV sentinel surveillance in India are to:

1. Monitor trends in HIV prevalence over time.
2. Monitor the distribution and spread of HIV in different subgroups and geographical areas.
3. Identify emerging pockets of HIV epidemic in the country.
4. Applications of HIV sentinel surveillance data.
5. Estimate and project burden of HIV at state and national levels.
6. Support programme prioritization and resource allocation.
7. Assist evaluation of programme impact.
8. Provide evidence to advocacy efforts.

1.2. Evolution of HIV Sentinel Surveillance in India

HIV surveillance in India began in 1986 when the Indian Council of Medical Research (ICMR) initiated a surveillance activity among blood donors and patients with STIs. After the National AIDS Control Organisation (NACO) was established in 1992, sentinel surveillance for HIV in India was initiated in 1993-94 with 52 sentinel sites in selected cities. In 1998, NACO formalized annual sentinel surveillance for HIV infection in the country with 180 sentinel sites, of which 176 were valid.

The first major expansion of the surveillance network was in 2003. More than 200 rural antenatal care (ANC) sentinel sites were established at the community health centre (CHC) level in most of the districts in high-prevalence states as well as some districts in low-prevalence states in North India. However, half of these ANC rural sites, especially those in low prevalence states of North India, were discontinued in the next round because they could not achieve the required target sample size due to poor utilization rates. Another significant expansion in 2003 was the addition of 30 FSW sites. Overall, 354 districts had at least one HSS site in 2003. From 2003 and until 2005, the same sentinel sites continued with expansion to 83 FSW and 30 injecting drug user (IDU) sites.

The year 2006 could be considered the watershed year for HSS development in India. The goal was to have at least one sentinel site in every district.

Six leading regional public health institutions in the country were involved to expand and strengthen the surveillance network and implementation activities and follow up programmes. These regional institutes (RI) provided technical support, guidance, monitoring, and supervision for implementing HSS. Two more RIs were created in 2008. Supervisory structures were further strengthened with constitution of central and state surveillance teams, comprised of public health experts, epidemiologists, and microbiologists from several medical colleges and research institutions.

During the subsequent three rounds of HSS (2007, 2008-09, and 2010-11), the focus was on expansion of surveillance among high-risk and bridge populations.

Key strategic HSS implementation improvements in these rounds included:

1. Technical validation of new sentinel sites by regional institutes before inclusion in surveillance and dropping poorly performing sites.

2. Introduced the dried blood spot (DBS) method of sample collection from high-risk groups (HRGs) to overcome logistic problems at HRG sites.

3. Introduced informed consent at high-risk group sites to address ethical concerns.

4. Initiated random sampling methods of recruitment at HRG sites, taking advantage of the availability of updated line lists of HRGs at the TI projects.

5. Standardized training protocols across states with uniform session plans and materials, and adoption of a two-tier training plan with training-of-trainers (TOT) followed by training of site personnel.

6. Developed a four-tier supervisory structure: national-level central team; regional institutes; state surveillance teams; and State AIDS Control Society (SACS) teams.

7. Strengthened focus on supportive supervision and action-oriented monitoring.

8. Increased focus on quality of planning, training, implementation, supervision and feedback.

9. Decreased number of testing laboratories for ANC and STD samples, limiting them to high-performing laboratories with enzyme-linked immune sorbent assay (ELISA) facilities to ensure high-quality testing and close supervision.

10. Developed a new web-based data management system to enhance data quality and ensure real time monitoring of surveillance activities.

11. Initiated epidemiological investigation into unusual findings (sudden rise or decline in prevalence) to understand reasons and correct.

12. Conducted pre-surveillance sentinel site evaluation to assess preparedness of site for HSS and to obtain profile-related information.

HIV sentinel Surveillance in Kerala

The first HIV positive person in Kerala was identified in 1987. Since then there has been a gradually growing epidemic in the State. In Kerala sentinel Surveillance was started in 1998. In the first round it was conducted at 3 ANC sites and 2 STD sites, in the next year an additional STD site was included. From 1999 to 2002 there were 3 ANC and 3 STD sites in the HSS in the state. In 2000 an FSW site was also added but it became a permanent site only from 2003 onwards. On the basis of the results of HSS 2008, NACO had estimated about 0.36% of the adult population in the state is infected with HIV.

An FSW site was included in the HSS during 2000. In 2003, for the first time an MSM site was included in Kerala for HSS, in 2004 an IDU site and in 2005 a TRK (LDT) site was introduced. In 2006 the number of sites was increased to 25, with all the 14 districts having at least one sentinel site. In 2007 an additional FSW site was included in Palakkad district, raising the HSS sites to 26. As the part of the national consensus in phasing out the STD sites, during the 2008 HSS, 3 STD sites of the state have been discontinued and thus the number of sentinel sites reduced to 23.

In HIV Sentinel Surveillance 2010, 4 new ANC sites and 8 new HRG sites were included. The ANC sites were located in Kozhikode, Ernakulam, Malappuram and Palakkad. Among the 8 new HRG sites, 4 FSW sites were located in Ernakulam, Trivandrum, Kozhikode and Kasaragod, 3 MSM sites in Kozhikode, Trivandrum and Kottayam and 1 migration site in Ernakulam. In this regard there were 33 sites in HSS 2010 of which 2 sites were composite. The same sites are continued up to HSS 2012-13.

CHAPTER 2

METHODOLOGY AND IMPLEMENTATION

This chapter describes HSS methodology and the implementation mechanisms adopted during HSS.

2.1. Methodology of HIV Sentinel Surveillance at ANC Sentinel Sites

HIV sentinel surveillance is defined as a system of monitoring the HIV epidemic among specified population groups by collecting information on HIV from designated sites (sentinel sites) over years, through a uniform and consistent methodology that allows comparison of findings across place and time, to guide programme response. A sentinel site is a designated service point/facility where blood specimens and relevant information's are collected from a fixed number of eligible individuals from a specified population group over a fixed period of time, periodically, for the purpose of monitoring the HIV epidemic. Under HIV sentinel surveillance (HSS), recruitment of respondents is conducted for three months at selected ANC sentinel sites. Because of the low HIV prevalence in India, the classical survey method of sample size calculation that gives a large sample size cannot feasibly be collected through facility-based surveillance on an annual basis. Hence, a sample size of 400 for surveillance among ANC attendees was approved by a consensus of experts. Eligible respondents are enrolled until the sample size of 400 is reached or until the end of the surveillance period, whichever is earlier.

The eligibility criteria for recruiting respondents at an ANC sentinel site were:

Pregnant woman with the age group of 15-49 years, attending the antenatal clinics for the first time during the current round of surveillance period. If a pregnant woman becomes eligible by the above criteria, she is included in surveillance irrespective of issues like date of antenatal registration, HIV positivity status, participation in previous rounds of surveillance and whether she is tested under PPTCT or not. Also, a pregnant woman is recruited only once during a round of surveillance. To ensure this, the date of her previous visit to ANC clinic is verified. If the date of her previous visit to ANC clinic falls during the current round of surveillance, she is not recruited under surveillance.

"Sampling method" refers to the approach adopted at the sentinel site for recruiting eligible individuals into HSS. Consecutive sampling method is adopted in HSS in India for ANC clinic attendees. After the start of surveillance, all individuals attending the

ANC sentinel site facility who are eligible for inclusion are recruited in the order they attend the clinic. This sampling method removes all chances of selection or exclusion based on individual preferences or other reasons, and hence reduces the selection bias. It is convenient, feasible, and easy to follow.

Testing strategy refers to the approach adopted for collecting and testing blood specimens and handling the test results in HSS. In India, the unlinked anonymous testing (UAT) strategy is used. Testing is conducted on a portion of blood specimen collected for routine diagnostic purposes (such as syphilis) after removing all personal identifiers. Neither the information collected in the data form nor the HIV test result from the blood specimen is ever linked to the individual from whom the information/ specimen is collected. Neither the personnel collecting the specimen nor the personnel testing the specimen are able to track the results back to the individual.

Hence, personal identifiers such as name, address, outpatient registration number, etc. are not mentioned anywhere on the data form, blood specimen, or data form transportation or sample transportation sheets. Similarly, the HSS sample number or any mark indicating inclusion in HSS is not mentioned in the ANC register or patient/OPD card. The portion of the blood specimen with identifiers is used for reporting the results of the routine test for which it has been collected. The portion of the blood specimen without identifiers is sent for HIV testing under HSS. A referral for HIV testing is made for all ANC clinic attendees.

Testing protocol refers to the number of HIV tests conducted on the blood specimen collected during HSS. A two-test protocol is adopted in HSS. The first test is of high sensitivity and second of high specificity and is confirmatory in nature. The second test is conducted only if the first is found to be positive. HIV testing under surveillance is for the purpose of ascertaining HIV levels and trends in a community and not for case diagnosis, which is why the two-test protocol is the global standard for surveillance. The methodology of HSS at ANC sentinel sites is summarized in Table 1 below

Table 1. Methodology of HIV Sentinel Surveillance at ANC Sentinel Sites	
Sentinel site	Antenatal clinic
Sample size	400
Duration	3 months
Frequency	Once in 2 years
Sampling method	Consecutive sampling
Eligibility	Pregnant women ages 15-49 years attending ANC clinic for the first time during the current round
Testing strategy	Unlinked anonymous testing
Blood specimen	Serum collected through venous blood specimen
Testing protocol	Two-test

2.2. Information Collected under HSS at ANC Sentinel Sites

HSS provides information on two bio-markers; HIV and syphilis. All blood specimens collected under HSS are tested for these two infections. Besides bio markers, when recruiting an individual in HSS, information is collected on basic demographic parameters such as age, education, occupation, spouse's occupation, and order of pregnancy. Collected information is kept minimal and restricted to those who might be asked under routine clinic procedures. During the recent rounds, a few questions were added to identify potential biases in the sample (e.g., source of referral) or to further profile the respondents with respect to their vulnerability (migration status of spouse) so that HIV prevalence estimates can be better explained and interpreted. HSS collects information on the following nine key demographic variables from every respondent.

1. Age: The age of the respondent is recorded in number of completed years. Since age is a part of eligibility criteria, improper recording or non-recording of age makes a sample invalid. Information on age helps identify the age groups with high HIV prevalence. In the absence of data on HIV incidence, high prevalence among younger age groups is considered a proxy for recent infections.

2. Literacy status: The literacy status of an individual has a direct bearing on the awareness levels with respect to risks of acquiring HIV and means of protecting oneself. Knowing the literacy status of the pregnant woman helps in understanding differentials in HIV prevalence and informs demographics about the women who are accessing services at ANC clinics. This information may also be helpful to compare and standardize the demographic profiles of two independent samples under HSS, while investigating any unusual increase or decrease in trends. Under HSS, the literacy status of respondents was classified into five categories as defined below: (a). Illiterate: People with no formal or non-formal education. (b). Literate and till 5th standard: People with non-formal education or those who joined school but did not study beyond 5th standard. (c). 6th to 10th standard: Those who studied beyond 5th standard but not beyond 10th standard. (d). 11th to graduation: Those who studied beyond 10th standard but not beyond graduation. Includes those with technical education/diplomas. (e). Post-graduation: Those who studied beyond graduation.

3. Order of current pregnancy: The order of pregnancy denotes the number of times a woman has been pregnant. It includes the number of live births, still births, and abortions. It is also referred to as gravidity. Women who are pregnant for

the first time are referred to as primi-gravida. In the context of HIV, order of pregnancy indicates the duration of exposure to sexual risks. Since primi-gravida are likely to be exposed to sexual risks only recently, HIV prevalence among them is considered a proxy for new HIV infections and helps in understanding the HIV incidence in that region. The order of pregnancy is recorded as first, second, third, fourth, or more.

4. Source of referral to the ANC clinic: Under HSS, ANC clinic attendees are asked who referred them to the clinic for antenatal check-up. This variable was added to the data collection form to understand the various sources of referral, especially to assess if there is any specific bias in the sample because of specific referrals of HIV-positive cases from any source. Published literature indicates that there is disproportionate referral of HIV-positive cases from private sector to government hospitals. Similarly, if there are higher numbers of referrals from ICTC/ART centres in the sample, it may bias the HIV prevalence, as those respondents are likely to be people who have been exposed to HIV risk, to have HIV risk perception or who are known to be HIV-positive. This variable helps assess any such phenomenon. The response categories listed in the HSS data form include: a. Self-referral b. Family/ relatives/ neighbours/ friends c. NGO d. Private hospital (doctors/ nurses) e. Government hospital (including ANM/ ASHA) f. ICTC/ ART centre.

5. Current place of residence: HSS 2014-15 records the reported current residence of the respondent as 'urban' or 'rural'. If the current place of residence of the respondent i.e., the place she is living with her husband falls under Municipal Corporation, municipal council, or cantonment area, it is classified as 'urban'. Otherwise, it is recorded as 'rural'. Place of residence helps in studying the epidemic patterns in urban and rural areas separately and provides programmatic in sight for implementing interventions. In the context of formerly high-prevalence states, urban rural differentials of HIV prevalence is important because HIV is known to have spread to rural areas, sometimes with higher prevalence in these states. In low-prevalence states with rising HIV trends, migration from rural areas to high prevalence destinations is likely to play a role. Therefore, studying rural epidemics is important to characterize the epidemic appropriately.

6. Duration of stay at current place of residence: All the respondents are asked about the duration of stay at the current place of residence (the place she is living with her husband) and the responses are recorded in years and months.

If the duration is less than one year, '0' years and the number of months as reported by the respondent are recorded. If the duration is less than one month, the duration is recorded as '0' years, '1' month. Duration of stay at current place of residence is asked to ascertain whether the pregnant woman belongs to the place where the ANC clinic is situated. Because many pregnant women in India go to their maternal home for delivery, it is likely that they attend ANC clinic at their mother's place. If this is the case, her duration of stay will be only a few days or months. Although counselors are instructed to ask where the respondent is living with her husband, this variable helps eliminate reporting errors. Also, it helps in understanding the duration of exposure to sexual risk. Similar to order of pregnancy, this variable also helps assess new HIV infections occurring in a region.

7. Current occupation of respondent: Certain occupations are associated with higher exposure and risk to HIV. It is important to understand the profile of respondents and differentials of HIV with respect to their occupation. For this purpose, HSS has categorized occupations into13 categories ensuring that all the possible occupations are covered and the categories are relevant to the epidemiological analysis of HIV prevalence data. The occupation categories and their definitions, were as follows:

   a. Agricultural labourer

   b. Non-agricultural labourer: includes workers at construction sites, quarries, stone crushers, road or canal works, brick-kilns, etc.

   c. Domestic servant

   d. Skilled/semi-skilled worker: includes workers in small-scale or cottage industries; industrial/factory workers; technicians such as electricians, masons, plumbers, carpenters, goldsmiths, iron-smiths, and those involved in automobile repair; artisans such as weavers, potters, painters, cobblers, shoe-makers, tailors, etc.

   e. Petty business/small shop: includes vendors selling vegetables, fruits, milk, and newspapers; pan shop operators.

   f. Large business/self-employed: includes professionals and business people.

   g. Service (govt./pvt.): those working on salary basis in government, private, or institutional sector; excludes drivers and hotel staff.

   h. Student

   i. Truck driver/helper

  j. Local transport worker (auto/ taxi driver, handcart pullers, rickshaw pullers, etc.)

  k. Hotel staff

  l. Agricultural cultivator/ land holder

  m. Housewife (in order to be consistent with the occupation codes for spouse of respondent, housewife is Code 14).

8. Current occupation of spouse: Occupation of spouse is an important epidemiological variable that may help identify population groups that are at higher risk of acquiring HIV. HSS used the same occupational categories as those used for the respondent. The two differences are that the category 'unemployed' (Code13) is used in the place of 'housewife' and there is an additional category: 'Not applicable (never married/widow/divorced/separated)' (Code 99).

9. Migration status of spouse: Analyses of drivers of the emerging epidemic in some low-prevalence states points to migration from these states to high-prevalence destinations (NACO Annual Report 2013-14, Chapter 2. Current Epidemiological Scenario of HIV/AIDS, pg.12). In order to assess the effects of migration status of spouse on HIV prevalence among ANC clinic attendees, respondents in HSS were asked whether spouse resides alone in another place/town away from wife for work for longer than 6 months. This question is not applicable to respondents who were never married/widowed/divorced/separated.

2.3. Implementation Structure of HIV Sentinel Surveillance in India

HIV sentinel surveillance has a robust structure for planning, implementation, and review at national, regional, and state levels. The structure and key functions of involved agencies are shown in Figure 1.

National level: The National AIDS Control Organisation (NACO) is the nodal agency for strategy formulation and commissioning for each round of HSS. The Technical Resource Group on Surveillance and Estimation, comprised of experts from the fields of epidemiology, demography, surveillance, biostatistics.
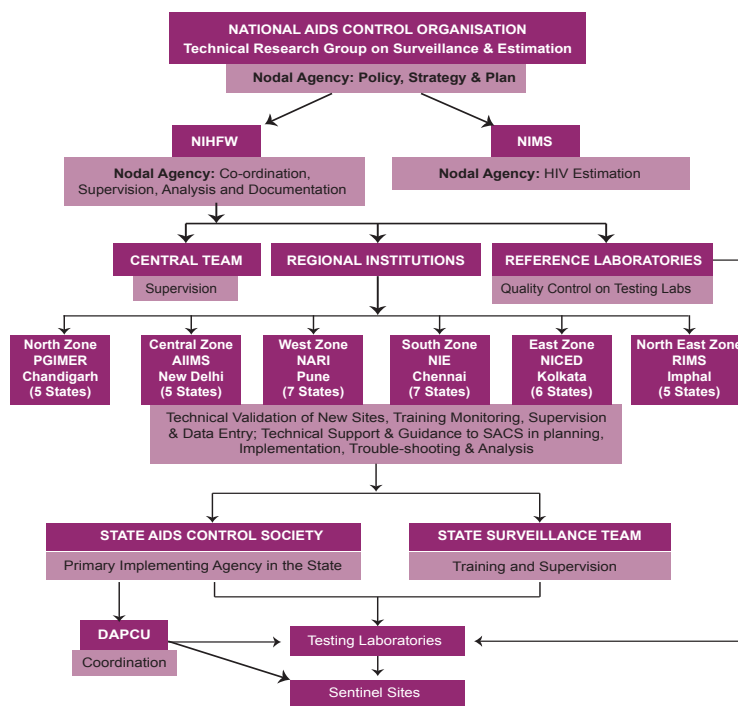
Figure 1: HSS Implementation Structure

Implementing Structure of HIV Sentinel Surveillance in India

The main goal of implementing structure of HSS is for performing the assessment of the implementation plans of HSS and reviews the outcomes of each round. Two national institutes—National Institute of Health and Family Welfare (NIHFW) and ICMR-National Institute of Medical Statistics (ICMR-NIMS) -supports national level activity planning and coordination. In addition, the central team, which is coordinated by NIHFW, New Delhi and is comprised of experts from the Centres for Disease Control and Prevention (CDC), World Health Organization (WHO), The Joint United Nations Programme on HIV/AIDS (UNAIDS), medical colleges, and other national and international agencies, provide support in training and supervision.

Regional level: Since 2006, NIE has been identified as regional institute (RI) for HSS to provide technical support to the State AIDS Control Societies (SACS) for all HSS activities in southern zone, starting with identification of new sites, training, monitoring and supervision, and improving quality of the data collection and their analysis.

Data entry is another function performed by RIs. The team at each RI is comprised of two epidemiologists/public health experts and one microbiologist, which are

supported by one project coordinator, two research officers and other supportive staff. The names of the six regional institutes and the distribution of states among them are in Table-2, below:

State level: SACS is the primary agency responsible for implementation of HSS and NACO has appointed state epidemiologists at the SACS to support the activities and promote data analysis. In addition to these, every state has a surveillance team comprised of public health experts and microbiologists who support SACS in the training, supervision, and monitoring of the personnel involved in sentinel surveillance. State surveillance teams (SSTs) are formed by RIs in consultation with SACS. All activities are coordinated by RIs.

District level: In districts with functional district AIDS Prevention and Control Units (DAPCUs), the DAPCU staffs are involved in the coordination of HSS activities at the sentinel sites and the associated testing labs. Laboratory support is provided by a network of testing and reference labs. There are 117 state reference laboratories (SRLs) that conduct primary testing of blood specimens collected under HSS. Thirteen national reference laboratories (NRLs) provide external quality assurance to the SRLs through repeat testing of all HIV-positive blood specimens and 5 percent of HIV negative specimens.

Table 2: Regional Institutes for HIV Sentinel Surveillance and their State Allocation	
Name of regional institution	Responsible states
Central Zone: All India Institute of Medical Science, New Delhi	Uttar Pradesh, Bihar, Jharkhand, Uttaranchal, and Delhi.
North Zone: Post-graduate Institute of Medical Education and Research, Chandigarh	Haryana, Himachal Pradesh, Jammu & Kashmir, Punjab, and Chandigarh.
West Zone: National AIDS Research Institute, Pune	Maharashtra, Gujarat, Goa, Madhya Pradesh, Rajasthan, Daman & Diu, and Dadra Nagar Haveli.
South Zone: National Institute of Epidemiology, ICMR, Chennai	Andhra Pradesh, Tamil Nadu, Karnataka, Kerala, Odisha, Puducherry, and Lakshadweep and Telangana.
East Zone: National Institute of Cholera and Enteric Diseases, Kolkata	West Bengal, Chhattisgarh, Sikkim, Andaman & Nicobar Islands, Meghalaya, and Nagaland.
Northeast Zone: Regional Institute of Medical Sciences, Imphal	Manipur, Mizoram, Tripura, Assam, and Arunachal Pradesh.

2.4. Key Initiatives during HIV Sentinel Surveillance 2014-15:

In response to key issues identified in the implementation of HSS during the previous rounds and to improve the quality and timeliness of the surveillance process in the 14th round, several new initiatives were implemented as part of continuous quality improvement.

SACS checklist for preparatory activities:

This was developed to monitor the planning process for HSS in each state. All the preparatory activities were broken into specific tasks with clear timelines and SACS were required to submit the completion status for each task. A team of officers from NACO coordinated with state nodal persons to ensure that preparatory activities in all states adhered to the timelines.

Pre-surveillance sentinel site evaluation (SSE):

A pre-surveillance evaluation of ANC and STD sentinel sites was conducted to identify and correct human resources and infrastructure-related issues at the sentinel sites before initiation of surveillance. The evaluation also provided site information such as type of facility, average OPD attendance, availability of HIV and AIDS services, and distance of facilities from HSS labs, which may have implications on adherence to methodology.

Standard operational manuals, wall charts, and bilingual data forms:

These were developed to simplify the HSS methodology for site-level personnel and to ensure uniform implementation of the guidelines in all the sentinel sites. These were printed centrally and distributed across the country.

Training during HSS 2014-15:

Steps to improve quality of training:

1. A well-structured training programme was adopted to ensure that all the personnel involved in HSS at different levels were adequately and uniformly trained in the respective areas of responsibility.

2. The training agenda, curriculum, planning and reporting formats were standardized and used in all the states. Standard slide sets and training manuals for training of sentinel site personnel were developed centrally to ensure uniformity.

3. Trainings included group work and a "know your sentinel site" exercise, which helped participants identify the routine practices that could affect the implementation of surveillance at their sites and recommended actions to address the same.

4. Pre and post-test assessments were given to each participant at the site-level trainings. Analysis of these scores helped state teams to identify the priority sites for supervisory visits.

5. Training reports for each batch were submitted in standard formats at the end of the each training.

Details of trainings:

1. Trainings started with two batches of national pre-surveillance meetings with about 90 personnel from regional institutes and SACS to discuss the critical aspects of planning for HSS 2014-15 and to clearly understand the system for supportive supervision through the online Strategic Information Management System (SIMS) application.

2. This was followed by 2-day regional TOTs organized by the RIs for SACS officers and state surveillance teams, comprised of public health experts and microbiologists, to create state-level master trainers and to plan for the site-level trainings.

3. Site-level trainings (2 days per batch @ 8-10 sites per batch) were conducted in all the states. Representatives from the regional institutes and NACO observed the trainings to ensure that trainings were provided as per the protocol and that all the sessions were covered as per the session plan.

4. Separate trainings on surveillance testing protocols and lab reporting mechanisms through the SIMS application for HSS were organized for microbiologists and lab technicians from 117 ANC/STD testing labs and 13 NRLs.

5. Overall, around 40 central team members; 30 officers from six RIs; 95 SACS officers including in-charge surveillance, epidemiologists, and M&E officers; 280 state surveillance team members; 260 laboratory personnel including microbiologists and lab technicians from the designated testing labs; and more than 3,000 sentinel site personnel including medical officers, nurse/counselors, and lab technicians were trained under HSS 2014-15.

Laboratory system: For HSS 2014-15, the laboratory system was strengthened by limiting the testing of specimens to designated SRLs. Real-time monitoring of the quality of blood specimens and laboratory processes was achieved through introduction of web based reporting through the SIMS application for HSS. Efforts were made to standardize quality assurance aspects of sample testing under HSS and to streamline responses in case of discordant test results between testing lab and reference lab through the SIMS application.

Supervisory mechanisms for HSS HSS 2014-15: Supervision of all HSS activities was prioritized to ensure smooth implementation and high-quality data collection. Extensive mechanisms were developed to set up a comprehensive supervisory system for HSS and to ensure that 100 percent of HSS sites were visited in the first 15 days of the start of sample collection. The principles adopted included action-oriented supervision, real-time monitoring and feedback, accountability for providing feedback and taking action, and an integrated web-based system to enhance the reach and effectiveness of supervision.

SIMS modules for web-based supervision

Specific modules were developed and made operational in the web-based SIMS for HSS to facilitate real-time monitoring of HSS 2014-15.

1. Field supervision was conducted by trained supervisors who visited the sentinel sites to monitor the quality of recruitment of respondents and other site-level procedures. Real-time reporting of field supervision used the SIMS supervisor module via the field supervisory quick feedback and action taken report sub-modules. The module was used extensively by all the supervisors and helped in quick identification and resolution of challenges in the field.

2. Data were supervised by data managers at RIs to monitor the quality of data collection and transportation using the SIMS module.

3. Laboratory supervision was conducted by SRLs and NRLs to monitor the quality of blood specimens, progress in laboratory processing, and external quality assurance, using the SIMS lab module.

Overall, 80 percent of supervisors reported on the SIMS field supervisor quick feedback format, and 52 percent of action taken report formats were submitted by HSS focal persons from SACS and RIs. Laboratory reporting through the lab module was completed by 87 percent of SRLs.

Integrated monitoring and supervision plan

1. An integrated supervision plan for each state was developed by RIs, SACS, and NIHFW to avoid duplication in monitoring coverage, there by facilitating maximum coverage of surveillance sites.

2. The first round of visit was conducted by RI, SACS, and SST members. Central team members (CTM) visits the top priority sites identified in feedback from the first round of visits. Subsequent visits were based on priority with a goal of making at least three visits to each identified problematic site.

SMS-based daily reporting from sentinel sites

This was piloted in last round and implemented in this round as an approach of daily reporting of the number of samples collected at each sentinel site through a group SMS from a registered mobile number to a central server. The system automatically compile and display site-wise data on an Excel format on a real-time basis. Access to this web-based application was given to SACS, RIs, and DAC and facilitated identification of sites with poor performance and enabled initiation of corrective action at sites that initiated HSS late; where sample collection was too slow or too fast; and where there were large gaps in sample collection.

CHAPTER 3.

Profile of Respondents

Data was collected from each respondent on key nine socio-demographic variables. Analysis of these variables is important because they help programme managers and policy makers understand the background characteristics of clinic attendees. Also they help in the identification of particular characteristics which make respondents more prone to acquiring HIV infection and assessing how representative the sample is.

Review of the profile of the respondents showed that, at state level, more than half of the respondents (52.7%) were in the age group of 25-34 years, with the median age of respondents being 25 years. Out of the 5574 respondents only 0.8% (46 ANC) of respondents had limited or no literacy skills. More than half (54.4%) of respondents studied upto 10th to graduation followed by those who studied for 6th to 10th standard education (33.4%). Those with only primary education accounted for 2.9%. More than two-fifth of the ANC clinic attendees (44.2%, 38.4% respectively) were in their first and second pregnancy. Almost 70% of the respondents reported that they reside in rural areas. About 82.8% of ANC clinic attendees reported that they were housewives. Only 9.5% reported that they were in Service (Govt./or Pvt.). Non-agricultural labourers (0.8%); agricultural labour (0.6%) and skilled/semi-skilled workers (28.1%) were the predominant occupations among the spouses of the respondents. Non-agricultural labourers (20.6%); service (20.7%); agricultural labour (4%), local transport worker (11.3%); petty business (5%) and hotel staff (2%) are other important occupation groups of spouses of respondents. 8.1% of ANC clinic attendees reported that their spouses reside in another place for work for longer than six months

Table 3: Profile of Respondents at State Level, HSS 2014-15		
Background characteristics	Number	%
Age (N=5594)		
15-24	2402	42.9
25-34	2947	52.7
35-44	245	4.4
45-49	0	0.0
Literacy status (N=5574)		
Illiterate	46	0.8
Literate and till 5th standard	162	2.9

6th to 10th standard	1861	33.4
11th to Graduation	3033	54.4
Post Graduation	472	8.5
Order of current pregnancy (N=5576)		
First	2463	44.2
Second	2142	38.4
Third	741	13.3
Fourth or more	230	4.1
Source of referral pregnancy (N=5571)		
Self referral	3651	65.5
Family/Relatives/Neighbours/Friends	1153	20.7
NGO	3	0.1
Private Hospital	94	1.7
Govt. Hospital	668	12.0
ICTC/ART Centre	2	0.0
Current place of residence (N=5525)		
Urban	1674	30.3
Rural	3851	69.7
Current occupation of the respondent (N=5589)		
Agricultural Labourer	35	0.6
Non-Agricultural labourer	42	0.8
Domestic servant	37	0.7
Skilled/Semiskilled worker	137	2.5
Petty business	13	0.2
Large business/self employed	15	0.3
Service (Govt./Pvt.)	529	9.5
Student	148	2.6
Truck driver/helper	1	0.0
Local transport worker	3	0.1
Hotel staff	3	0.1
Agricultural cultivator/landholder	1	0.0
Housewife	4625	82.8
Current occupation of the spouse (N=5588)		
Agricultural Labourer	223	4.0
Non-Agricultural labourer	1152	20.6
Domestic servant	7	0.1

Skilled/Semiskilled worker	1571	28.1
Petty business	277	5.0
Large business/self employed	277	5.0
Service (Govt./Pvt.)	1156	20.7
Student	1	0.0
Truck driver/helper	141	2.5
Local transport worker	630	11.3
Hotel staff	109	2.0
Agricultural cultivator/landholder	27	0.5
Unemployed	14	0.3
Not Applicable	3	0.1
Spouse resides alone in another place/town from wife for work for longer than 6 months (N=5573)		
Yes	452	8.1
No	5118	91.8
Not Applicable	3	0.1
HIV (N=5594)		
Negative	5591	99.9
Positive	3	0.1
Syphilis (N=5594)		
Negative	5594	100.0
Positive	0	0.0

3.1. Age

Age in completed years is recorded for every respondent at the time of recruitment into HSS. The majority (52.7%) belonged to the age group of 25-34 years and 42.9% was in the age group of 15-24 years. Only 4.4% of respondents belonged to the age group of 35-44 years and no one has registered in the 45-49 year group.

Figure 2: Percent Distribution of respondents by age group, HSS 2014-15, Kerala
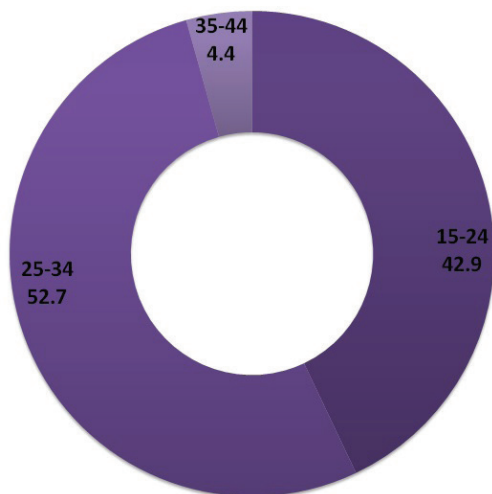
Table 4: Percent Distribution of respondents by age group and district, HSS 2014-15					
	15-24	25-34	35-44	45-49	N
	%	%	%	%	
Alappuzha	41.9	55.6	2.5	0.0	399
Ernakulam	33.3	62.8	4.0	0.0	400
Idukki	33.3	63.3	3.5	0.0	400
Kannur	33.8	60.8	5.5	0.0	400
Kasaragod	37.3	56.6	6.0	0.0	399
Kollam	56.3	42.3	1.5	0.0	400
Kottayam	28.5	63.3	8.3	0.0	400
Kozhikode	46.3	46.5	7.3	0.0	400
Malappuram	59.0	39.0	2.0	0.0	400
Palakkad	54.6	43.6	1.8	0.0	399
Pathanamthitta	36.3	60.2	3.5	0.0	399
Thiruvananthapuram	48.1	46.9	5.0	0.0	399
Thrissur	43.6	47.9	8.5	0.0	399
Wayanad	49.0	49.0	2.0	0.0	400

District wise analysis shows that Malappuram district is having 59% of ANC under the age group 15-24 years followed by Palakkad district (54.6%). Further split up among the younger age group 15-24 in Malappuram district shows that 28.8% (68 ANC) are in the age group 15-19 and 71.2% belong to the age group 20-24 years. Idukki and Kottayam have the maximum number (63.3%) of ANC in the age group 25-34 years and Thrissur is having 8.5% of 35-44 years age group of ANCs.

3.2. Literacy Status

Under HSS 2014-15, respondent literacy status was classified into five categories:

1. Illiterate: people with no formal or non-formal education.

2. Literate and till 5th standard: people with non-formal education or those who joined school but had not studied beyond 5th standard.

3. 6th to 10th standard: people who studied beyond 5th standard but not beyond 10th standard.

4. 11th to graduation: people who studied beyond 10th standard but not beyond graduation. Includes those with technical education/diplomas.

5. Post-graduation: people who studied beyond graduation.

Figure 3: Percent Distribution of respondents by educational status, HSS 2014-15, Kerala
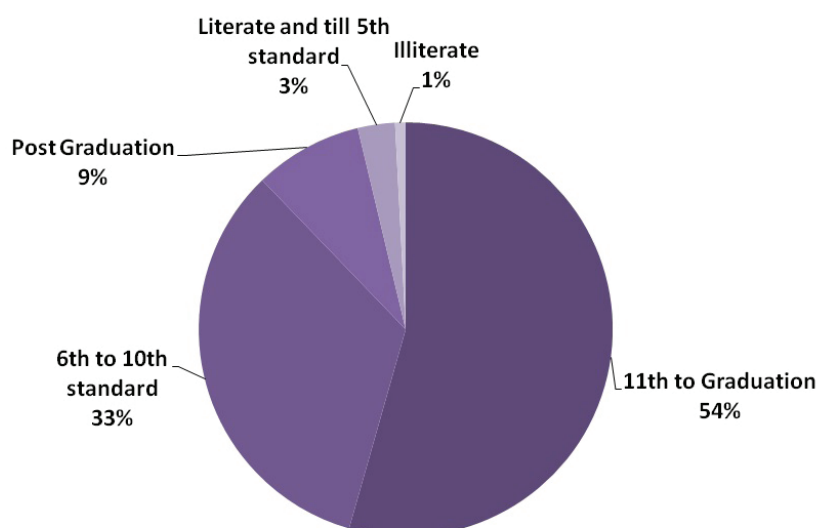
In Kerala, 99.2% are literate and only 0.8% of respondents at the state level had no formal education.

Table 5: Percent Distribution of respondents by education and state, HSS 2014-15						
	Illiterate	Literate and till 5th standard	6th to 10th standard	11th to Graduation	Post Graduation	N
	%	%	%	%	%	
Alappuzha	0.3	0.3	25.1	68.6	5.8	398
Ernakulam	0.3	0.3	4.8	63.3	31.5	400
Idukki	0.3	0.0	39.4	51.5	8.8	398
Kannur	0.8	1.3	39.8	55.4	2.8	397
Kasaragod	0.5	8.6	63.4	26.5	1.0	396
Kollam	0.0	0.5	33.5	61.0	5.0	400
Kottayam	0.0	0.3	29.5	64.8	5.5	400
Kozhikode	0.0	0.5	6.1	67.0	26.4	394
Malappuram	0.3	1.3	45.0	52.0	1.5	398
Palakkad	2.3	2.8	56.4	37.6	1.0	399
Pathanamthitta	0.3	0.3	23.0	64.9	11.6	396
Thiruvanantha-puram	0.3	0.5	25.6	63.7	10.0	399
Thrissur	0.0	6.0	29.8	58.9	5.3	399
Wayanad	6.5	18.3	46.0	26.8	2.5	400

Around 3% of respondents studied up to 5th standard and the highest proportion of respondents (54%) studied beyond 10th standard and up to graduation. Around 33% of the respondents reported to have studied 6th and 10th standard, while another about 8% had studied beyond graduation. District wise literacy shows that ANCs in Kollam, Kottayam, Kozhikode and Thrissur have 100% literacy followed by Ernakulam (99.7%), Allappuzha (99.8%) and Idukki with (99.7%). Illiteracy is higher in Wayanad district (6.5%) followed by Palakkad District (2.3%).

3.3. Order of Pregnancy

The order of pregnancy denotes the number of times a woman has become pregnant. It includes the number of live births, still births, and abortions. It is also referred to as 'gravidity'. As noted earlier, in the context of HIV, order of pregnancy indicates

the duration of exposure to sexual risks, so HIV prevalence among primi-gravida is considered a proxy for new HIV infections and is an indicator of state HIV incidence.

At the state level, a little less than half (44.2%) of the respondents reported being pregnant for the first time, 38.4% were pregnant for the second time, and 13.3% of respondents reported that it was their third pregnancy. Only 4.1% of respondents were pregnant for the fourth or more time.

Figure 4: Percent Distribution of respondents by Order of Pregnancy, HSS 2014-15, Kerala
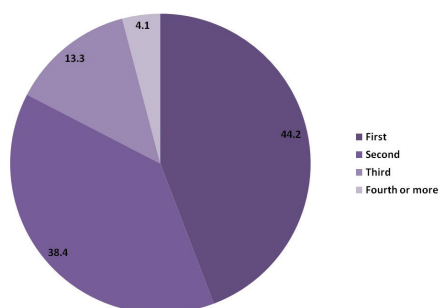
Table 6: Percent Distribution of respondents by Order of Pregnancy and district, HSS 2014-15					
	First	Second	Third	Fourth or more	N
	%	%	%	%	
Alappuzha	43.2	42.7	10.3	3.8	398
Ernakulam	56.0	36.9	6.3	0.8	398
Idukki	43.9	42.9	13.0	0.3	399
Kannur	34.0	54.4	8.3	3.3	397
Kasaragod	36.2	35.4	17.6	10.8	398
Kollam	47.0	38.5	11.8	2.8	400
Kottayam	45.0	36.0	14.0	5.0	400
Kozhikode	57.1	25.0	12.1	5.8	396
Malappuram	32.8	41.8	21.3	4.3	400
Palakkad	38.9	41.0	16.3	3.8	398
Pathanamthitta	53.0	40.5	5.5	1.0	398
Thiruvananthapuram	49.7	31.9	15.6	2.8	398
Thrissur	44.1	37.8	12.5	5.5	399
Wayanad	37.5	33.0	21.4	8.1	397

The first order of pregnancy varies from 57.1% at Kozhikode to 32.8% in Malappuram. Morethan half of the ANC attendees were at their with primi-gravida was observed in Kozhikode (57.1%), Ernakulam (56%), Pathanamthitta (53%), Thiruvananthapuram (49.7%). Second order pregnancy varies from 54.4% in Kannur to 25% in Kozhikode. More than half of ANC attendees in Kannur district were under second order of pregnancy followed by Idukki (42.9%) and Alappuzha (42.7%). Wayanad is having the highest order in third pregnancy (21.4%) followed by Malappuram (21.3%). The least was in Pathanamthitta (5.5%). It is also noted that 11 out of 14 districts were showed more than 10% in having third order pregnancy. Fourth order pregnancy can in a way lead to reproductive health problems. More number of cases were seen in Kasaragod district (10.8%) and lowest in Idukki (0.3%).

3.4. Source of Referral to the ANC Clinic

The variable illuminates the various sources of referral, and helps identify if a specific bias is being introduced in the sample due to specific referrals of HIV-positive cases from any source. The response categories listed in the HSS data form include self-referral; family/relative/ neighbour/friend; NGO; private hospital (doctor/nurse); government hospital (including ANM/ASHA); and ICTC/ ART centre. Government health care providers include ANM, ASHA, doctors/nurses at PHC, and CHC.

Figure 5: Percent Distribution of respondents by source of referral, HSS 2014-15, Kerala
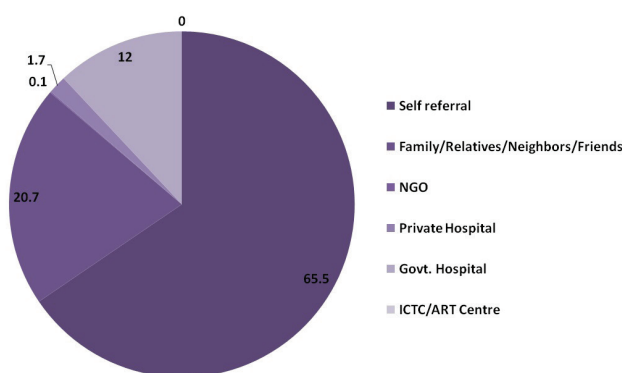
In Kerala, the HSS findings among the ANC shows that, majority of the ANC cases are self referrals to hospitals. 65.5% of ANCs were self referrals, 20.7% were referred by family/relative/ neighbour/friend and 12% by the govt. hospitals. No referrals were observed from the ICTC/ART Centres.

District	Self referral	Family/Relatives/Neighbors/Friends	NGO	Private Hospital	Govt. Hospital	ICTC/ART Centre	N
	%	%	%	%	%	%	N
Alappuzha	37.1	0.5	0.0	0.0	62.4	0.0	399
Ernakulam	67.5	29.5	0.3	2.8	0.0	0.0	400
Idukki	11.8	0.0	0.0	0.0	87.7	0.5	399
Kannur	98.2	0.0	0.0	0.5	1.3	0.0	399
Kasaragod	11.3	88.7	0.0	0.0	0.0	0.0	398
Kollam	99.5	0.3	0.0	0.0	0.3	0.0	400
Kottayam	86.0	0.0	0.0	3.8	10.3	0.0	400
Kozhikode	51.4	42.2	0.0	5.6	0.8	0.0	391
Malappuram	100.0	0.0	0.0	0.0	0.0	0.0	399
Palakkad	70.4	28.1	0.5	0.5	0.5	0.0	395
Pathanamthitta	100.0	0.0	0.0	0.0	0.0	0.0	396
Thiruvananthapuram	83.0	6.3	0.0	9.5	1.3	0.0	399
Thrissur	58.1	40.9	0.0	0.8	0.3	0.0	399
Wayanad	42.8	54.2	0.0	0.3	2.8	0.0	397

Table 7: Percent Distribution of respondents by source of referral and district, HSS 2014-15

Analysing the ANC referrals 100% of self referral was seen in Malappuram and Pathananthitta followed by Kollam (99.5%) and Kannur (98.2%). Self referral was lowest in Kasaragod district (11.3%). The role in referral by family/relatives/ neighbours was high in Kasaragod district (88.7%) followed by Wayanad (54.2%) and Kozhikode (42.2%). Eventhough private hospital referral is low in Kerala, 9.5% of ANC referral from private is seen in Thiruvananthapuram district. No private referral was observed in Alappuzha, Idukki, Kasaragod, Kollam, Malappuram and Pathanamthitta districts. Also, ART/ICTC referral was not recorded in any of the districts at Kerala.

3.5. Current Place of Residence

In HSS, place of residence of ANC attendees is considered as an important parameter. The reported current residence of the respondent is coded as 'Urban' or 'Rural'. If the current place of residence of the respondent was Municipal Corporation, municipal

council, or cantonment area, it was classified as 'urban'. Otherwise, it was recorded as 'rural'.

Figure 6: Percent Distribution of respondents by Current Place of residence, HSS 2014-15, Kerala
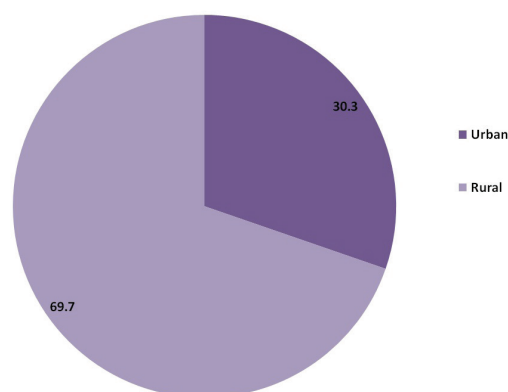
In the state, 69.7% of ANCs were residing in rural areas and only 30.3% belongs to urban areas.

Table 8 : Percent Distribution of respondents by Current Place of residence and district, HSS 2014-15			
District	Urban	Rural	N
Alappuzha	83.7	16.3	398
Ernakulam	69.2	30.8	399
Idukki	21.5	78.5	396
Kannur	7.2	92.8	375
Kasaragod	23.4	76.6	394
Kollam	30.8	69.2	399
Kottayam	3.3	96.8	400
Kozhikode	56.4	43.6	388
Malappuram	3.5	96.5	397
Palakkad	14.6	85.4	397
Pathanamthitta	18.5	81.5	395
Thiruvananthapuram	42.7	57.3	396
Thrissur	45.7	54.3	398
Wayanad	2.5	97.5	393

The district wise classification of urban–rural difference shows that among urban residents more ANCs belong to Alappuzha district (83.7%) followed by Ernakulam (69.2%), Thrissur (45.7%) and Thiruvananthapuram (42.7%). Lowest urban residence of ANC was recorded in Wayanad (2.5%), Kottayam (3.3%) and Malappuram (3.5%), whereas rural residence was more seen in Wayanad, Kottaym and Malappuram.

3.6. Current Occupation of the Respondent

Certain occupations were associated with higher exposure and risk to HIV. It is important to understand the profile of respondents with respect to their occupation. For this purpose, HSS has categorized 13 occupations.

Figure 7: Percent Distribution of respondents by Occupation, HSS 2014-15, Kerala
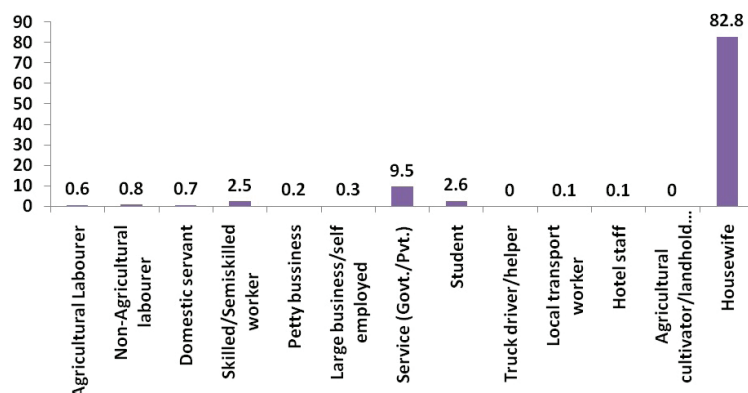
At the state level, the majority of the respondents (82.8%) were housewives, and 9.5% Service (Govt./Pvt.); 2.6% of respondents were students and 2.5% reported to have engaged/involved in Skilled/Semiskilled work.

Table 9: Percent Distribution of respondents by Occupation and district, HSS 2014-15

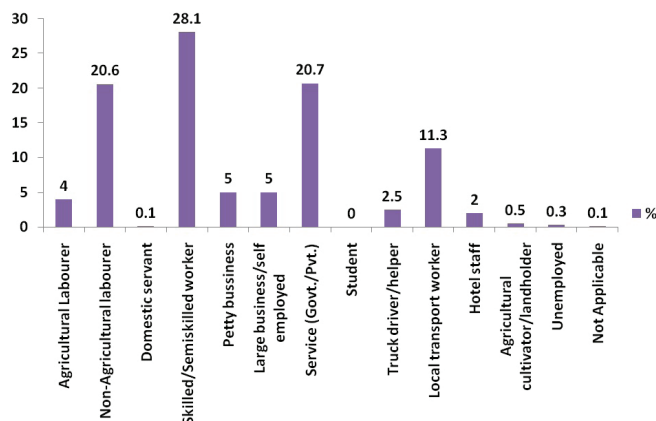|	Agricultural Labourer	Non-Agricultural labourer	Domestic servant	Skilled/Semiskilled worker	Petty business	Large business/self employed	Service (Govt./Pvt.)	Student	Truck driver/helper	Local transport worker	Hotel staff	Agricultural cultivator/landholder	Housewife	
	%	%	%	%	%	%	%	%	%	%	%	%	%	N
Alappuzha	0.0	1.0	0.0	0.8	0.8	0.8	10.5	2.5	0.0	0.0	0.0	0.0	83.7	399
Ernakulam	0.0	0.0	0.5	0.5	0.0	1.0	30.3	5.5	0.3	0.3	0.3	0.0	61.5	400
Idukki	0.0	0.3	0.0	1.0	0.3	0.0	3.3	0.5	0.0	0.0	0.0	0.0	94.7	399
Kannur	0.0	0.0	3.0	1.0	0.3	0.0	6.5	0.3	0.0	0.0	0.0	0.0	89.0	399
Kasaragod	0.0	0.0	0.3	2.5	0.0	0.0	1.8	0.3	0.0	0.0	0.0	0.0	95.2	399
Kollam	0.0	1.8	0.0	2.0	0.0	0.0	9.3	2.3	0.0	0.0	0.0	0.0	84.7	399
Kottayam	0.0	0.0	0.0	0.3	0.0	0.0	12.0	1.8	0.0	0.0	0.0	0.0	86.0	400
Kozhikode	0.0	0.3	4.5	14.3	0.0	1.0	8.3	6.5	0.0	0.0	0.0	0.0	65.1	398
Malappuram	0.0	0.3	0.0	1.5	0.0	0.0	1.5	0.5	0.0	0.0	0.0	0.3	96.0	400
Palakkad	0.5	1.8	0.0	0.8	0.0	0.0	8.0	1.8	0.0	0.0	0.0	0.0	87.2	399
Pathanamthitta	0.0	0.3	0.0	0.3	0.8	0.5	7.8	5.3	0.0	0.0	0.0	0.0	85.2	399
Thiruvananthapuram	0.0	0.5	0.3	2.3	0.0	0.0	18.3	4.3	0.0	0.0	0.0	0.0	74.4	399
Thrissur	0.3	0.8	0.8	6.3	1.3	0.0	11.5	5.5	0.0	0.5	0.5	0.0	72.7	399
Wayanad	8.0	3.8	0.0	1.0	0.0	0.5	3.5	0.3	0.0	0.0	0.0	0.0	83.0	400

Occupational analysis of the respondents showed that in all districts majority of the ANCs were housewives. It was higher in Malappuram (96%), Kasaragod (95.2%) and Idukki (94.7%). Lowest was in Ernakulam district (61.5%). Student ANCs were more in Kozhikode (6.5%) and in Thrissur and Ernakulam (5.5% respectively). Skilled and semi-skilled labours were more in Kozhikode district (14.3%). More ANCs working in service sector are in Ernakulam district (30.3%) and lowest in Malappuram (1.5%).

3.7. Current Occupation of Spouse

The respondents were also asked about the current occupation of their spouses. Occupation of spouse is an important epidemiological variable that may help identify the population groups at higher risk of acquiring HIV. HSS used the same occupational categories as those used for the respondent. The two differences were that the category 'unemployed' (Code 13) is used in the place of 'housewife' and there is an additional category 'not applicable' (for never married/widowed/divorced/ separated)' (Code 99).

Figure 8: Percent Distribution of respondents by the Occupation of spouse, HSS 2014-15, Kerala

Occupation	%
Agricultural Labourer	4
Non-Agricultural labourer	20.6
Domestic servant	0.1
Skilled/Semiskilled worker	28.1
Petty bussiness	5
Large business/self employed	5
Service (Govt./Pvt.)	20.7
Student	0
Truck driver/helper	2.5
Local transport worker	11.3
Hotel staff	2
Agricultural cultivator/landholder	0.5
Unemployed	0.3
Not Applicable	0.1

At the state level, the majority of the spouse (28.1%) were skilled and semi skilled workers, and 20.7% belonged to Service (Govt./Pvt.). 20.6% of spouses were non-agricultural labourers. Unemployed spouses were accounted for 0.3%.

Table 10: Percent Distribution of respondents by the Occupation of spouse and district, HSS 2014-15

	Agricultural Labourer	Non-Agricultural labourer	Domestic servant	Skilled/Semiskilled worker	Petty business	Large business/self employed	Service (Govt./Pvt.)	Student	Truck driver/helper	Local transport worker	Hotel staff	Agricultural cultivator/landholder	Unemployed	Not Applicable	
	%	%	%	%	%	%	%	%	%	%	%	%	%	%	N
Alappuzha	0.0	24.3	0.0	20.8	5.5	3.5	35.1	0.0	0.8	9.0	1.0	0.0	0.0	0.0	399
Ernakulam	0.5	0.3	0.5	14.0	8.3	14.5	51.0	0.0	4.3	4.8	1.3	0.8	0.0	0.0	400
Idukki	4.8	12.0	0.8	47.4	5.5	4.3	5.8	0.0	3.8	12.0	2.8	1.0	0.0	0.0	399
Kannur	0.0	39.9	0.0	26.9	5.0	1.5	9.3	0.0	6.5	9.0	1.8	0.0	0.0	0.0	398
Kasaragod	1.0	1.8	0.0	67.4	3.0	0.5	13.8	0.0	0.8	9.8	2.0	0.0	0.0	0.0	399
Kollam	0.3	13.0	0.0	41.3	3.5	1.3	20.0	0.0	4.8	14.8	0.5	0.0	0.5	0.3	400
Kottayam	0.0	18.5	0.0	29.8	2.5	0.8	26.3	0.0	0.3	19.5	1.0	1.3	0.0	0.0	400
Kozhikode	0.3	1.5	0.0	22.6	14.8	22.4	20.9	0.3	6.0	4.5	4.3	2.5	0.0	0.0	398
Malappuram	0.0	40.9	0.0	24.8	0.5	4.3	16.8	0.0	0.8	11.0	0.0	0.8	0.3	0.0	399
Palakkad	10.3	42.6	0.0	17.5	4.0	0.0	14.8	0.0	3.3	7.0	0.3	0.0	0.0	0.3	399
Pathanamthitta	1.8	25.1	0.0	20.3	4.5	4.5	22.8	0.0	0.5	18.0	2.5	0.0	0.0	0.0	399
Thiruvananthapuram	0.0	28.3	0.0	18.8	3.0	7.0	28.3	0.0	0.0	12.0	2.5	0.0	0.0	0.0	399
Thrissur	3.5	4.5	0.5	34.8	5.8	4.0	15.0	0.0	2.8	21.3	6.5	0.3	1.0	0.0	399
Wayanad	33.5	36.0	0.0	7.3	3.5	1.0	9.8	0.0	1.0	5.0	1.0	0.3	1.8	0.0	400

3.8. Migration Status of Spouse

In order to assess the relationship between spousal migration status and HIV prevalence among ANC clinic attendees, respondents in HSS were asked whether spouse resides in another place/town away from wife for work for longer than 6 months. This question was not applicable to those respondents who were never married/widowed/divorced/separated.

Figure 9: Percentage of respondents with migrant spouse, HSS 2014-15, Kerala
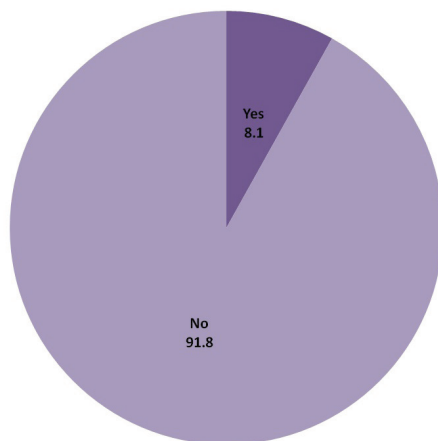
In the state only 8.1% spouse were migrants and rest of the spouse were living with the respondents.

District	% respondents with migrant spouse	N
Alappuzha	9.3	398
Ernakulam	13.3	400
Idukki	1.8	400
Kannur	6.1	395
Kasaragod	4.5	399
Kollam	14.3	398a
Kottayam	0.5	400
Kozhikode	39.8	399
Malappuram	0.0	395
Palakkad	5.8	398
Pathanamthitta	2.0	396
Thiruvananthapuram	8.3	398
Thrissur	0.5	397
Wayanad	7.3	400

Table 11: Percentage of respondents with Migrant spouse and district, HSS 2014-15

Respondents with migrant spouses were more concentrated in Kozhikode district (39.8%) followed by Kollam (14.3%) and Ernakulam (13.3%). In Malappuram all ANC were living with their spouse. Migrant spouses were less in Thrissur district (0.5%).

To Sum up the profile of the respondents at a glance shows that the ANC cases were:

- Morethan half of the ANC belonged to 25-49 years age group
- Respondents literacy status is high; 11th to graduation followed by 6th to 10th std
- Among the respondents, first order pregnancy is more.
- More than 60% of the ANCs were self referrals to ANC clinics
- Majority of the ANCs belonged to rural areas (70%)
- More than 80% of ANCs were housewives.
- Most of the respondents spouses were skilled and semi skilled workers.
- More than 90% of ANCs reside with spouses
- No reported cases of syphilis among the respondents

CHAPTER 4.

Levels of HIV Prevalence among ANC Clinic Attendees

HIV prevalence is the proportion of respondents who are found HIV positive at a given point of time in a specified geographic area. It indicates the burden of the epidemic in different population groups.

HIV prevalence among ANC clinic attendees is considered as proxy for HIV burden in general population. HIV prevalence of 1% or more among ANC clinic attendees is considered as high level, 0.5-0.99% is considered as moderate level and less than 0.5% is considered as low HIV prevalence for the analysis purpose in this report. This chapter describes the levels of HIV prevalence among ANC clinic attendees at state and district level.

4.1 HIV prevalence at state level

Figure 10: HIV Prevalence among ANC Clinic attendees during HSS over the years

### 4.2. HIV Prevalence at District/Site Levels

During the current round of HSS 2014-15, in Kerala all the 14 districts have the ANC sites. A total of 5594 samples were collected from ANCs and two reactive samples were traced out.

Table 12: Distribution of ANC HSS sites - Prevalence of HIV among clinic attendees - HSS 2014-15:

Districts	ANC sites	Sample collected	Reactive	% positivity
Thiruvananthapuram	1	399	0	0
Kollam	1	400	0	0
Pathanamthitta	2	399	1	0.25
Alapuzha	1	399	0	0
Kottayam	1	400	1	0.25
Idukki	1	400	0	0
Ernakulam	1	400	0	0
Thrissur	1	399	0	0
Palakkad	1	399	0	0
Malappuram	1	400	1	0.25
Kozhikode	1	400	0	0
Wayanad	1	400	0	0
Kannur	1	400	0	0
Kasargod	1	399	0	0

As a base of collecting 400 samples in a site, in Kerala 6 sites collected 399 samples (Thiruvananthapuram, Alappuzha, Palakkad, Pathanamthitta, Thrissur, Kasaragod) and rest of the 8 districts have achieved the full sample size. The samples tested revealed that three districts have shown HIV prevalence in the state (Idukki, Kasaragod and Palakkad) which accounted to 0.25% each in the three districts.

Figure 11: HIV Prevalence among ANC clinic attendees by district, HSS 2014 - 15
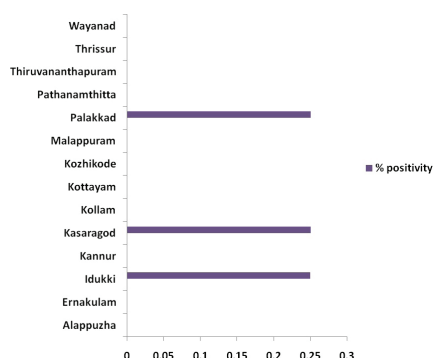
4.3. Variations in the Number of High HIV-Prevalence Sites over Time

In the last round of HSS ANC 2012-13, Kerala has 10 ANC sites and collected 2400 samples. Only one district had shown positivity- Kottayam (0.25%). During this year the ANC sites had increased to 14 and 5594 samples were tested. Three districts – Idukki, Kasaragod and Palakkad had shown HIV prevalence.

CHAPTER 5

HIV Prevalence among ANC Clinic Attendees by Background Characteristics

The national, state and district response to the HIV epidemic is guided by data obtained through HIV Sentinel Surveillance (HSS). The HIV epidemic in India continues to be concentrated among HRG with low level and declining prevalence among general population.

This chapter gives details about HIV/AIDS prevalence as observed against the key nine demographic and socio-economic variables which were recorded for each respondent. Fully acknowledging that several factors work in tandem or individually to either cause or prevent HIV, hence we do not suggest any evident causation by projecting the key variables vis a vis the HIV prevalence, as risk factors for acquiring HIV. However, this sort of detailed analysis will help the programme and policy makers to understand the risk factors associated with transmission of HIV/AIDS with particular demographic characteristics. This chapter presents cross tabulations of demographic variables with HIV/AIDS positivity among the ANC clinic attendees. A detailed state-wise analysis will be needed to understand region wise variations, applying local knowledge about vulnerabilities and risk factors.

The following sections present the findings for each of these background characteristics.

1. Age
2. Literacy status
3. Order of current pregnancy
4. Source of referral to the ANC clinic
5. Current place of residence
6. Duration of stay at current place of residence
7. Current occupation of respondent
8. Current occupation of spouse
9. Migration status of spouse

5.1. HIV Prevalence among ANC Clinic Attendees by Age

Age is the prime parameter as far as incidence of reproductive health is concerned.

Table 13: HIV Prevalence among ANC Clinic Attendees by Age and District, HSS 2014-15				
	15-24		25-49	
Kerala	0.00	2402	0.09	3192
Alappuzha	0.00	167	0.00	232
Ernakulam	0.00	133	0.00	267
Idukki	0.00	133	0.37	267
Kannur	0.00	135	0.00	265
Kasaragod	0.00	149	0.40	250
Kollam	0.00	225	0.00	175
Kottayam	0.00	114	0.00	286
Kozhikode	0.00	185	0.00	215
Malappuram	0.00	236	0.00	164
Palakkad	0.00	218	0.55	181
Pathanamthitta	0.00	145	0.00	254
Thiruvananthapuram	0.00	192	0.00	207
Thrissur	0.00	174	0.00	225
Wayanad	0.00	196	0.00	204

District wise analysis showed that HIV prevalence was more among the age group 25 – 49 years. Prevalence was recorded in Idukki, Kasaragod and Palakkad districts. This reveals that the women in the reproductive age span are more prone to HIV infections.

5.2. HIV Prevalence among ANC Clinic Attendees by Literacy Status

HIV prevalence and Literacy status when analysed, it is seen that no positivity was seen among the illiterates and literate till 5th standard. HIV prevalence was noted in Kasaragod and Palakkad among literates with 6th to 10th standard and in Idukki among the ANCs with 11th to graduate level.

Table 14: HIV Prevalence (%) among ANC Clinic Attendees by Literacy Status and Districts, HSS 2014-15

	Illiterate		Literate and till 5th standard		6th to 10th standard		11th to Graduation		Post Graduation	
	%	N	%	N	%	N	%	N	%	N
Kerala	0.0	46	0.0	162	0.1	1861	0.0	3033	0.0	472
Alappuzha	0.0	1	0.0	1	0.0	100	0.0	273	0.0	23
Ernakulam	0.0	1	0.0	1	0.0	19	0.0	253	0.0	126
Idukki	0.0	1			0.0	157	0.5	205	0.0	35
Kannur	0.0	3	0.0	5	0.0	158	0.0	220	0.0	11
Kasaragod	0.0	2	0.0	34	0.4	251	0.0	105	0.0	4
Kollam			0.0	2	0.0	134	0.0	244	0.0	20
Kottayam			0.0	1	0.0	118	0.0	259	0.0	22
Kozhikode			0.0	2	0.0	24	0.0	264	0.0	104
Malappuram	0.0	1	0.0	5	0.0	179	0.0	207	0.0	6
Palakkad	0.0	9	0.0	11	0.4	225	0.0	150	0.0	4
Pathanamthitta	0.0	1	0.0	1	0.0	91	0.0	257	0.0	46
Thiruvananthapu-ram	0.0	1	0.0	2	0.0	102	0.0	254	0.0	40
Thrissur			0.0	24	0.0	119	0.0	235	0.0	21
Wayanad	0.0	26	0.0	73	0.0	184	0.0	107	0.0	10

5.3. HIV Prevalence among ANC Clinic Attendees by Order of Pregnancy

Order of pregnancy has an impact with the reproductive health problems. Positives were seen among the ANCs in the first order pregnancy in the districts of Kasaragod and Palakkad. It is to be noted that the ANCs in northern region of Kerala state were more prone to HIV. Positivity in the second order pregnancy was traced out in Idukki.

Table 15: HIV Prevalence (%) among ANC Clinic Attendees by Order of Pregnancy and districts , HSS 2014-15

	First		Second		Third		Fourth or more	
	%	N	%	N	%	N	%	N
Kerala	0.1	2463	0.0	2142	0.0	741	0.0	230
Alappuzha	0.0	172	0.0	170	0.0	41	0.0	15
Ernakulam	0.0	223	0.0	147	0.0	25	0.0	3
Idukki	0.0	175	0.6	171	0.0	52	0.0	1
Kannur	0.0	135	0.0	216	0.0	33	0.0	13
Kasaragod	0.7	144	0.0	141	0.0	70	0.0	43
Kollam	0.0	188	0.0	154	0.0	47	0.0	11
Kottayam	0.0	180	0.0	144	0.0	56	0.0	20
Kozhikode	0.0	226	0.0	99	0.0	48	0.0	23
Malappuram	0.0	131	0.0	167	0.0	85	0.0	17
Palakkad	0.6	155	0.0	163	0.0	65	0.0	15
Pathanamthitta	0.0	211	0.0	161	0.0	22	0.0	4
Thiruvananthapuram	0.0	198	0.0	127	0.0	62	0.0	11
Thrissur	0.0	176	0.0	151	0.0	50	0.0	22
Wayanad	0.0	149	0.0	131	0.0	85	0.0	32

5.4 HIV Prevalence among ANC Clinic Attendees by Source of Referral

HIV prevalence and source of referral shows that prevalence is high among self referral in Kasaragod and Palakkad whereas in Idukki it is among the Government referral.

Table 16: HIV Prevalence (%) among ANC Clinic Attendees by Source of Referral and Districts, HSS 2014-15

	Self Referral		Family/ Relatives/ Neighbors/ Friends		NGO		Private (Doctor/ Nurses)		Govt (including, ASHA/ ANM)		ICTC / ART Centre	
	%	N	%	N	%	N	%	N	%	N	%	N
Kerala	0.1	3651	0.0	1153	0.0	3	0.0	94	0.1	668	0.0	2
Alappuzha	0.0	148	0.0	2					0.0	249		
Ernakulam	0.0	270	0.0	118	0.0	1	0.0	11				

	%	N	%	N	%	N	%	N	%	N
Idukki	0.0	47					0.3	350	0.0	2
Kannur	0.0	392					0.0	2	0.0	5
Kasaragod	2.2	45	0.0	353						
Kollam	0.0	398	0.0	1					0.0	1
Kottayam	0.0	344					0.0	15	0.0	41
Kozhikode	0.0	201	0.0	165			0.0	22	0.0	3
Malappuram	0.0	399								
Palakkad	0.4	278	0.0	111	0.0	2	0.0	2	0.0	2
Pathanamthitta	0.0	396								
Trivandrum	0.0	331	0.0	25			0.0	38	0.0	5
Thrissur	0.0	232	0.0	163			0.0	3	0.0	1
Wayanad	0.0	170	0.0	215			0.0	1	0.0	11

5.5. HIV Prevalence among ANC Clinic Attendees by Place of Residence

The place of residence also plays a vital role in analyzing the concentration of HIV prevalence in the state.

Table 17: HIV Prevalence among ANC Clinic Attendees by Place of Residence and district, HSS 2014-15				
	Urban		Rural	
	%	N	%	N
Kerala	0.0	1674	0.1	3851
Alappuzha	0.0	333	0.0	65
Ernakulam	0.0	276	0.0	123
Idukki	0.0	85	0.3	311
Kannur	0.0	27	0.0	348
Kasaragod	0.0	92	0.3	302
Kollam	0.0	123	0.0	276
Kottayam	0.0	13	0.0	387
Kozhikode	0.0	219	0.0	169
Malappuram	0.0	14	0.0	383
Palakkad	0.0	58	0.3	339
Pathanamthitta	0.0	73	0.0	322
Thiruvananthapuram	0.0	169	0.0	227
Thrissur	0.0	182	0.0	216
Wayanad	0.0	10	0.0	383

The data of HSS 2014-15 showed that the HIV prevalence was seen among ANCs who belonged to rural areas. No urban women were traced out with HIV in this study. As of above, rural women with HIV belong to Idukki, Palakkad and Kasaragod districts.

5.6. HIV Prevalence among ANC Clinic Attendees by Current Occupation of Respondent and Spouse

In Kerala, Literacy status is high and to an extent people are engaged in some sort of work. The occupational status and the prevalence of HIV among the respondents and their spouse gives out in which group occupied or non-occupied the prevalence was observed. The tables showed the HIV prevalence among the ANC respondents according to their occupational category and also to their spouse's occupation.

The HIV prevalence was seen among the ANCs who were housewives in the three districts – Idukki, Palakkad and Kasaragod. The spouse's occupational category showed that most of them belong to agricultural and semiskilled activities when cross checked with the HIV prevalence data.

5.7. HIV Prevalence among ANC Clinic Attendees by Migration Status of Spouse

Migration status of spouse also plays a vital role in the prevalence of HIV.

Table 18: HIV Prevalence among ANC Clinic Attendees by Migration Status of Spouse and District, HSS 2014-15				
	Migrants		Non-Migrants	
	%	N	%	N
Kerala	0.0	452	0.1	5118
Alappuzha	0.0	37	0.0	361
Ernakulam	0.0	53	0.0	347
Idukki	0.0	7	0.3	393
Kannur	0.0	24	0.0	371
Kasaragod	0.0	18	0.3	381
Kollam	0.0	57	0.0	340
Kottayam	0.0	2	0.0	397
Kozhikode	0.0	159	0.0	240
Malappuram			0.0	395
Palakkad	0.0	23	0.3	374
Pathanamthitta	0.0	8	0.0	388
Thiruvananthapuram	0.0	33	0.0	365
Thrissur	0.0	2	0.0	395
Wayanad	0.0	29	0.0	371

ANC with migrant spouses were not traced out of having HIV. Whereas ANCs who live with their spouses were pointed out of having HIV in the survey. To sum up, the ANCs which were traced out of having HIV with their background characteristics showed that:

- Among the age group, HIV positivity was observed among the age group 25 – 49 years.
- HIV prevalence was seen among literates of 6th to 10th std followed by 11th to graduates.
- Prevalence was more among the first order pregnancy.
- HIV positivity was detected more among self referrals and govt.
- Prevalence of HIV was more in rural areas.
- Prevalence was more among housewives.
- Among the ANC positives, spouse's belonged to agricultural and semiskilled workers.
- None detected positive for HIV among migrant spouses.

CHAPTER – 6

Trends of HIV Prevalence among ANC Clinic Attendees

The primary objective of HIV Sentinel Surveillance is to generate data on trends of HIV prevalence among various population groups in the country and state. Over time, HIV Sentinel Surveillance has offered vital clues to newer areas where HIV was emerging, highlighting rising trends in certain Districts or regions.

This has been a critical input to the strategic planning efforts under the National AIDS Control Programme and contributed to shaping the strategies for prevention and control of HIV/AIDS in the state. This chapter presents the trends of HIV prevalence among ANC clinic attendees at state and district levels. Data from the year 2002 has been used for trend analysis. Data from only consistent sites was used for trend analysis as it avoids the effect of addition of new sites on HIV prevalence in subsequent years, and hence provides a better picture of HIV trends in a district. Further, in order to smoothen the sampling variations in HIV prevalence due to small sample size at sentinel site level, a three-year moving average was calculated at state/district levels and trends have been analysed using this data. All the invalid sites i.e. sites where sample size was less than 75% (300) of the target sample size of 400, were excluded from trend analysis for that year.

Though there was a clear declining trend seen in Kerala, within the state, there are variations in HIV prevalence among the districts. District level information on HIV is essential for planning district strategies in HIV prevention and control. District wise trend analysis was performed on surveillance data collected during the year 2002-2015 using moving average technique.

6.1. District wise analysis in the prevalence of HIV

District wise data analysis showed that there was a varying trend among the districts. As such the districts can be classified as increasing, decreasing and constant levels.

Figure 12: Idukki district showed an increasing trend in Kerala
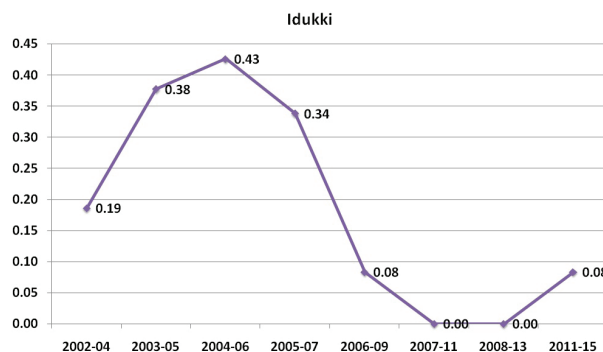
In 2002-04, the prevalence was 0.19% which showed an upward trend up to the year 2004-06 and after wards showed a declining trend. During the year 2007-11 and upto 2013 the positivity rate was nil and the year 2011-15 the prevalence has shown an increasing trend where the prevalence rate was 0.08%.

Districts where the HIV prevalence was decreasing were Kannur, Kottayam, Malappuram and Trivandrum.
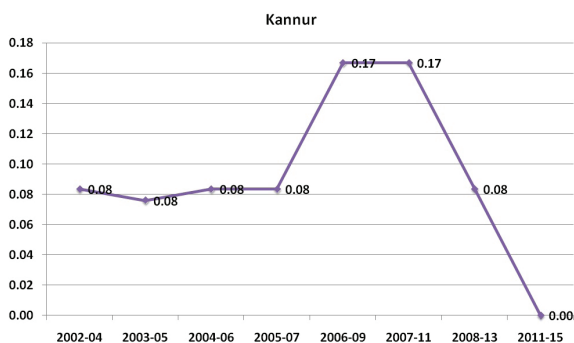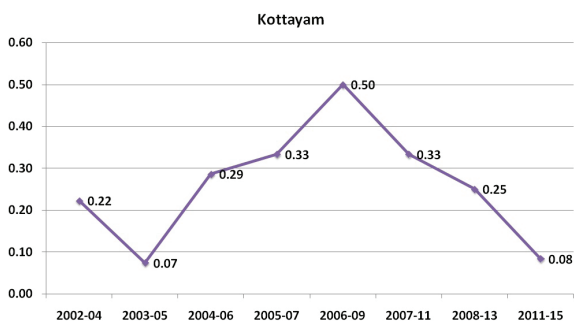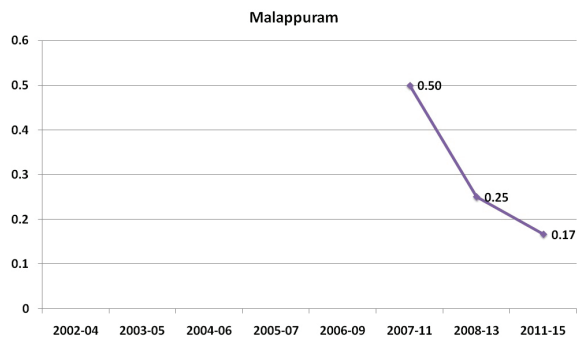
Figure 13

Kannur

Figure 14

Kottayam
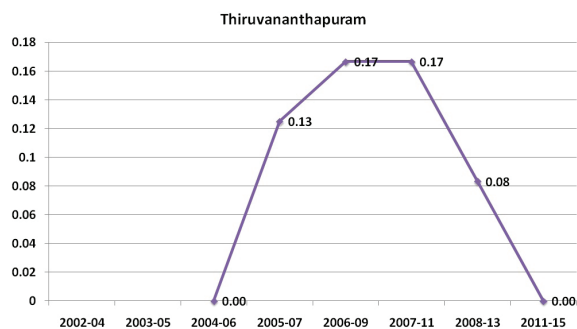
Figure 15

Malappuram

Figure 16

Thiruvananthapuram

In all the four districts it can be clearly seen that after 2007–11 period, the prevalence rate has come down. In Kannur and Trivandrum, there was a declining trend ie; zero prevalence rate from 0.17% in 2007–11 to 2011–15. In Kottayam, prevalence declined from 0.50% to 0.08% in the specified period; whereas in Malappuram, the positivity came down to 0.17% from 0.50%

CHAPTER – 7

Conclusion

In Kerala, the HIV prevalence has shown a declining trend. In the current phase of HSS ANC 2014-15, there were 14 ANC sites, out of which 1 was a composite site.

Data collection was done in all the sites as per the norms and guidelines given to the state. Data collected using individual data forms not only gives information about the sentinel site but also gives an idea about certain personal characteristics like age, sex and educational level of the participants, occupation, migration etc.

Each ANC site is instructed to collect 400 samples. In Kerala, 6 sites collected 399 samples (Trivandrum, Alappuzha, Palakkad, Pathanamthitta, Thrissur, Kasaragod) and rest of the 8 sites have achieved the full sample size. The data collection was completed within the allotted time and samples were sent to the concerned labs for testing. The samples tested revealed that the three districts have shown HIV prevalence in the state (Idukki, Kasaragod and Palakkad) which accounted to 0.25% each in three districts.

As with the information collected from the sites, the background characteristics of the ANC attendees showed that more than half of the ANCs belonged to 25-49 years age group with high literacy status. Among the respondents, first order pregnancy was more (44.2%) and more than 65% of the ANCs were self referrals to ANC clinics. Most of the respondent's spouses are skilled and semi skilled workers and more than 90% of ANCs reside with spouses. No reported cases of syphilis among the respondents.

The ANCs which were traced out of having HIV with their background characteristics showed that: HIV positivity was seen among the age group 25-49 years among the literacy status of 6th to 10th std. Prevalence is more among first order pregnancy and HIV positivity was detected more among self and govt. referrals. Prevalence of HIV was more among housewives in rural areas.

As the number of blood samples collected from each sentinel group was very limited it was difficult to draw a concrete conclusion from the HSS data. Though there were data on the background characteristics of the respondents, it cannot be used for drawing inferences as the number of samples in HSS is not sufficient enough to be analysed on the basis of these characteristics.

In Kerala, district wise analysis shows that there was varying trend among the districts. The district which showed an increasing trend in Kerala was Idukki. Idukki which is a hilly district in Kerala requires more awareness related to health in the field. Hospital facilities were less in the districts and more people depend on the government hospitals. People who were far away were reluctant to go to hospitals for minor reasons. Infrastructural facilities were low in the district. Even though educationally better, more concentration was needed in the district. IEC activities were going on in the district with the help of District Medical Officer of Health. More activities on awareness was concentrated in the inner areas and also medical camps were being organised in the places.