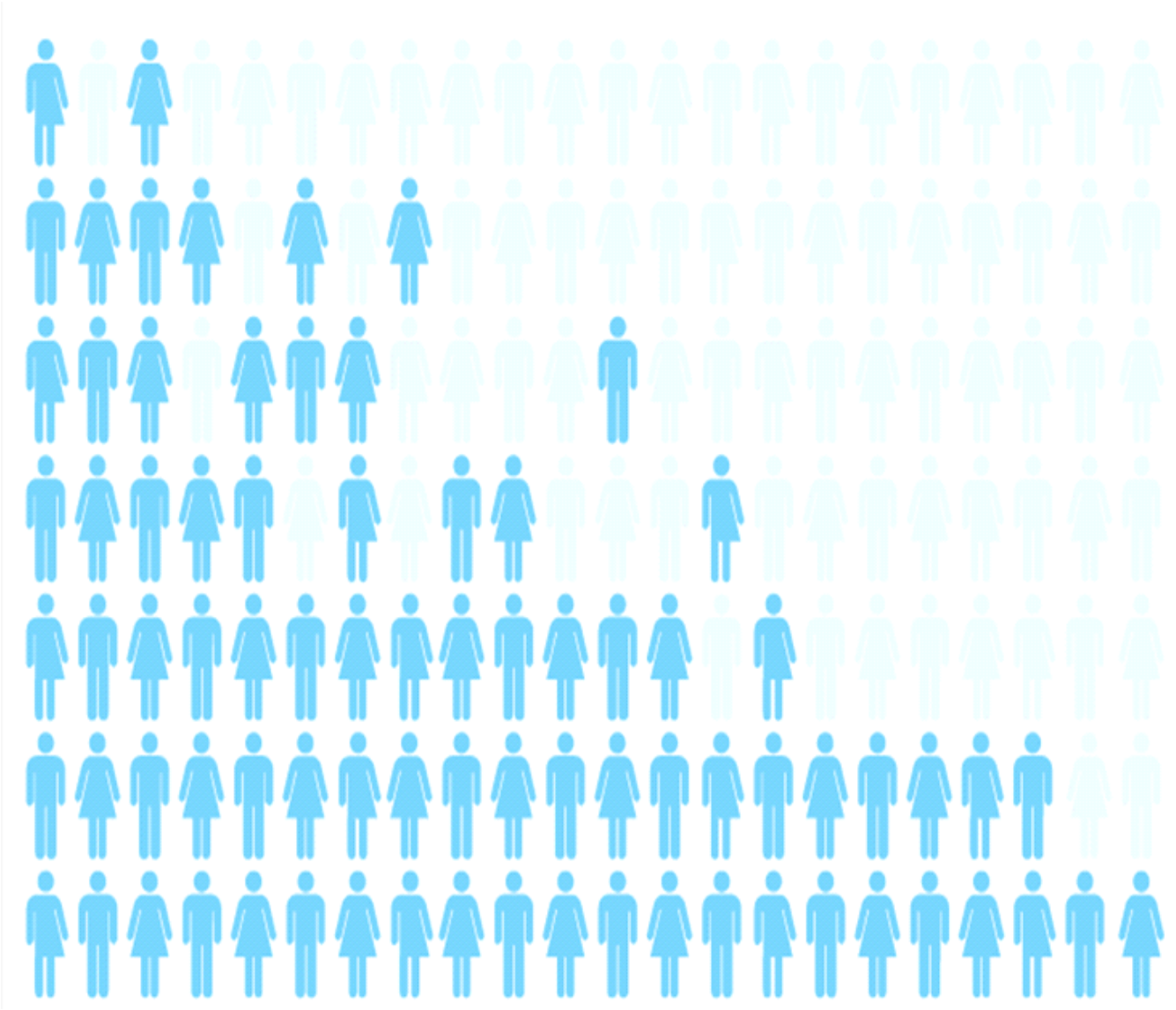
HIV Sentinel Surveillance (ANC)
Kerala State Report



2016-17

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HIV

SENTINEL SURVEILLANCE (ANC)

Kerala State Report

2016-17

ICMR-NATIONAL INSTITUTE OF EPIDEMIOLOGY
Chennai

NATIONAL AIDS CONTROL ORGANISATION
New Delhi

KERLA STATE AIDS CONTROL SOCIETY
Thiruvananthapuram

ICMR - NATIONAL INSTITUTE OF EPIDEMIOLOGY
राष्ट्रीय जानपादिक रोग विज्ञान संस्थान
R-127, Second Main Road, Tamil Nadu Housing Board,
Ayapakkam, Chennai - 600 077, India
Phone: 91-44-26136204 / 26136201 / 26820469 (D)
Fax: +91-44-26820464 Website: www.nie.gov.in
directorne@dataone.in, director.nie@icmr.gov.in
manojmurhekar@nie.gov.in

Department of Health Research
Ministry of Health & Family Welfare
Government of India

Dr. Manoj Murhekar, M.D.
Director

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 15th round of surveillance, in conjunction with the past 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

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For additional information and Correspondence

Focal Person - HIV Sentinel Surveillance
ICMR – NATIONAL INSTITUTE OF EPIDEMIOLOGY
Indian Council of Medical Research
Department of Health Research
Ministry of Health and Family Welfare
Government of India
127, Second Main Road
TNHB, Ayapakkam
Chennai-600077

Edited by

Mr. A. Elangovan, Scientist G
Dr. B. Ganesh, Scientist D

Contributed by

Mr. A. Santhakumar, Scientist C (Surveillance)
Dr. Rebecca Thomas, AD-ICTC, KSACS

Technical Support by

Dr. N. Manikandan, Scientist B (Surveillance)
Ms. SP. Jothi Meenakshi, Scientist B (Surveillance)
Ms. G. Amirthammal, Technical Officer (Surveillance)

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CHAPTER 1.

INTRODUCTION

Acquired immune deficiency syndrome or acquired immunodeficiency 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 and tumours. The first HIV infection was reported in the year 1981 in the United States of America. Afterwards the epidemics spread rapidly throughout the globe. As per NACO statistics, 2010 there are 34 million [31.6 million – 35.2 million] people were estimated to be living with HIV.

In India it was in 1986, the first HIV infection reported from Chennai, Kerala. In the last two decades the awful disease spread throughout the country and as per NACO report 2010, there are about 24 lakhs of HIV infected people living in India with 0.19 % of the adult population infected.

1.1. Objectives and Application of HIV Sentinel Surveillance

Surveillance is a vital component of any disease control programme. The purpose of surveillance is action. 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 use (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

a. Pregnant women attending ANC clinics in urban and rural areas While ANC clinic attendees are considered proxy for general population, STI patients are 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 1985 when the Indian Council of Medical Research (ICMR) initiated a surveillance activity among blood donors and patients with STIs. After the National AIDS Control Organization (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 important expansion in 2003 was the addition of 30 FSW sites. Overall, 354 districts had at least one HSS site in 2003. From 2003 until 2005, the same sentinel sites continued with expansion to 83 FSW and 30 injecting drug user (IDU) sites.

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. 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 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 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 up dated 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, and 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 only to be excluded in the next round. The FSW site was reintroduced during HSS 2003 round the taken off in next round and was reintroduced again in 2006 HSS round. In 2003 for the first time an MSM site was included the Kerala HSS, in 2004 an IDU site and 2005 a TRK 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 sited 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

In the 15th round of HSS ANC 2014-15, 4 more ANC sites have been newly taken of which 1 is composite site. The same sites are continued up to HSS 2016-17.

CHAPTER 2

METHODOLOGY AND IMPLEMENTATION

This chapter describes HSS methodology and the implementation mechanisms adopted during HSS 2016-17.

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 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 are:

1. Ages 15-49 years

2. Pregnant woman attending the antenatal clinic for the first time during the current round of 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 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."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 2 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	Linked 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. The data form used in HSS 2014-15 is in Annex 2.HSS 2014-15 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 2014-15, 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 beyond5th standard but not beyond 10th standard. d. 11th to graduation: Those who studied beyond10th 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 a region. The order of pregnancy is recorded as first, second, third, fourth, or more.

4. **Duration of pregnancy:** Duration of pregnancy is usually measured in terms of three trimesters; each of them of about three month's duration. (a) First trimester: The first trimester of pregnancy is from conception to 12th week of pregnancy. (b) Second trimester: The second trimester of pregnancy is from 13th to 27th week of pregnancy. (3) Third trimester: The third trimester of pregnancy spans from week 28 to birth.

5. **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

6. **Current place of residence:** HSS 2016-17 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.

7. **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 the 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.

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8. **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 where required, are:

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

9. **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).

10. **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 effect 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.

11. HIV Testing History: This refers to the HIV testing history of pregnant women.

12. Time of last HIV Testing: This question aims to understand the timing of last HIV testing of respondents in reference to current pregnancy.

13. Result of last HIV test: This refers to the result of the last HIV test of the ANC respondent.

14. Management of HIV infections: This refers to the enrolment of HIV positive respondents in HIV care, either for pre-ART or ART services, at the time of surveillance.

15. ART Uptake: This refers to the current uptake of 'Antiretroviral therapy' by HIV positive respondents .

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 2.

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.

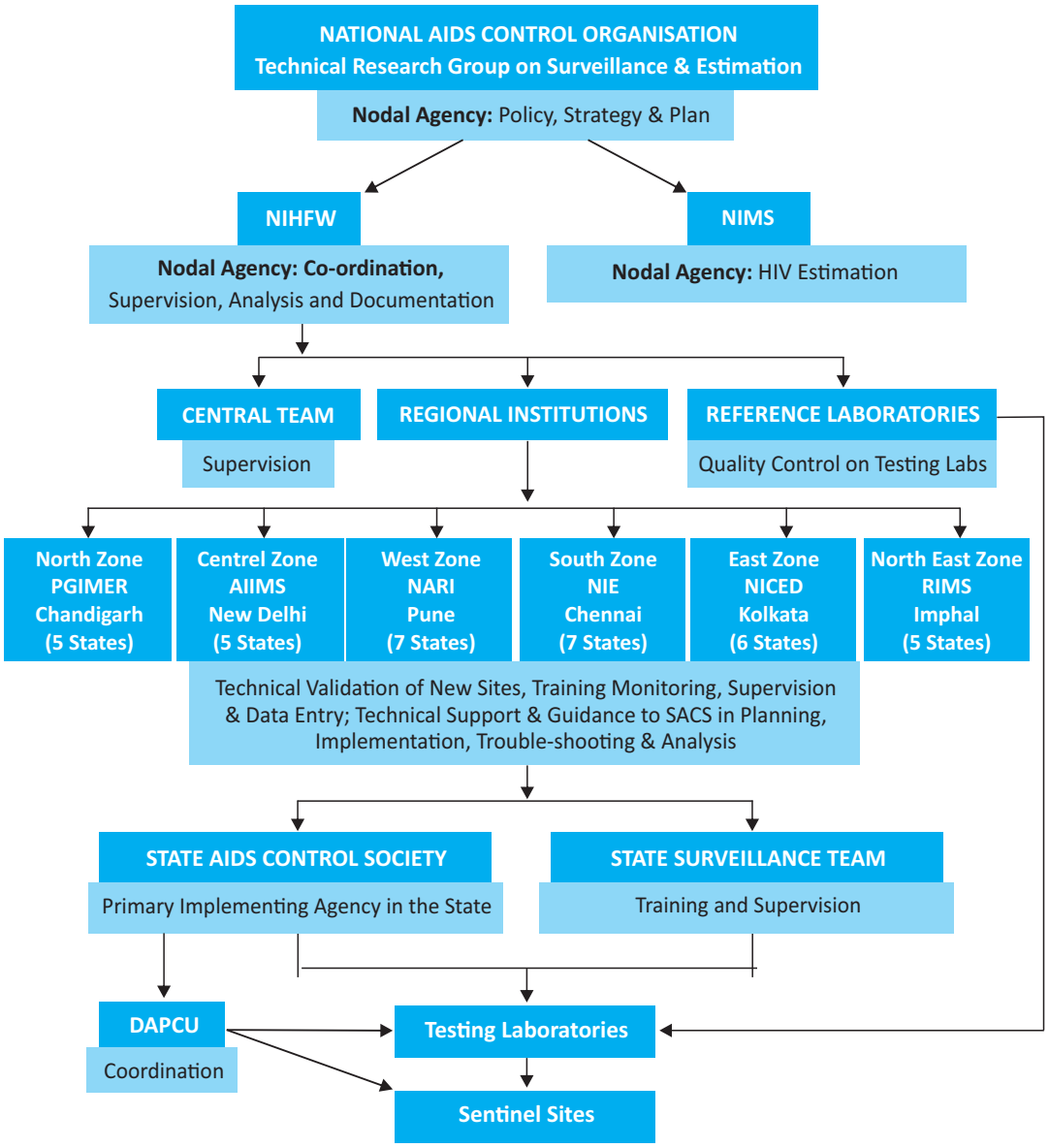


Figure 1: Implementing Structure of HIV Sentinel Surveillance in India

Implementation plans of HSS and reviews the outcomes of each round. Two national institutes—National Institute of Health and Family Welfare (NIHFW) and National Institute of Medical Statistics (NIMS)—support 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 Centre for Disease Control and Prevention (CDC), World Health Organization (WHO), The Joint United Nations Programme on HIV and AIDS(UNAIDS), medical colleges, and other national and international agencies, provided support in training and supervision.

Regional level: Since 2006, NIE has been identified as regional institutes (RIs) 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 collected 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 micro-biologist, which are supported by one project coordinator, two research officers, one computer Assistant/data manager, and between four and ten data entry operators, depending on the volume of data entry. The names of the six regional institutes and the distribution of states among them are in Table 2, below.

Table :2 Regional Institutes for HIV Sentinel Surveillance t and heir 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: Postgraduate 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 EntericDiseases, Kolkata	West Bengal, Chhattisgarh, Sikkim, Andaman & NicobarIslands, Meghalaya, and Nagaland.
Northeast Zone: Regional Institute of Medical Sciences, Imphal	Manipur, Mizoram, Tripura, Assam, and Arunachal Pradesh.

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.

2.4. Key Initiatives during HIV Sentinel Surveillance 2016-17:

In response to key issues identified in the implementation of HSS during previous rounds and to improve the quality and timeliness of the surveillance process in the 15th 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 resource 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 ensure uniform implementation of the guidelines in all sentinel sites. These were printed centrally and distributed across the country.

Training during HSS 2016-17:

Steps to improve quality of training:

1. A well-structured training programme was adopted to ensure that all personnel involved in HSS at different levels were adequately and uniformly trained in the respective areas of responsibility.
2. The training agenda, curriculum, and planning and reporting formats were standardized and used in all 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 of site-level trainings. Analysis of these scores helped state teams to identify 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 2016-17 and 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 plan site-level trainings.
3. Site-level trainings (2 days per batch @ 8-10sites per batch) were conducted in all the states. Representatives from regional institutes and NACO observed the trainings to ensure that trainings were provided as per the protocol and that all 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 NRL.
5. Overall, 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 2016-17.

Laboratory System: For HSS 2016-17, 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 2016-17: 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 2016-17.

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 52percent of action taken report formats were submitted by HSS focal persons from SACS and RIs. Laboratory reporting through the lab module was completed by 87percent 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 visits was conducted by RI, SACS, and SST members. Central team members (CTM) visited 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 an approach of daily reporting of the number of samples collected at each sentinel site through an SMS from a registered mobile number to a central server. The system automatically compiled and displayed 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 fourteen 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.

Table 3: Profile of Respondents at State Level, Kerala HSS 2016-17

Age (N -5599)	Number	%
15-24	2169	38.7
25-34	3141	56.1
35-44	282	5.0
45-49	7	0.1
literacy Status (N-5584)		
Illiterate	31	0.6
Literate and till 5th standard	70	1.3
6th to 10th standard	1737	31.1
11th to Graduation	3290	58.9
Post Graduation	456	8.2
Order of current pregnancy (N -5593)		
First	2331	41.7
Second	2189	39.1
Third	795	14.2
Fourth or more	278	5.0
Duration of current pregnancy (N-5591)		
First trimester	2594	46.4
Second trimester	1614	28.9
Third trimester	1383	24.7
Received ANC service during current pregnancy (N-5592)		
Yes	2278	40.7
NO	3314	59.3

Source of referral to the ANC clinic (N -5586)		
Self Referral	3800	68.0
Family/ Relatives/ Neighbors/ Friends	985	17.6
NGO	2	0.0
Private (Doctor/ Nurses)	307	5.5
Govt (including, ASHA/ ANM)	492	8.8
ICTC / ART Centre	0	0.0
Current place of residence (N -5572)		
Urban	1364	24.5
Rural	4208	75.5
Current occupation of the respondent (N. 5596)		
Agricultural Labourer	0	0.0
Truck driver/Helper	0	0.0
Agricultural cultivator/	0	0.0
Local transport Worker (auto/taxi driver, hand cart pullers, rickshaw pullers etc)	1	0.0
Hotel staff	2	0.0
Petty business / small shop	7	0.1
Large Business/Self employed	8	0.1
Non -Agricultural Labourer	9	0.2
Domestic Servant	18	0.3
Skilled / Semiskilled worker	39	0.7
Student	120	2.1
Service (Govt./Pvt.)	541	9.7
Housewife	4851	86.7
Current occupation of the spouse (N-5594)		
Student	1	0.0
Domestic Servant	3	0.1
Not Applicable	6	0.1

Unemployed	7	0.1
Agricultural cultivator/	8	0.1
Hotel staff	101	1.8
Truck driver/Helper	104	1.9
Large Business/Self employed	166	3.0
Agricultural Labourer	199	3.6
Petty business / small shop	436	7.8
Local transport worker (auto/taxi driver, hand cart pullers, rickshaw pullers etc)	655	11.7
Non-Agricultural Labourer	1109	19.8
Skilled / Semiskilled worker	1384	24.7
Service (Govt./Pvt.)	1415	25.3
Spouse resides alone in another place/town from wife for work for longer than 6 months (5591)		
Yes	618	11.1
No	4967	88.8
Not Applicable	6	0.1
Ever Been tested for HIV (N-5597)		
Yes	3926	70.1
No	1671	29.9
If ever tested HIV, When was the last tested (N-5594)		
Tested during current pregnancy	1792	32.0
Tested during current pregnancy	2131	38.1
NA (For never tested)	1671	29.9
Result of respondent's last HIV test result (N-5585)		
Positive	1	0.0
Negative	3897	69.8
Did not collect the last result	3	0.1

No response	13	0.2
NA (For never tested)	1671	29.9
If previous HIV test positive, taking ART medications (N-5597)		
Yes	0	0.0
No	1	0.0
NA (never tested or Not positive when last tested)	5596	100.0
HIV (N-5599)		
Negative	5596	99.95
Positive	3	0.05
Syphilis (N-5599)		
Negative	5598	100.0
Positive	1	0.02

3.1. Age

Age in completed years is recorded for every respondent at the time of recruitment into HSS. The majority of respondents (58.5%) belonged to the age group of 15-24 years and a little more than a third (39.7%) were in the age group of 25-34 years. Only 1.7% of respondents belonged to the age group of 35-44 years and no one has registered in the 45-49 years age group.

Figure 2: Percentage (%) Distribution of respondents by age group

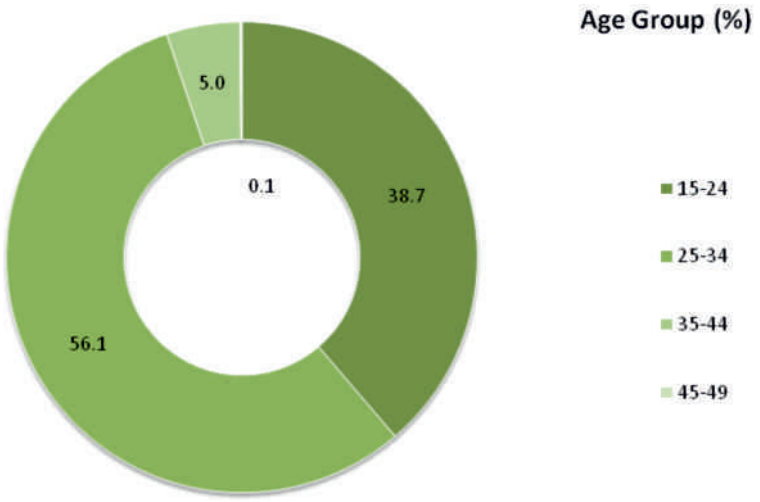


Table 4: Percentage (%) Distribution of respondents by age group and district, HSS 2016-17

Distribution of Age group					
District/Age Group	15-24	25-34	34-44	45-49	N
Kerala	38.74	56.10	5.04	0.13	5599
Alappuzha	39.00	56.50	4.50	0.00	400
Ernakulam	21.00	70.50	7.50	1.00	400
Idukki	32.75	61.00	6.25	0.00	400
Kannur	38.10	56.14	5.26	0.50	399
Kasaragod	25.50	66.25	8.25	0.00	400
Kollam	46.75	50.75	2.50	0.00	400
Kottayam	25.00	65.25	9.75	0.00	400
Kozhikode	33.50	60.75	5.75	0.00	400
Malappuram	50.75	45.75	3.50	0.00	400
Palakkad	46.75	50.00	3.25	0.00	400
Pthanamthitta	37.00	58.25	4.75	0.00	400
Thiruvananthapuram	47.50	50.00	2.25	0.25	400
Thrissur	50.50	46.25	3.25	0.00	400
wayanad	48.25	48.00	3.75	0.00	400

3.2. Literacy Status

Under HSS 2016-17, 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.

More than 2% of respondents at the state level had no formal education. Around 5.8% of respondents studied up to fifth standard and the highest proportion of respondents (42.6%) were studied between sixth and tenth standards. Around 42.4% of the respondents reported to have studied beyond 10th standard and up to graduation, while another about 6.6% had studied beyond graduation.

Figure 3: Percent Distribution of respondents by educational status

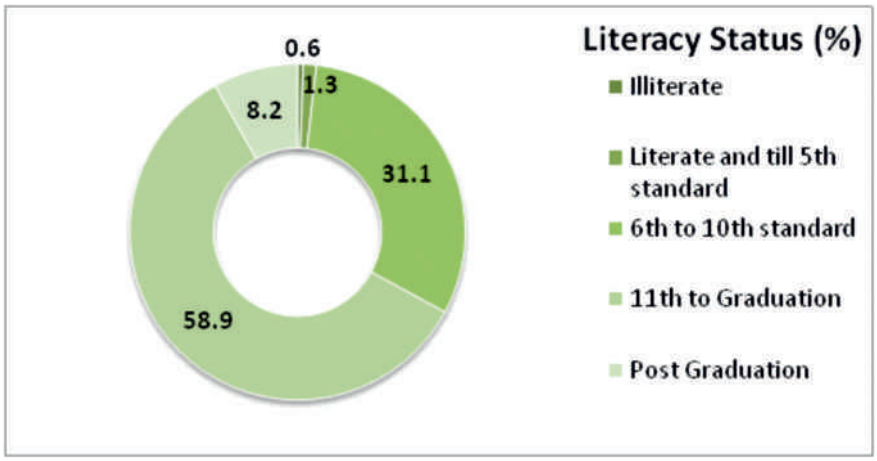


Table 5: Percent Distribution of respondents by education and districts in Tamil Nadu, HSS 2016-17

Row Labels	Illiterate	Literate and till 5th standard	6th to 10th standard	11th to Graduation	Post Graduation	N
Kerala	**0.6**	**1.3**	**31.1**	**58.9**	**8.2**	**5584**
Alappuzha	0.0	0.3	21.0	73.3	5.5	400
Ernakulam	0.0	0.0	4.3	75.7	20.1	399
Idukki	0.0	0.8	28.3	67.8	3.3	400
Kannur	0.3	1.8	36.4	56.8	4.8	398
Kasaragod	2.3	4.0	75.9	16.3	1.5	398
Kollam	0.3	0.0	24.1	69.2	6.5	399
Kottayam	0.0	0.8	21.3	71.5	6.5	400
Kozhikode	0.0	0.3	2.8	57.5	39.5	395
Malappuram	0.8	0.8	38.5	58.8	1.3	400
Palakkad	2.5	1.0	43.2	46.2	7.0	398
Pthanamthitta	0.0	0.3	41.3	55.0	3.5	400
Thiruvananthapuram	0.3	0.3	22.8	69.0	7.8	400
Thrissur	0.3	0.8	30.5	63.0	5.5	400
wayanad	1.3	6.8	45.3	44.6	2.0	397

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 'gravida'. 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 as a proxy for new HIV infections and is an indicator of state HIV incidence.

At the state level, around 45% of the respondents reported being pregnant for the first time, while close to 40.7% of the respondents was pregnant for the second time and 11.2% of respondents reported that it was their third pregnancy. Only 2.9% of respondents were pregnant for the fourth or more time.

Figure 4: Percent Distribution of respondents by order of pregnancy in Kerala, HSS 2016-17

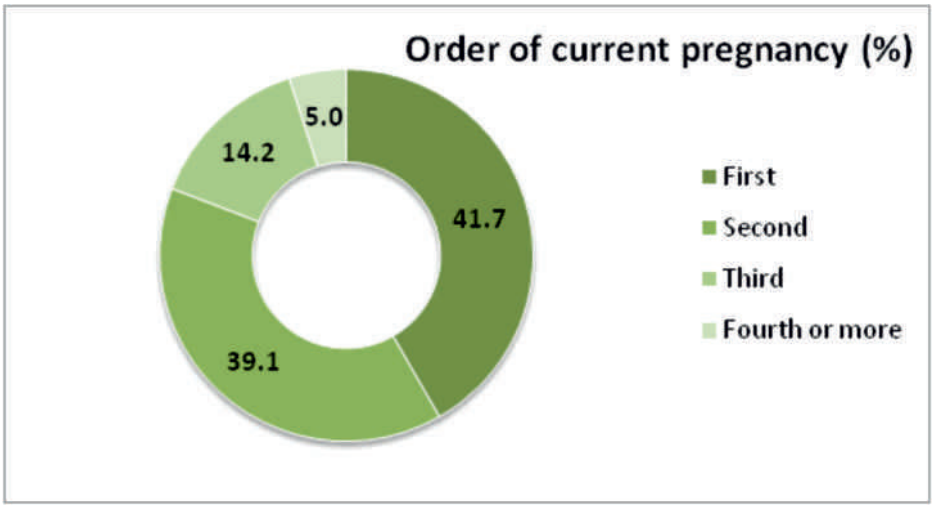


Table 6: District-wise % Distribution of respondents by Order of Pregnancy in Kerala, HSS 2016-17

State/District	First	Second	Third	Fourth or more	N
Kerala	**41.68**	**39.14**	**14.21**	**4.97**	**5593**
Alappuzha	38.75	43.00	14.00	4.25	400
Ernakulam	50.75	44.25	4.00	1.00	400
Idukki	37.25	40.25	17.25	5.25	400
Kannur	40.20	44.97	11.56	3.27	398
Kasaragod	24.81	44.11	20.55	10.53	399
Kollam	53.50	39.75	6.25	0.50	400
Kottayam	40.50	36.75	15.75	7.00	400
Kozhikode	53.38	35.84	8.77	2.01	399
Malappuram	29.50	30.00	25.00	15.50	400
Palakkad	42.82	38.04	15.11	4.03	397
Pthanamthitta	52.00	41.50	6.50	0.00	400
Thiruvananthapuram	46.75	36.00	13.50	3.75	400
Thrissur	40.00	40.00	16.75	3.25	400
wayanad	33.25	33.50	24.00	9.25	400

3.4. Duration of current Pregnancy

Duration of pregnancy is usually measured in terms of three trimesters; each of them of about three month's duration.

I. First trimester: The first trimester of pregnancy is from conception to 12th week of pregnancy.

ii. Second trimester: The second trimester of pregnancy is from 13th to 27th week of pregnancy.

iii. Third trimester: The third trimester of pregnancy spans from week 28 to birth.

At the state level, the majority of respondents (46.4%) belonged to the first trimester. Around 28.9% of respondents belonged to the second trimester, while another about 24% respondents were belonged to the third trimester.

Figure 5: Percent Distribution of respondents by duration of current pregnancy

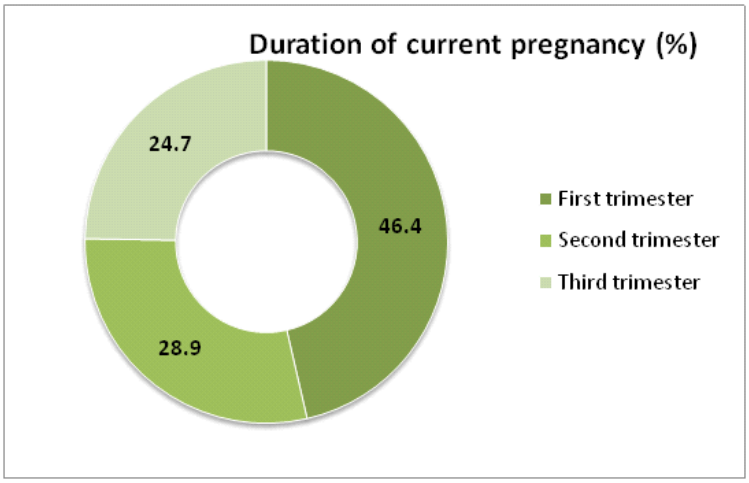


Table 7: District-wise % Distribution of respondents by Duration of pregnancy in Kerala, HSS 2016-17

State/District	First trimester %	Second trimester %	Third trimester %	N
Kerala	**46.40**	**28.87**	**24.74**	**5591**
Alappuzha	40.50	23.00	36.50	400
Ernakulam	38.00	41.50	20.50	400
Idukki	41.75	27.25	31.00	400
Kannur	12.28	73.93	13.78	399
Kasaragod	27.99	41.98	30.03	393
Kollam	70.75	12.75	16.50	400
Kottayam	31.50	25.25	43.25	400
Kozhikode	28.00	34.25	37.75	400
Malappuram	45.00	26.75	28.25	400
Palakkad	57.14	26.82	16.04	399
Pthanamthitta	84.25	14.00	1.75	400
Thiruvananthapuram	84.50	10.00	5.50	400
Thrissur	31.75	22.25	46.00	400
wayanad	55.75	24.75	19.50	400

3.5. Prior receipt of antenatal care services during current pregnancy

This refers to any prior receipt of antenatal care services from a health care facility (PHC/CHC/District hospitals / Maternity hospitals/Private health care facilities/NGO Health care facilities) by the pregnant women during her current pregnancy.

At the state level, about 40.7% of respondents were received ANC services during current pregnancy whereas 59.3% of respondents were not received antenatal care services.

Figure 6: Percent Distribution of respondents by ANC service uptake

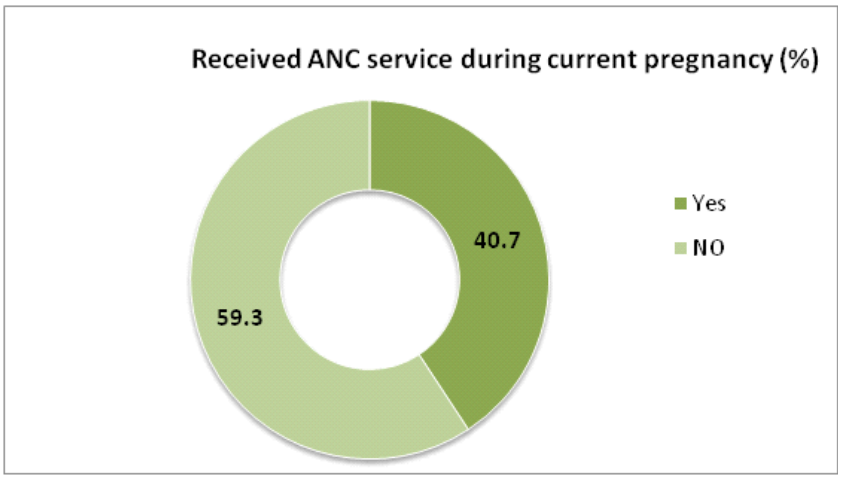


Table 8: District-wise % Distribution of respondents by Prior receipt of antenatal care services during current pregnancy in Kerala, HSS 2016-17

State/District	Prior receipt of antenatal care services	NO	N
	%	%	
Kerala	**40.7**	**59.3**	**5592**
Alappuzha	28.3	71.8	400
Ernakulam	7.8	92.2	399
Idukki	11.8	88.3	400
Kannur	17.0	83.0	399
Kasaragod	7.3	92.7	398
Kollam	24.5	75.5	400
Kottayam	85.5	14.5	400
Kozhikode	43.3	56.8	400
Malappuram	82.8	17.3	400
Palakkad	90.7	9.3	398
Pthanamthitta	29.4	70.6	398
Thiruvananthapuram	36.0	64.0	400
Thrissur	60.5	39.5	400
wayanad	45.5	54.5	400

3.6. Source of Referral to the ANC Clinic

This 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.

Self-referral was identified as the major source of referral to ANC clinics, accounting for 68% of respondents, followed by family/relatives/neighbor/friends (17.63%). Only close to 8.8% had been referred by Govt (including ASHA/ANM) at the state level.

Figure 7: Percent Distribution of respondents by source of referral

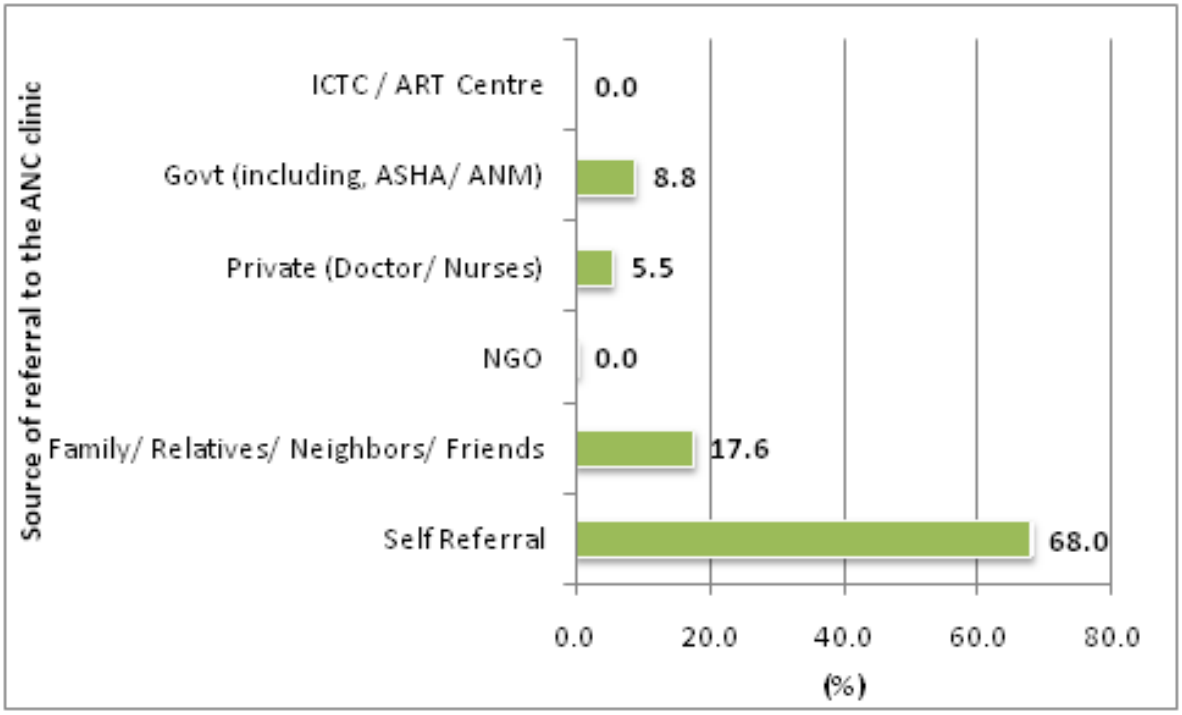


Table 9: District-wise % Distribution of respondents by source of referral and district in Kerala, HSS 2016-17

Row Labels	Self Referral	Family/ Relatives/ Neighbors/ Friends	NGO	Private (Doctor/ Nurses)	Govt (including, ASHA/ ANM)	ICTC / ART Centre	N
	%	%	%	%	%	%	
Kerala	**68.03**	**17.63**	**0.04**	**5.50**	**8.81**	**0.00**	**5586**
Alappuzha	56.00	41.00	0.00	1.25	1.75	0.00	400
Ernakulam	50.50	47.00	0.00	2.50	0.00	0.00	400
Idukki	95.49	0.00	0.00	4.51	0.00	0.00	399
Kannur	90.95	9.05	0.00	0.00	0.00	0.00	398
Kasaragod	100.00	0.00	0.00	0.00	0.00	0.00	397
Kollam	99.50	0.00	0.25	0.25	0.00	0.00	398
Kottayam	75.25	0.00	0.00	4.75	20.00	0.00	400
Kozhikode	90.73	8.02	0.25	1.00	0.00	0.00	399
Malappuram	16.50	1.25	0.00	55.00	27.25	0.00	400
Palakkad	72.36	23.37	0.00	0.00	4.27	0.00	398
Pthanamthitta	67.67	24.81	0.00	0.00	7.52	0.00	399
Thiruvananthapuram	64.00	29.25	0.00	5.50	1.25	0.00	400
Thrissur	44.61	49.87	0.00	1.50	4.01	0.00	399
wayanad	29.32	13.03	0.00	0.50	57.14	0.00	399

3.7. Current Place of Residence

2016-17 records the reported current residence of the respondent 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.

At the state level, 75.5% of the respondents are reported to be currently residing in rural areas and the rest (24.5%) are reported to be currently residing in urban areas. However, there were inter-district variations.

Figure 8: Percent Distribution of respondents by current place of residence

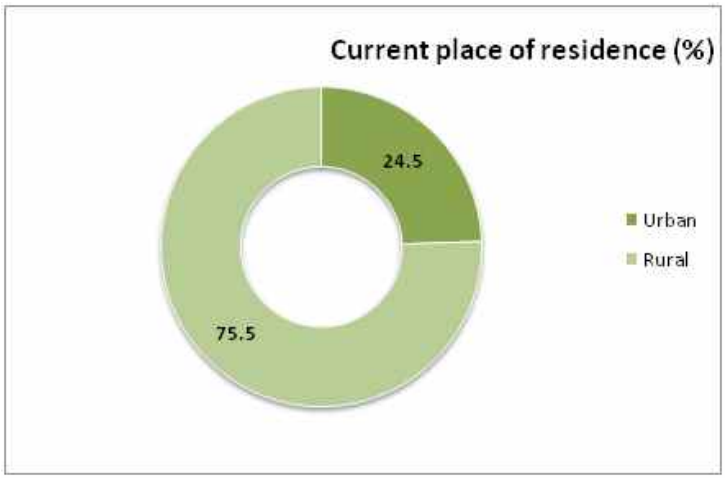


Table 10: District-wise % Distribution of respondents by Current Place of residence and district in Kerala, HSS 2016-17

State/District	Urban %	Rural %	N
Kerala	**24.5**	**75.5**	**5572**
Alappuzha	43.5	56.5	400
Ernakulam	88.2	11.8	399
Idukki	15.8	84.3	400
Kannur	18.2	81.8	396
Kasaragod	5.1	94.9	396
Kollam	19.8	80.3	400
Kottayam	10.8	89.3	400
Kozhikode	58.8	41.3	400
Malappuram	2.8	97.3	400
Palakkad	15.1	84.9	392
Pthanamthitta	10.4	89.6	396
Thiruvananthapuram	41.5	58.5	400
Thrissur	11.5	88.5	399
wayanad	0.8	99.2	394

3.8. Current Occupation of the Respondent

Certain occupations are 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, as detailed in an earlier chapter.

At the state level, the majority of the respondents (86.7%) were housewives, and 9.7% of respondents reported to be Service (Govt./Pvt.) and students were accounted for 2.1% of respondents followed by Skilled/semikilled worker (0.7%) and Domestic servant (0.3%).

Figure 9: District-wise % Distribution of respondents by Occupation

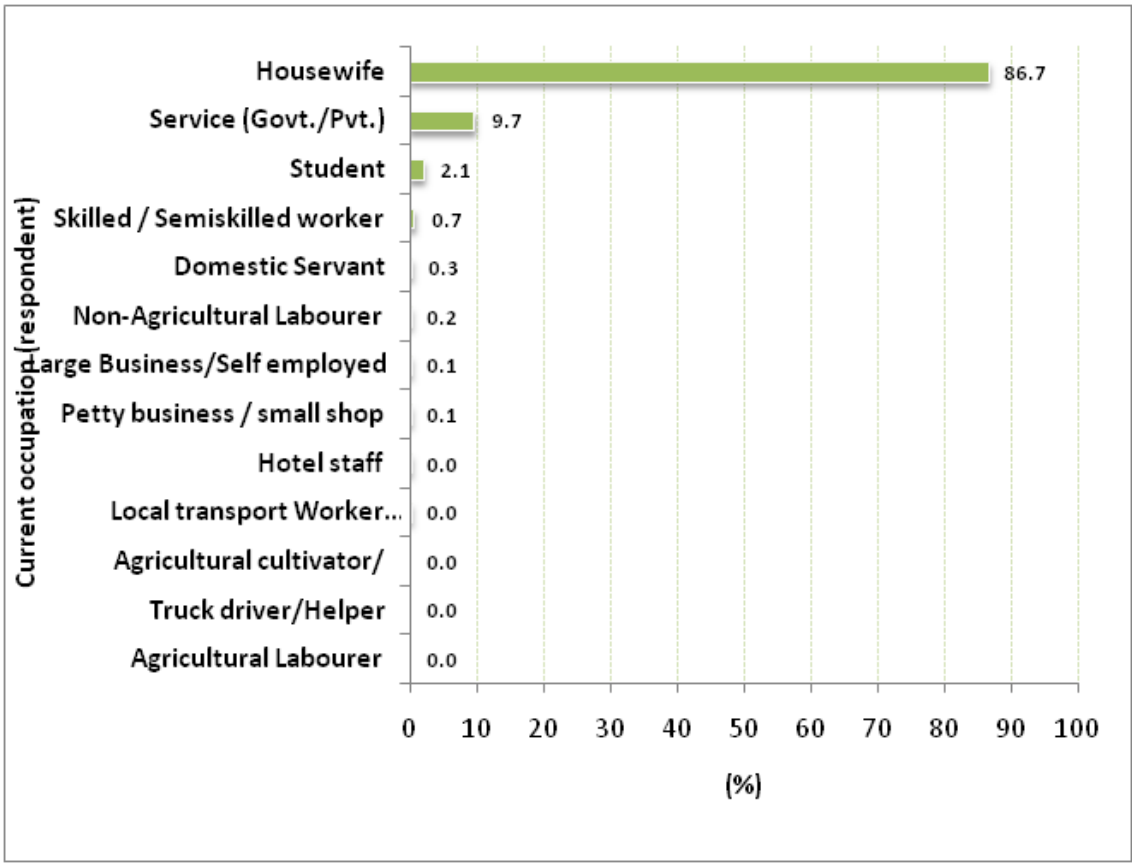


Table 11: District-wise % Distribution of respondents by Occupation in Kerala, HSS 2016-17

State/District	Agricultural Labourer	Non-Agricultural Labourer	Domestic Servant	Skilled / Semiskilled worker	Petty business / small shop	Large Business/Self employed	Service (Govt./Pvt.)	Student	Hotel staff	Truck driver/Helper	Local transport Worker (auto/taxi driver, hand cart pullers, rickshaw pullers etc)	Agricultural cultivator	Housewife	N
	%	%	%	%	%	%	%	%	%	%	%	%	%	
Kerala	**0.00**	**0.16**	**0.32**	**0.70**	**0.13**	**0.14**	**9.67**	**2.14**	**0.04**	**0.00**	**0.02**	**0.00**	**86.69**	**5596**
Alappuzha	0.00	0.00	0.00	0.75	0.00	0.25	11.50	5.75	0.00	0.00	0.00	0.00	81.75	400
Ernakulam	0.00	0.25	0.00	0.75	0.00	0.50	36.00	0.50	0.25	0.00	0.00	0.00	61.75	400
Idukki	0.00	0.00	0.00	0.50	0.00	0.00	5.50	0.00	0.00	0.00	0.00	0.00	94.00	400
Kannur	0.00	0.00	0.00	0.50	0.00	0.25	6.27	1.75	0.00	0.00	0.00	0.00	91.23	399
Kasaragod	0.00	0.00	1.00	0.00	0.50	0.75	1.25	0.00	0.00	0.00	0.00	0.00	96.50	400
Kollam	0.00	0.50	0.00	1.25	0.00	0.00	5.76	5.01	0.00	0.00	0.00	0.00	87.47	399
Kottayam	0.00	0.00	0.00	1.75	0.00	0.00	11.75	0.50	0.00	0.00	0.00	0.00	86.00	400
Kozhikode	0.00	0.00	2.75	1.50	0.75	0.25	23.25	0.25	0.25	0.00	0.25	0.00	70.75	400
Malappuram	0.00	0.25	0.00	0.00	0.25	0.00	2.00	4.00	0.00	0.00	0.00	0.00	93.50	400
Palakkad	0.00	0.00	0.75	0.00	0.25	0.00	3.52	4.27	0.00	0.00	0.00	0.00	91.21	398
Pthanamthitta	0.00	0.00	0.00	1.25	0.00	0.00	7.00	0.50	0.00	0.00	0.00	0.00	91.25	400
Thiruvananthapuram	0.00	0.00	0.00	0.25	0.00	0.00	9.50	3.75	0.00	0.00	0.00	0.00	86.50	400
Thrissur	0.00	1.00	0.00	1.25	0.00	0.00	9.75	3.00	0.00	0.00	0.00	0.00	85.00	400
wayanad	0.00	0.25	0.00	0.00	0.00	0.00	2.25	0.75	0.00	0.00	0.00	0.00	96.75	400

3.9. 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 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 10: % Distribution of respondents by the Occupation of spouse

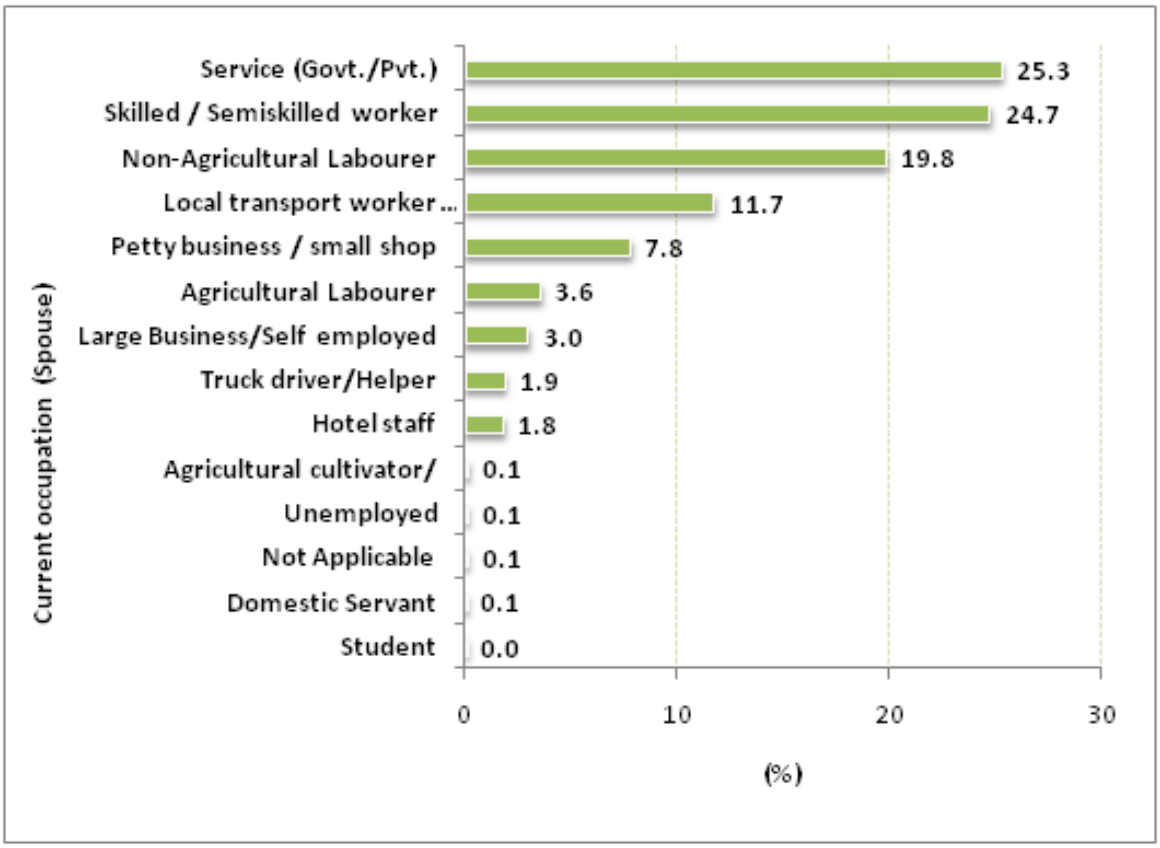


Table 12: District-wise % Distribution of respondents by the Occupation of spouse in Tamil Nadu, HSS 2016-17

Row Labels	Agricultural Labourer	Non-Agricultural Labourer	Domestic Servant	Skilled / Semiskilled worker	Petty business / small shop	Large Business/Self employed	Service (Govt./Pvt.)	Student	Hotel staff	Truck driver/Helper	Local transport Worker (auto/taxi driver, hand cart pullers, rickshaw pullers etc)	Agricultural cultivator	Unemployed	Not Applicable	N
	%	%	%	%	%	%	%	%	%	%	%	%	%	99	
Kerala	**3.6**	**19.8**	**0.1**	**24.7**	**7.8**	**3.0**	**25.3**	**0.0**	**1.8**	**1.9**	**11.7**	**0.1**	**0.1**	**0.1**	**5594**
Alappuzha	0.0	7.8	0.0	23.6	8.8	1.5	40.6	0.3	2.0	3.0	12.5	0.0	0.0	0.0	399
Ernakulam	0.3	0.3	0.0	2.3	6.3	10.3	76.5	0.0	2.8	0.3	1.0	0.0	0.0	0.3	400
Idukki	2.5	13.0	0.0	34.5	8.5	0.3	18.0	0.0	4.3	0.0	18.3	0.5	0.0	0.3	400
Kannur	0.0	0.8	0.8	60.9	5.3	0.5	16.3	0.0	1.3	0.8	13.3	0.0	0.3	0.0	399

Kasaragod	1.0	66.5	0.0	5.0	1.5	3.8	7.8	0.0	3.0	0.5	10.5	0.0	0.3	0.3	400
Kollam	0.5	16.3	0.0	39.3	5.0	0.0	24.8	0.0	0.3	11.5	2.5	0.0	0.0	0.0	400
Kottayam	1.5	15.3	0.0	34.3	5.3	0.0	23.5	0.0	1.8	0.0	18.5	0.0	0.0	0.0	400
Kozhikode	0.3	1.0	0.0	7.3	20.3	13.3	54.1	0.0	1.0	0.5	1.5	0.5	0.3	0.0	399
Malappuram	0.5	45.5	0.0	11.5	11.8	0.5	12.3	0.0	1.5	6.5	9.0	0.3	0.8	0.0	400
Palakkad	23.9	4.3	0.0	23.2	14.4	1.0	13.1	0.0	1.0	1.3	16.9	0.5	0.0	0.5	397
Pthanamthitta	15.5	21.5	0.0	14.8	9.0	1.8	12.8	0.0	4.0	0.0	20.8	0.0	0.0	0.0	400
Thiruvananthapuram	0.0	22.8	0.0	18.5	3.3	5.0	31.8	0.0	2.3	0.5	15.5	0.3	0.3	0.0	400
Thrissur	0.0	8.8	0.0	57.3	4.0	0.8	12.0	0.0	0.0	1.3	16.0	0.0	0.0	0.0	400
wayanad	4.0	53.8	0.0	14.3	6.0	3.0	10.8	0.0	0.3	0.0	7.8	0.0	0.0	0.3	400

3.10. 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.

At the state level, around 11.1% of the respondents reported that their spouses were migrants, though there were significant inter-district variations.

Figure 11: Percentage of respondents with migrant spouse

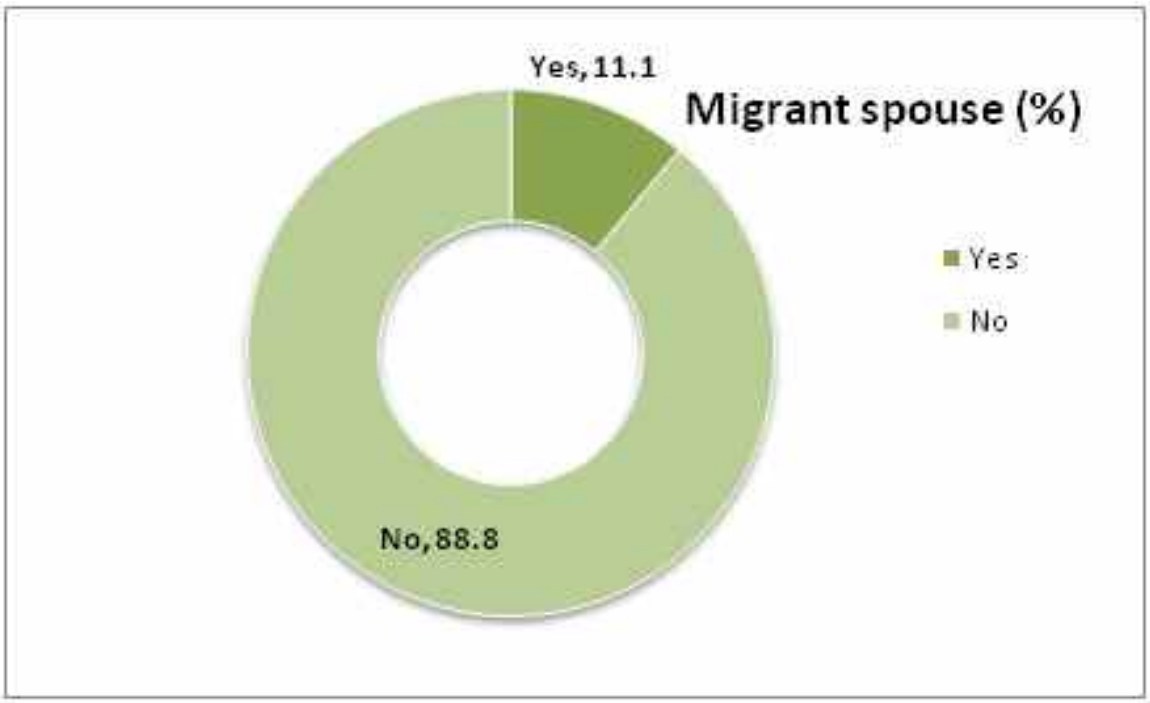


Table 13: District-wise percentage of respondents with migrant spouse in Kerala, HSS 2016-17

State/District	Migrant Spouse	Non migrants	Not Applicable	N
	%	%	%	
Kerala	**11.1**	**88.8**	**0.1**	**5591**
Alappuzha	13.5	86.5	0.0	400
Ernakulam	8.8	91.0	0.3	400
Idukki	2.5	97.3	0.3	400
Kannur	15.0	85.0	0.0	399
Kasaragod	0.5	99.3	0.3	400
Kollam	19.5	80.5	0.0	400
Kottayam	4.5	95.5	0.0	400
Kozhikode	33.7	66.3	0.0	398
Malappuram	11.8	88.3	0.0	400
Palakkad	4.1	95.4	0.5	394
Pthanamthitta	8.3	91.8	0.0	400
Thiruvananthapuram	10.3	89.8	0.0	400
Thrissur	6.8	93.3	0.0	400
wayanad	15.8	84.0	0.3	400

3.11. HIV Testing History

This refers to the HIV testing history of pregnant women. At the state level, 70.1% of respondents were reported that they were previously tested for HIV.

Figure 12: Percent Distribution of respondents by HIV testing history

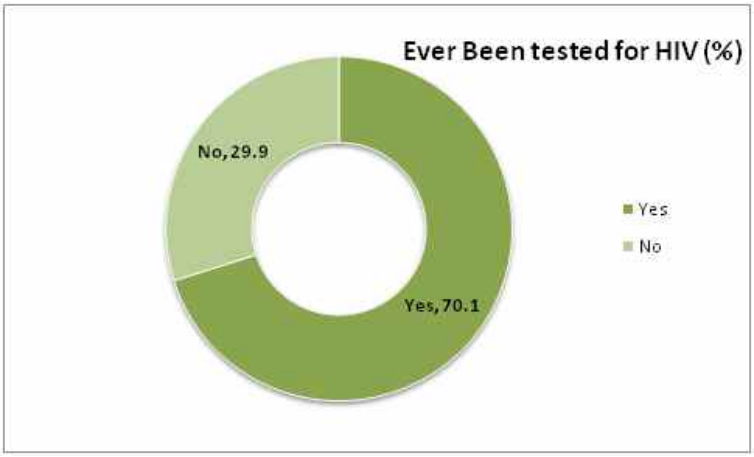


Table 14: District-wise percentage of respondents with HIV testing history in Kerala, HSS 2016-17

Row Labels	Ever been tested for HIV		Grand Total
	Yes	No	
	%	%	
Kerala	**70.1**	**29.9**	**5597**
Alappuzha	80.3	19.8	400
Ernakulam	78.0	22.0	400
Idukki	62.5	37.5	400
Kannur	62.2	37.8	399
Kasaragod	65.0	35.0	400
Kollam	56.5	43.5	400
Kottayam	90.0	10.0	400
Kozhikode	72.8	27.3	400
Malappuram	75.0	25.0	400
Palakkad	58.3	41.7	398
Pthanamthitta	59.3	40.8	400
Thiruvananthapuram	63.3	36.8	400
Thrissur	87.3	12.8	400
wayanad	71.8	28.3	400

3.12. Time of last HIV Testing

This question aims to understand the timing of last HIV testing of respondents in reference to current pregnancy. At the state level, majority of the respondents (45.7%) were tested for HIV during current pregnancy, whereas 54.3% of respondents were tested before current pregnancy. Around 14.7% of the respondents were reported as never tested for HIV.

Figure 13: Percent Distribution of respondents by Time of last HIV Testing

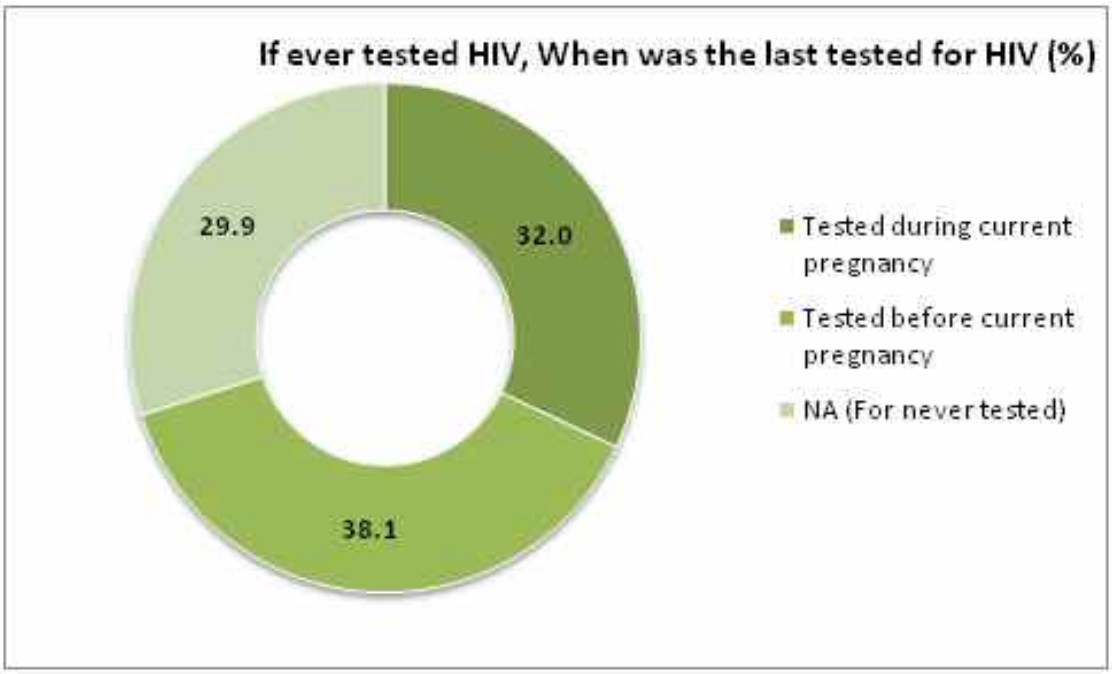


Table 15: District-wise percentage of respondents with Time of last HIV Testing in Kerala, HSS 2016-17

(Only the respondent whom tested for HIV test previously)			
Row Labels	Tested during current pregnancy	Tested before current pregnancy	N
	%	%	
Kerala	**45.7**	**54.3**	**3923**
Alappuzha	54.2	45.8	321
Ernakulam	51.6	48.4	312
Idukki	30.4	69.6	250
Kannur	5.3	94.7	247
Kasaragod	91.9	8.1	259
Kollam	39.4	60.6	226
Kottayam	72.5	27.5	360
Kozhikode	35.1	64.9	291
Malappuram	49.7	50.3	300
Palakkad	54.3	45.7	232
Pthanamthitta	18.1	81.9	237
Thiruvananthapuram	3.2	96.8	253
Thrissur	74.5	25.5	349
wayanad	32.2	67.8	286

3.13. Result of last HIV test

This refers to the result of the last HIV test of the ANC respondent. At the state level, around 0.01% of the respondents were reported that their last HIV test result was Positive. The majority of respondents (69.7%) were reported as HIV negative. Whereas 29.9% of respondent reported that they were never tested.

Figure 14: Percent Distribution of respondents by Result of last HIV test

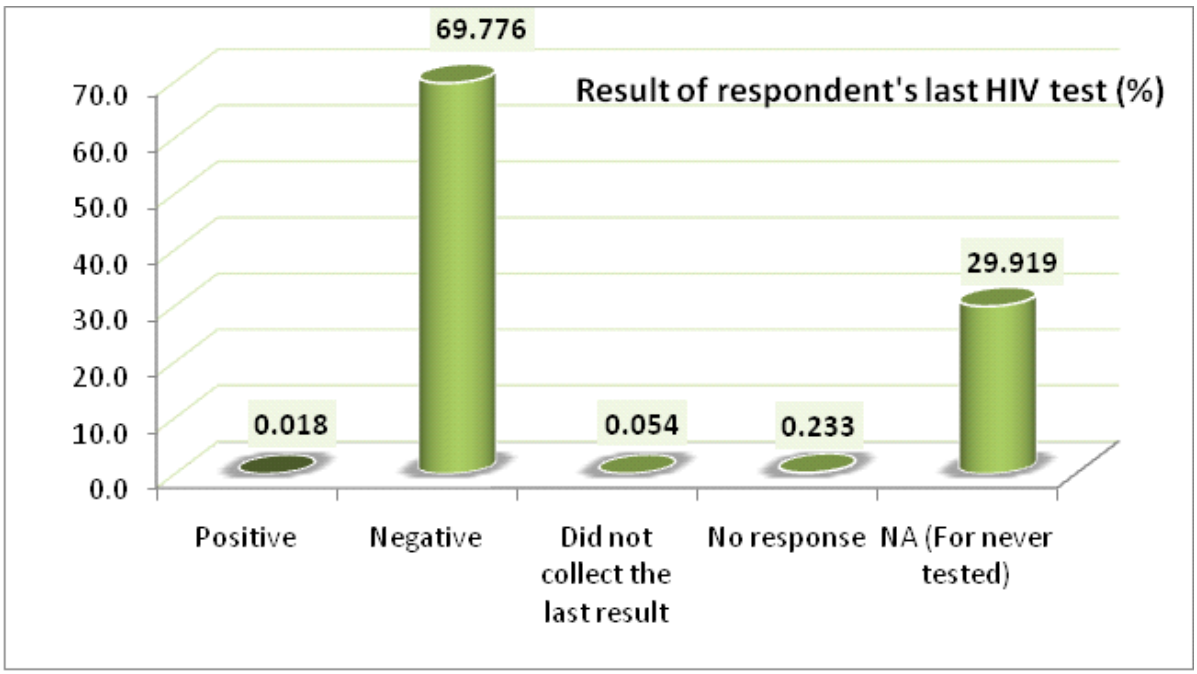


Table 16: District-wise percentage of respondents with Result of last HIV test in Kerala, HSS 2016-17

(Only the respondent whom tested for HIV test previously)					
Row Labels	Positive	Negative	Did not collect the test result	No Response	N
	%	%	%	%	
Kerala	**0.03**	**99.57**	**0.08**	**0.33**	**3914**
Alappuzha	0.00	96.26	0.62	3.12	321
Ernakulam	0.00	100.00	0.00	0.00	311
Idukki	0.00	100.00	0.00	0.00	248
Kannur	0.40	99.19	0.00	0.40	248
Kasaragod	0.00	99.62	0.00	0.38	260
Kollam	0.00	100.00	0.00	0.00	226
Kottayam	0.00	100.00	0.00	0.00	360
Kozhikode	0.00	100.00	0.00	0.00	289
Malappuram	0.00	100.00	0.00	0.00	300
Palakkad	0.00	100.00	0.00	0.00	227
Pthanamthitta	0.00	100.00	0.00	0.00	237
Thiruvananthapuram	0.00	100.00	0.00	0.00	253
Thrissur	0.00	99.71	0.29	0.00	349
wayanad	0.00	99.65	0.00	0.35	285

3.14. Management of HIV infections

This refers to the enrolment of HIV positive respondents in HIV care, either for pre-ART or ART services, at the time of surveillance. At the state level, 100% (n=1) of the respondents whom with HIV positive results were taking care from Government hospital/ART centres.

Table 17: District-wise percentage of respondents with Management of HIV infections in Kerala, HSS 2016-17

(If respondent whom say Positive for privious HIV test and their current HIV management)

	(1) ART	(2) NGO	(3) PVt	(4)Pharmacist/Chemist	(5) Alternative/non Allopathic	(6) Any other type	(7) Not seeking taking for HIV management	(1)+(2)	(1)+(3)	(1)+(2)+(3)	(1)+(2)+(3)+(6)	(1)+(2)+(6)	No Answer	total
Kerala	100	0	0	0	0	0	0	0	0	0	0	0	0	1
Kannur	100	0	0	0	0	0	0	0	0	0	0	0	0	1

3.15. ART Uptake

This refers to the current uptake of 'Antiretroviral therapy' by HIV positive respondents (N=1). At the state level, 100% (n=1) of the respondents were currently taking ART.

Table 18: District-wise percentage of HIV positive respondents with ART uptake in Kerala, HSS 2016-17

State/District	Yes	No	Blank/Missing)	N
	%	%	(blank)	
Kerala	**0.0**	**100.0**	**0.0**	**1**
Kannur	0.0	100.0	0.0	1

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.

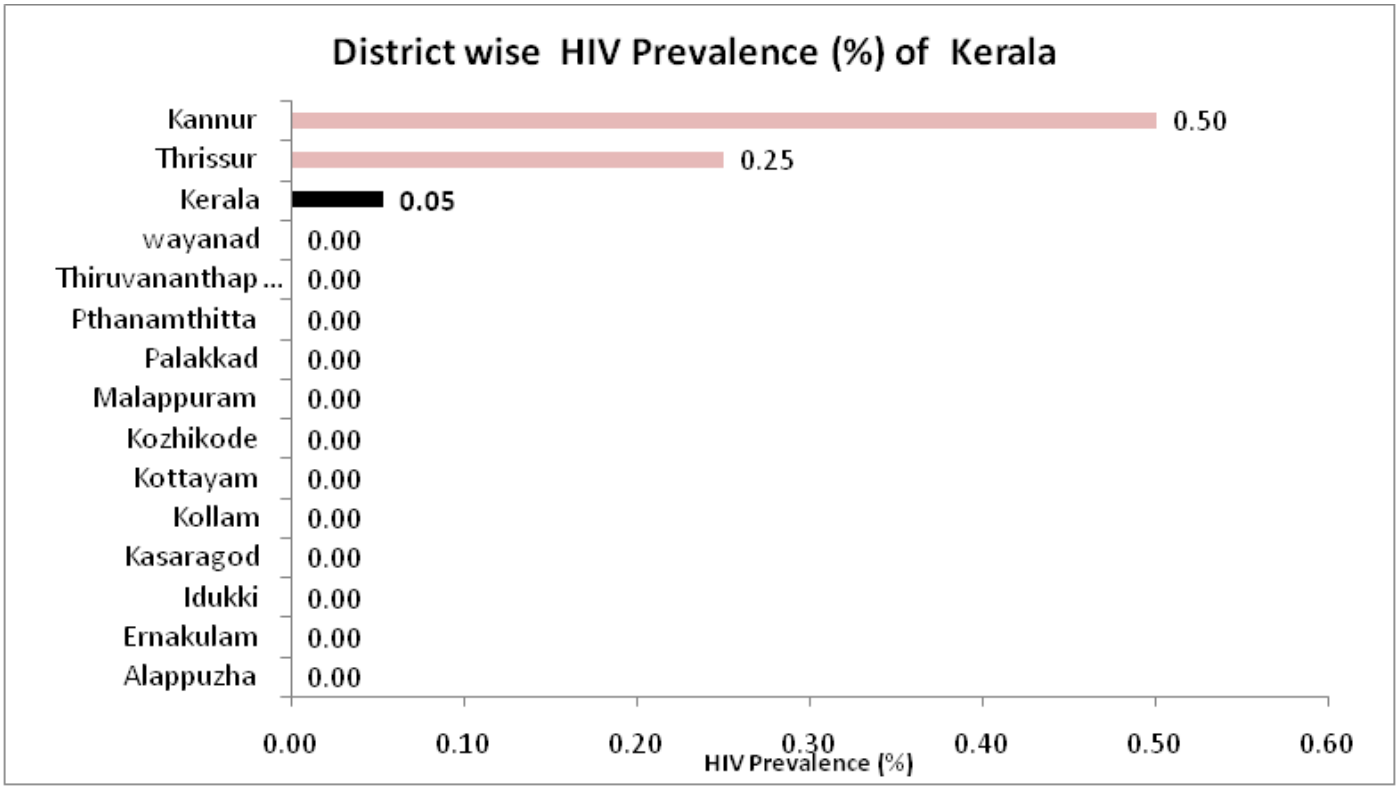
HIV prevalence among ANC clinic attendees is considered as proxy for HIV burden in general population. HIV prevalence of 1% or more among ANC clinic attendees is considered as high level, 0.5-0.99% is considered as moderate level and less than 0.5% is considered as low HIV prevalence for the analysis 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 and District Level

Table 19: HIV Prevalence at State & District Level

District	Positive (%)	Grand Total
Alappuzha	0.00	400
Ernakulam	0.00	400
Idukki	0.00	400
Kasaragod	0.00	400
Kollam	0.00	400
Kottayam	0.00	400
Kozhikode	0.00	400
Malappuram	0.00	400
Palakkad	0.00	400
Pthanamthitta	0.00	400
Thiruvananthapuram	0.00	400
wayanad	0.00	400
Kerala	**0.05**	**5599**
Thrissur	0.25	400
Kannur	0.50	399

Figure 15: HIV Prevalence among (%) among ANC Clinic Attendees by district, HSS 2016-17



Chapter 5.

HIV Prevalence among ANC Clinic Attendees by Background Characteristic

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. Duration of Pregnancy
5. ANC service uptake
6. Source of referral to the ANC clinic
7. Current place of residence
8. Current occupation of respondent
9. Current occupation of spouse
10. Migration status of spouse

5.1. HIV Prevalence among ANC Clinic Attendees by Age

Figure 16: HIV Prevalence among ANC Clinic Attendees by Age, HSS 2016-17, Kerala

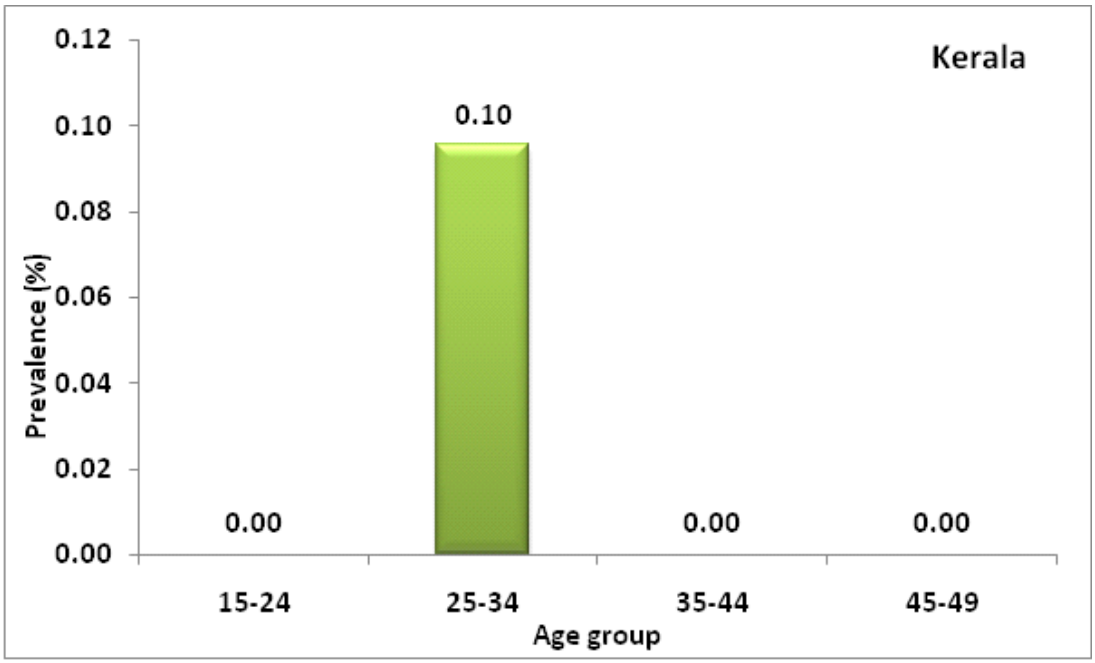


Table 20 HIV Prevalence among ANC Clinic Attendees by Age

	15-24		25-34		35-44		45-49 Total		Grand Total
State/Districts	%	**Total**	%	**Total**	%	**Total**	%	**N**	**N**
Kerala	**0.00**	**2169**	**0.10**	**3141**	**0.00**	**282**	**0**	**7.00**	**5599**
Alappuzha	0.00	**156**	0.00	**226**	0.00	**18**	0	**0.00**	**400**
Ernakulam	0.00	**84**	0.00	**282**	0.00	**30**	0	**4.00**	**400**
Idukki	0.00	**131**	0.00	**244**	0.00	**25**	0	**0.00**	**400**
Kannur	0.00	**152**	0.89	**224**	0.00	**21**	0	**2.00**	**399**
Kasaragod	0.00	**102**	0.00	**265**	0.00	**33**	0	**0.00**	**400**
Kollam	0.00	**187**	0.00	**203**	0.00	**10**	0	**0.00**	**400**
Kottayam	0.00	**100**	0.00	**261**	0.00	**39**	0	**0.00**	**400**
Kozhikode	0.00	**134**	0.00	**243**	0.00	**23**	0	**0.00**	**400**
Malappuram	0.00	**203**	0.00	**183**	0.00	**14**	0	**0.00**	**400**
Palakkad	0.00	**187**	0.00	**200**	0.00	**13**	0	**0.00**	**400**
Pthanamthitta	0.00	**148**	0.00	**233**	0.00	**19**	0	**0.00**	**400**
Thiruvananthapuram	0.00	**190**	0.00	**200**	0.00	**9**	0	**1.00**	**400**
Thrissur	0.00	**202**	0.54	**185**	0.00	**13**	0	**0.00**	**400**
wayanad	0.00	**193**	0.00	**192**	0.00	**15**	0	**0.00**	**400**

5.2. HIV Prevalence among ANC Clinic Attendees by Literacy Status

Under HSS 2014-15, KERALA, HIV prevalence among ANC Clinic attendees the literacy status was classified into five categories:

Illiterate: people with no formal or non-formal education the HIV prevalence is 0.0 %

Literate and till 5th standard: people with non-formal education or those who joined school but had not studied beyond 5th standard the HIV prevalence is 1.4%

6 to 10th standard: people who studied beyond 5th standard but not beyond 10th standard the HIV prevalence is 0.06%.

11 to graduation: people who studied beyond 10th standard but not beyond graduation. Includes those with technical education/diplomas the HIV prevalence is 0.0%.

Post-graduation: people who studied beyond graduation the HIV prevalence is 0.2%.

Figure 17: HIV Prevalence (%) among ANC Clinic Attendees by Literacy Status, HSS 2016-17, Kerala

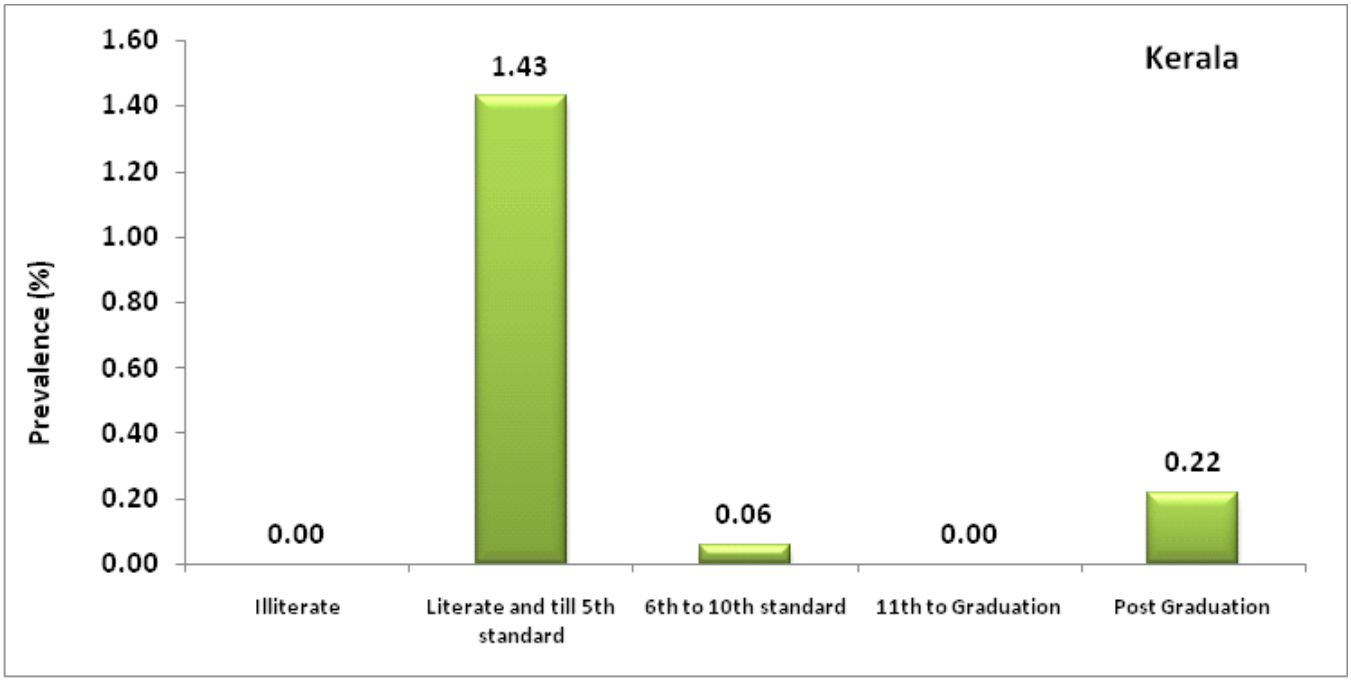


Table 21: HIV Prevalence (%) among ANC Clinic Attendees by Literacy Status and Districts, HSS 2016-17, Kerala

	1. Illiterate Total		2. Literate and till 5th standard Total		3. 6th to 10th standard Total		4. 11th to Graduation Total		5. Post Graduation Total		
Row Labels	%	Total	%	Total	%	Total	%	Total	%	Total	N
Kerala	**0.00**	**31**	**1.43**	**70**	**0.06**	**1737**	**0.00**	**3290**	**0.22**	**456**	**5584**
Alappuzha	0.00		0.00	1	0.00	84	0.00	293	0.00	22	400
Ernakulam	0.00		0.00		0.00	17	0.00	302	0.00	80	399
Idukki	0.00		0.00	3	0.00	113	0.00	271	0.00	13	400
Kannur	0.00	1	14.29	7	0.00	145	0.00	226	5.26	19	398
Kasaragod	0.00	9	0.00	16	0.00	302	0.00	65	0.00	6	398
Kollam	0.00	1	0.00		0.00	96	0.00	276	0.00	26	399
Kottayam	0.00		0.00	3	0.00	85	0.00	286	0.00	26	400
Kozhikode	0.00		0.00	1	0.00	11	0.00	227	0.00	156	395
Malappuram	0.00	3	0.00	3	0.00	154	0.00	235	0.00	5	400
Palakkad	0.00	10	0.00	4	0.00	172	0.00	184	0.00	28	398
Pthanamthitta	0.00		0.00	1	0.00	165	0.00	220	0.00	14	400
Thiruvananthapuram	0.00	1	0.00	1	0.00	91	0.00	276	0.00	31	400
Thrissur	0.00	1	0.00	3	0.82	122	0.00	252	0.00	22	400
wayanad	0.00	5	0.00	27	0.00	180	0.00	177	0.00	8	397

5.3 HIV Prevalence among ANC Clinic Attendees by 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 'gravida'. 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 as a proxy for new HIV infections and is an indicator of state HIV incidence.

Figure 18: HIV Prevalence (%) among ANC Clinic Attendees by Order of Pregnancy, HSS 2016-17, Kerala

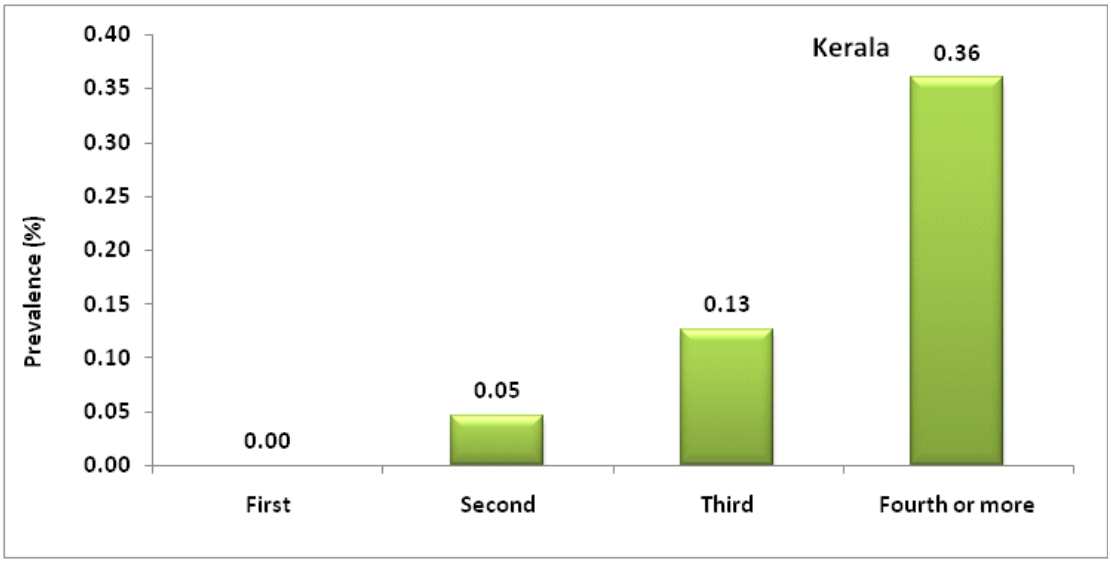


Table 22: HIV Prevalence (%) among ANC Clinic Attendees by Order of Pregnancy and districts, HSS 2016-17, Kerala

	1. First		2. Second		3. Third		4. Fourth or more		
Row Labels	%	N	%	N	%	N	%	N	Total
Kerala	**0.00**	**2331**	**0.05**	**2189**	**0.13**	**795**	**0.36**	**278**	**5593**
Alappuzha	0.00	155	0.00	172	0.00	56	0.00	17	400
Ernakulam	0.00	203	0.00	177	0.00	16	0.00	4	400
Idukki	0.00	149	0.00	161	0.00	69	0.00	21	400
Kannur	0.00	160	0.56	179	0.00	46	7.69	13	398
Kasaragod	0.00	99	0.00	176	0.00	82	0.00	42	399
Kollam	0.00	214	0.00	159	0.00	25	0.00	2	400
Kottayam	0.00	162	0.00	147	0.00	63	0.00	28	400
Kozhikode	0.00	213	0.00	143	0.00	35	0.00	8	399
Malappuram	0.00	118	0.00	120	0.00	100	0.00	62	400
Palakkad	0.00	170	0.00	151	0.00	60	0.00	16	397
Pthanamthitta	0.00	208	0.00	166	0.00	26	0.00		400
Thiruvananthapuram	0.00	187	0.00	144	0.00	54	0.00	15	400
Thrissur	0.00	160	0.00	160	1.49	67	0.00	13	400
wayanad	0.00	133	0.00	134	0.00	96	0.00	37	400

5.4 HIV Prevalence among ANC Clinic Attendees by Duration of Pregnancy

Figure 19: HIV Prevalence (%) among ANC Clinic Attendees by Duration of Pregnancy, HSS 2016-17, Kerala

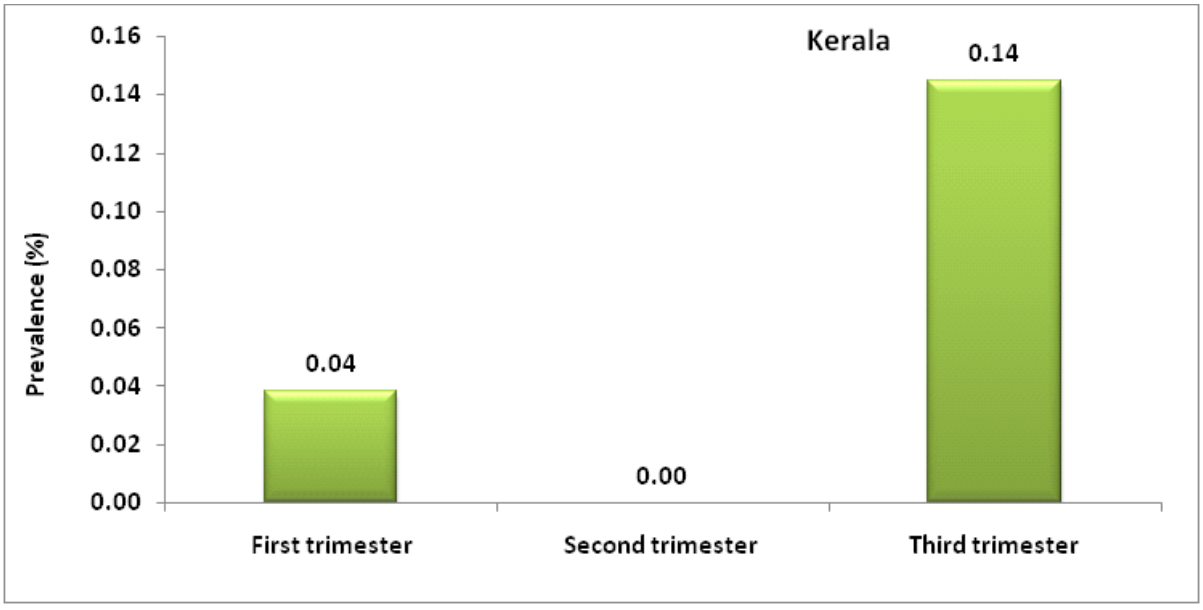


Table 23: HIV Prevalence (%) among ANC Clinic Attendees by Duration of Pregnancy and districts, HSS 2016-17, Kerala

State/District	1. First		2. Second		3. Third		Grand Total
	%	N	%	N	%	N	
Kerala	**0.04**	**2594**	**0.00**	**1614**	**0.14**	**1383**	**5591**
Alappuzha	0.00	162	0.00	92	0.00	146	400
Ernakulam	0.00	152	0.00	166	0.00	82	400
Idukki	0.00	167	0.00	109	0.00	124	400
Kannur	2.04	49	0.00	295	1.82	55	399
Kasaragod	0.00	110	0.00	165	0.00	118	393
Kollam	0.00	283	0.00	51	0.00	66	400
Kottayam	0.00	126	0.00	101	0.00	173	400
Kozhikode	0.00	112	0.00	137	0.00	151	400
Malappuram	0.00	180	0.00	107	0.00	113	400
Palakkad	0.00	228	0.00	107	0.00	64	399
Pthanamthitta	0.00	337	0.00	56	0.00	7	400
Thiruvananthapuram	0.00	338	0.00	40	0.00	22	400
Thrissur	0.00	127	0.00	89	0.54	184	400
wayanad	0.00	223	0.00	99	0.00	78	400

5.5 HIV Prevalence among ANC Clinic Attendees by ANC service uptake

Figure 20: HIV Prevalence (%) among ANC Clinic Attendees by Duration of Pregnancy and districts, HSS 2016-17, Kerala

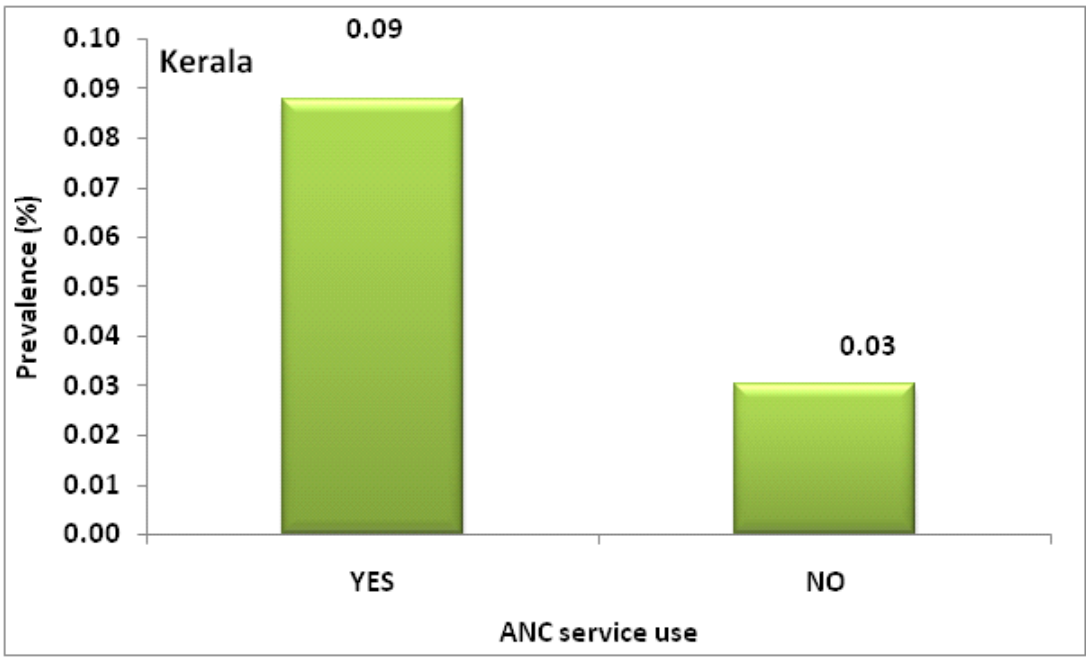


Table 24: HIV Prevalence (%) among ANC Clinic Attendees by Duration of Pregnancy and districts, HSS 2016-17, Kerala

Row Labels	Yes		No		Total
	%	N	%	N	
Kerala	**0.09**	**2278**	**0.03**	**3314**	**5592**
Alappuzha	0.00	113	0.00	287	400
Ernakulam	0.00	31	0.00	368	399
Idukki	0.00	47	0.00	353	400
Kannur	1.47	68	0.30	331	399
Kasaragod	0.00	29	0.00	369	398
Kollam	0.00	98	0.00	302	400
Kottayam	0.00	342	0.00	58	400
Kozhikode	0.00	173	0.00	227	400
Malappuram	0.00	331	0.00	69	400
Palakkad	0.00	361	0.00	37	398
Pthanamthitta	0.00	117	0.00	281	398
Thiruvananthapuram	0.00	144	0.00	256	400
Thrissur	0.41	**242**	0.00	**158**	400
wayanad	0.00	**182**	0.00	**218**	400

5.6 HIV Prevalence among ANC Clinic Attendees by Source of Referral

Figure 21: HIV Prevalence (%) among ANC Clinic Attendees by Source of Referral, HSS 2016-17, Kerala

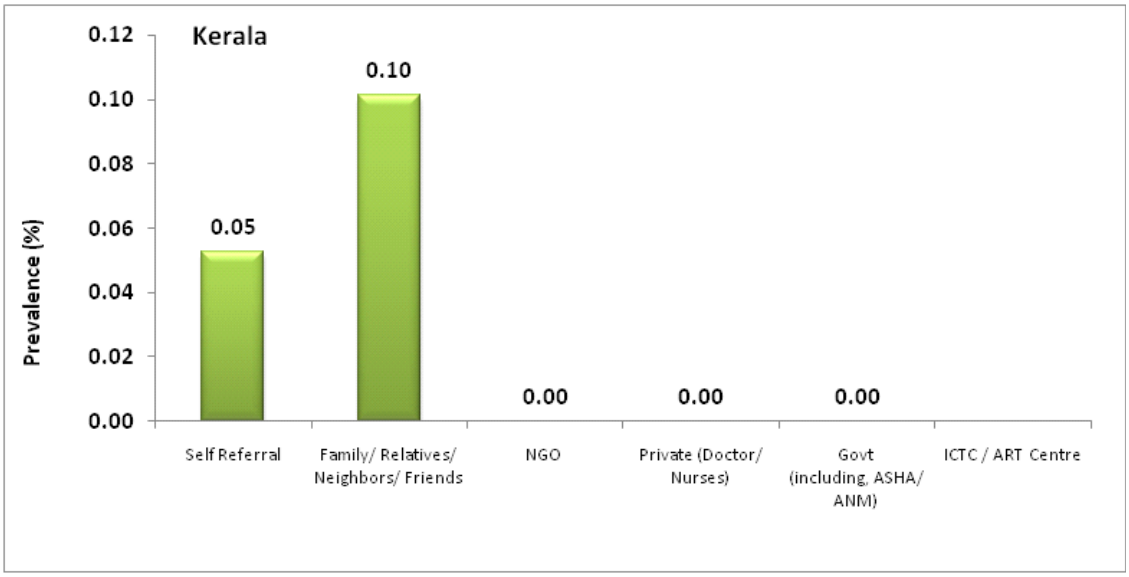


Table 25: HIV Prevalence (%) among ANC Clinic Attendees by Source of Referral, HSS 2016-17, Kerala

State/District	1. Self Referral		2. Family/ Relatives/ Neighbors/ Friends		3. NGO		4. Private (Doctor/ Nurses)		5. Govt (including, ASHA/ ANM)		6. ICTC / ART Centre		Total
	%	N	%	N	%	N	%	N	%	N	%	N	
Kerala	**0.05**	**3800**	**0.10**	**985**	**0.00**	**2**	**0.00**	**307**	**0.00**	**492**			**5586**
Alappuzha	0.00	224	0.00	164			0.00	5	0.00	7			400
Ernakulam	0.00	202	0.00	188			0.00	10					400
Idukki	0.00	381					0.00	18					399
Kannur	0.55	362	0.00	36									398
Kasaragod	0.00	397											397
Kollam	0.00	396			0.00	1	0.00	1					398
Kottayam	0.00	301					0.00	19	0.00	80			400
Kozhikode	0.00	362	0.00	32	0.00	1	0.00	4					399
Malappuram	0.00	66	0.00	5			0.00	220	0.00	109			400
Palakkad	0.00	288	0.00	93					0.00	17			398
Pthanamthitta	0.00	270	0.00	99					0.00	30			399
Thiruvananthapuram	0.00	256	0.00	117			0.00	22	0.00	5			400
Thrissur	0.00	178	0.50	199			0.00	6	0.00	16			399
wayanad	0.00	117	0.00	52			0.00	2	0.00	228			399

5.7 HIV Prevalence among ANC Clinic Attendees by Place of Residence

Figure 22: HIV Prevalence (%) among ANC Clinic Attendees by Place of residence, HSS 2016-17, Kerala

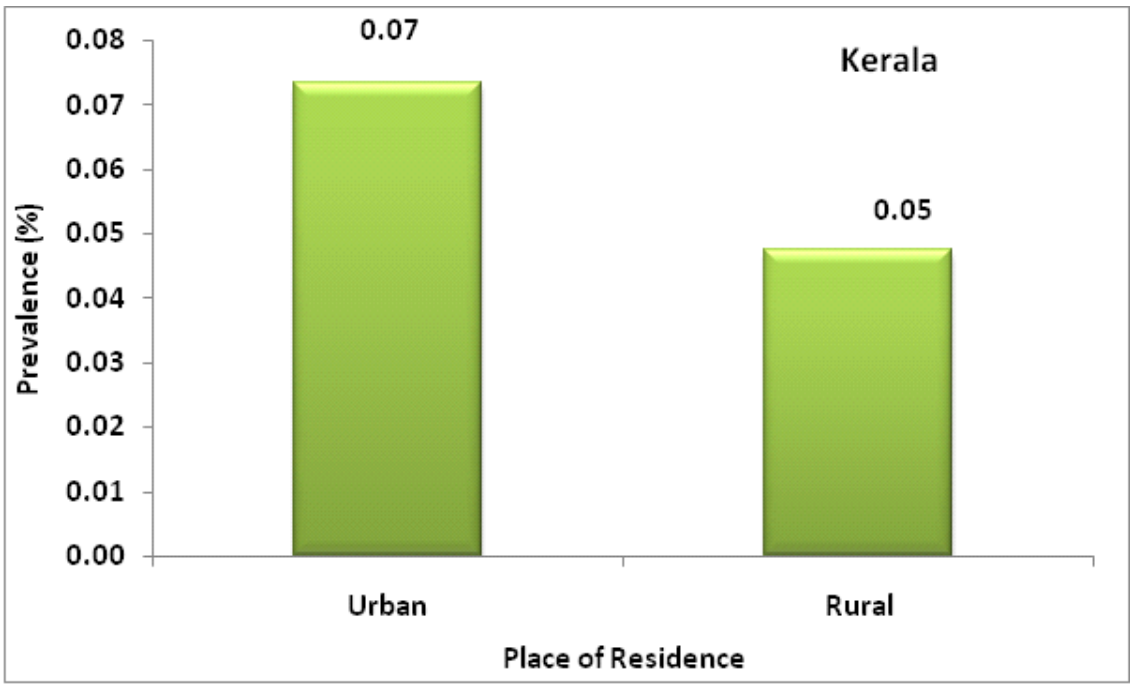


Table 26: HIV Prevalence among ANC Clinic Attendees by Place of Residence and district, HSS 2016-17

	Urban		Rural		Total
Row Labels	%	N	%	N	
Kerala	**0.07**	**1364**	**0.05**	**4208**	**5572**
Alappuzha	0.00	174	0.00	226	400
Ernakulam	0.00	352	0.00	47	399
Idukki	0.00	63	0.00	337	400
Kannur	1.39	72	0.31	324	396
Kasaragod	0.00	20	0.00	376	396
Kollam	0.00	79	0.00	321	400
Kottayam	0.00	43	0.00	357	400
Kozhikode	0.00	235	0.00	165	400
Malappuram	0.00	11	0.00	389	400
Palakkad	0.00	59	0.00	333	392
Pthanamthitta	0.00	41	0.00	355	396
Thiruvananthapuram	0.00	166	0.00	234	400
Thrissur	0.00	46	0.28	353	399
wayanad	0.00	3	0.00	391	394

5.8. HIV Prevalence among ANC Clinic Attendees by Current Occupation of Respondent

Figure 23: HIV Prevalence (%) among ANC Clinic Attendees by Current Occupation of Respondent, HSS 2016-17, Kerala

Table 27: HIV Prevalence among ANC Clinic Attendees by Current Occupation of Respondent, HSS 2016-17

State/District	Agricultural Labourer		Non-Agricultural Labourer		Domestic Servant		Skilled / Semiskilled worker		Petty business / small shop		Large Business/Self employed		Service (Govt./Pvt.)		Student		Hotel staff		Truck driver/Helper		Local transport Worker		Agricultural cultivator/		Housewife		Total
	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	
Kerala			**0.00**	**9**	**0.00**	**18**	**0.00**	**39**	**0.00**	**7**	**0.00**	**8**	**0.00**	**541**	**0.00**	**120**	**0.00**	**2**			**0.00**	**1**			**0.06**	**4851**	**5596**
Alappuzha							0.00	3			0.00	1	0.00	46	0.00	23									0.00	327	400
Ernakulam			0.00	1			0.00	3			0.00	2	0.00	144	0.00	2	0.00	1							0.00	247	400
Idukki							0.00	2					0.00	22											0.00	376	400
Kannur							0.00	2			0.00	1	0.00	25	0.00	7									0.55	364	399
Kasaragod					0.00	4			0.00	2	0.00	3	0.00	5											0.00	386	400
Kollam			0.00	2			0.00	5					0.00	23	0.00	20									0.00	349	399
Kottayam							0.00	7					0.00	47	0.00	2									0.00	344	400
Kozhikode					0.00	11	0.00	6	0.00	3	0.00	1	0.00	93	0.00	1	0.00	1			0.00	1			0.00	283	400
Malappuram			0.00	1					0.00	1			0.00	8	0.00	16									0.00	374	400
Palakkad			0.00	3					0.00	1			0.00	14	0.00	17									0.00	363	398
Pthanamthitta							0.00	5					0.00	28	0.00	2									0.00	365	400
Thiruvananthapuram							0.00	1					0.00	38	0.00	15									0.00	346	400
Thrissur			0.00	4			0.00	5					0.00	39	0.00	12									0.29	340	400
wayanad			0.00	1									0.00	9	0.00	3									0.00	387	400
Orissa	**0.79**	**127**	**0.92**	**109**	**0.00**	**7**	**0.00**	**53**	**0.00**	**31**	**0.00**	**5**	**0.45**	**220**	**0.00**	**29**	**0.00**	**4**					**0.00**	**16**	**0.27**	**12175**	**12776**

5.9. HIV Prevalence among ANC Clinic Attendees by Current Occupation of Spouse

Figure 24: HIV Prevalence among ANC Clinic Attendees by Current Occupation of Spouse, HSS 2016-17

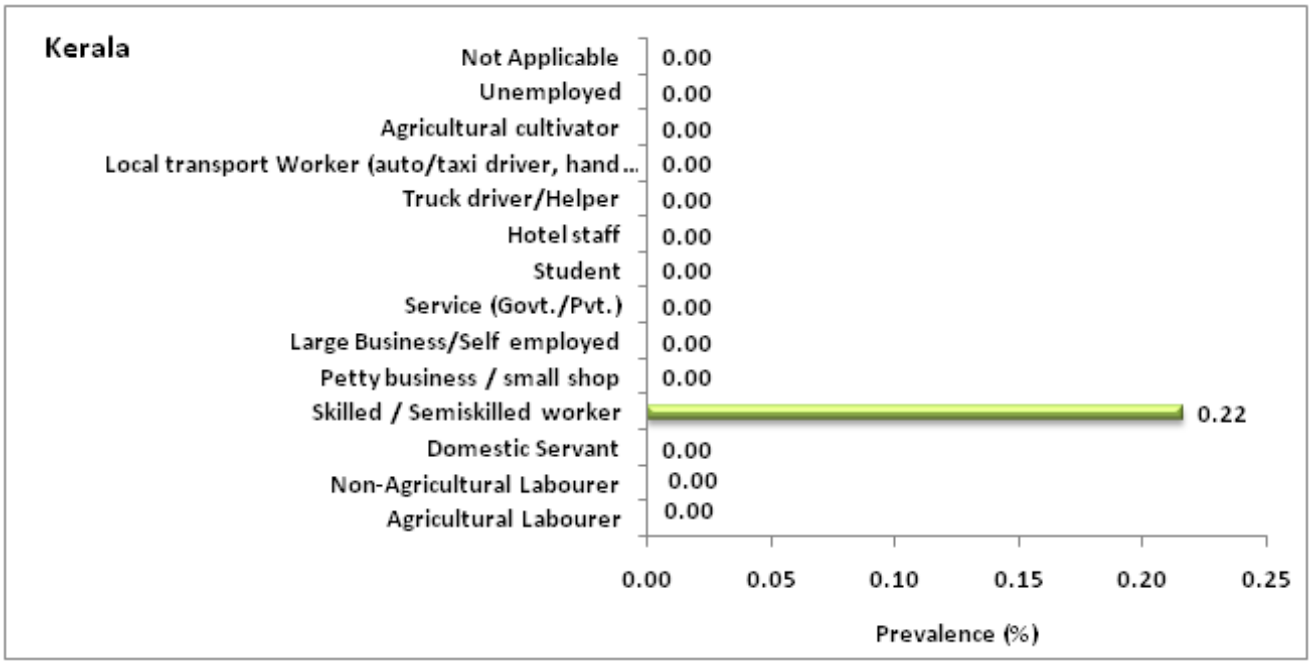


Table 28: HIV Prevalence among ANC Clinic Attendees by Current Occupation of Spouse, HSS 2016-17

State/District	Agricultural Labourer		Non-Agricultural Labourer		Domestic Servant		Skilled / Semiskilled worker		Petty business / small shop		Large Business/Self employed		Service (Govt./Pvt.)		Student		Hotel staff		Truck driver/Helper		Local transport Worker		Agricultural cultivator/		Unemployed		Not Applicable	
	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N
Kerala	**0.00**	**199**	**0.00**	**1109**	**0.00**	**3**	**0.22**	**1384**	**0.00**	**436**	**0.00**	**166**	**0.00**	**1415**	**0.00**	**1**	**0.00**	**101**	**0.00**	**104**	**0.00**	**655**	**0.00**	**8**	**0.00**	**7**	**0.00**	**6**
Alappuzha			0.00	31			0.00	94	0.00	35	0.00	6	0.00	162	0.00	1	0.00	8	0.00	12	0.00	50						
Ernakulam	0.00	1	0.00	1			0.00	9	0.00	25	0.00	41	0.00	306			0.00	11	0.00	1	0.00	4					0.00	1
Idukki	0.00	10	0.00	52			0.00	138	0.00	34	0.00	1	0.00	72			0.00	17			0.00	73	0.00	2			0.00	1
Kannur			0.00	3	0.00	3	0.82	243	0.00	21	0.00	2	0.00	65			0.00	5	0.00	3	0.00	53			0.00	1		
Kasaragod	0.00	4	0.00	266			0.00	20	0.00	6	0.00	15	0.00	31			0.00	12	0.00	2	0.00	42			0.00	1	0.00	1
Kollam	0.00	2	0.00	65			0.00	157	0.00	20			0.00	99			0.00	1	0.00	46	0.00	10						
Kottayam	0.00	6	0.00	61			0.00	137	0.00	21			0.00	94			0.00	7			0.00	74						
Kozhikode	0.00	1	0.00	4			0.00	29	0.00	81	0.00	53	0.00	216			0.00	4	0.00	2	0.00	6	0.00	2	0.00	1		
Malappuram	0.00	2	0.00	182			0.00	46	0.00	47	0.00	2	0.00	49			0.00	6	0.00	26	0.00	36	0.00	1	0.00	3		
Palakkad	0.00	95	0.00	17			0.00	92	0.00	57	0.00	4	0.00	52			0.00	4	0.00	5	0.00	67	0.00	2			0.00	2
Pthanamthitta	0.00	62	0.00	86			0.00	59	0.00	36	0.00	7	0.00	51			0.00	16			0.00	83						
Thiruvananthapuram			0.00	91			0.00	74	0.00	13	0.00	20	0.00	127			0.00	9	0.00	2	0.00	62	0.00	1	0.00	1		
Thrissur			0.00	35			0.44	229	0.00	16	0.00	3	0.00	48					0.00	5	0.00	64						
wayanad	0.00	16	0.00	215			0.00	57	0.00	24	0.00	12	0.00	43			0.00	1			0.00	31					0.00	1

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

Figure 25: HIV Prevalence among ANC Clinic Attendees by Migration status of Spouse, HSS 2016-17

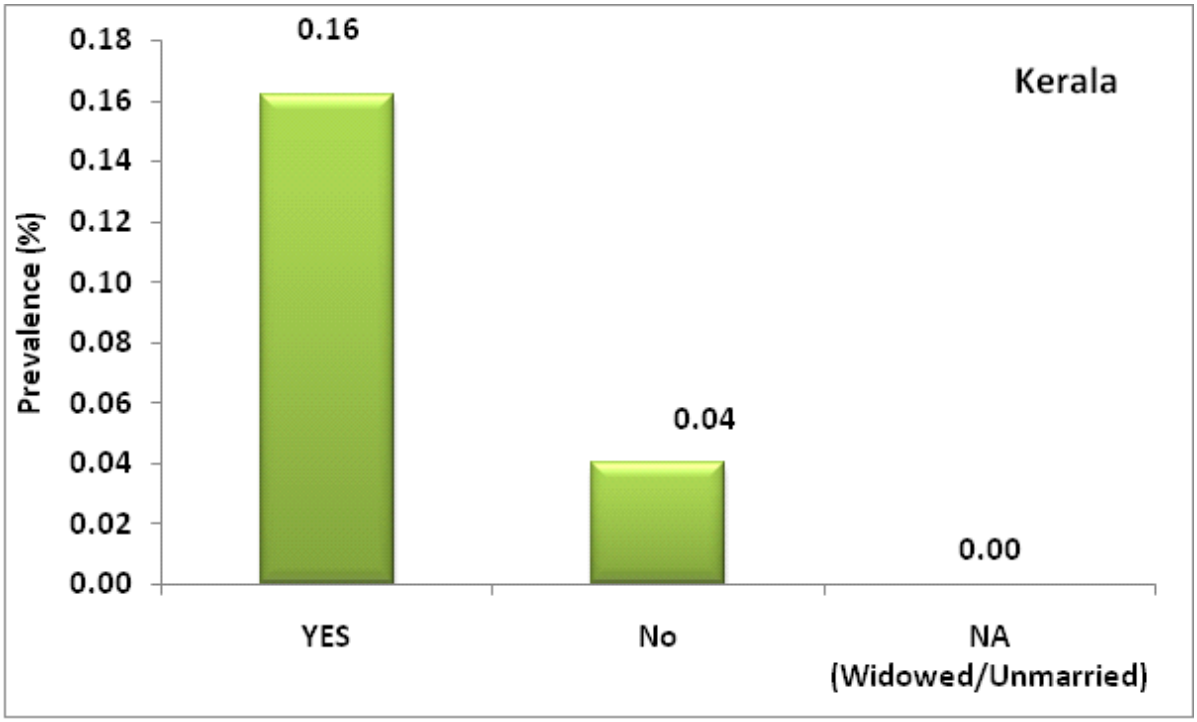


Table 29: HIV Prevalence among ANC Clinic Attendees by Migration status of Spouse, HSS 2016-17

State/District	Yes		No		Not Applicable		Grand Total
	%	N	%	N	%	N	
Kerala	**0.16**	**618**	**0.04**	**4967**	**0.00**	**6**	**5591**
Alappuzha	0.00	54	0.00	346			400
Ernakulam	0.00	35	0.00	364	0.00	1	400
Idukki	0.00	10	0.00	389	0.00	1	400
Kannur	1.67	60	0.29	339			399
Kasaragod	0.00	2	0.00	397	0.00	1	400
Kollam	0.00	78	0.00	322			400
Kottayam	0.00	18	0.00	382			400
Kozhikode	0.00	134	0.00	264			398
Malappuram	0.00	47	0.00	353			400
Palakkad	0.00	16	0.00	376	0.00	2	394
Pthanamthitta	0.00	33	0.00	367			400
Thiruvananthapuram	0.00	41	0.00	359			400
Thrissur	0.00	27	0.27	373			400
wayanad	0.00	63	0.00	336	0.00	1	400

Chapter 6.

HIV Prevalence trend among ANC clinic attendees

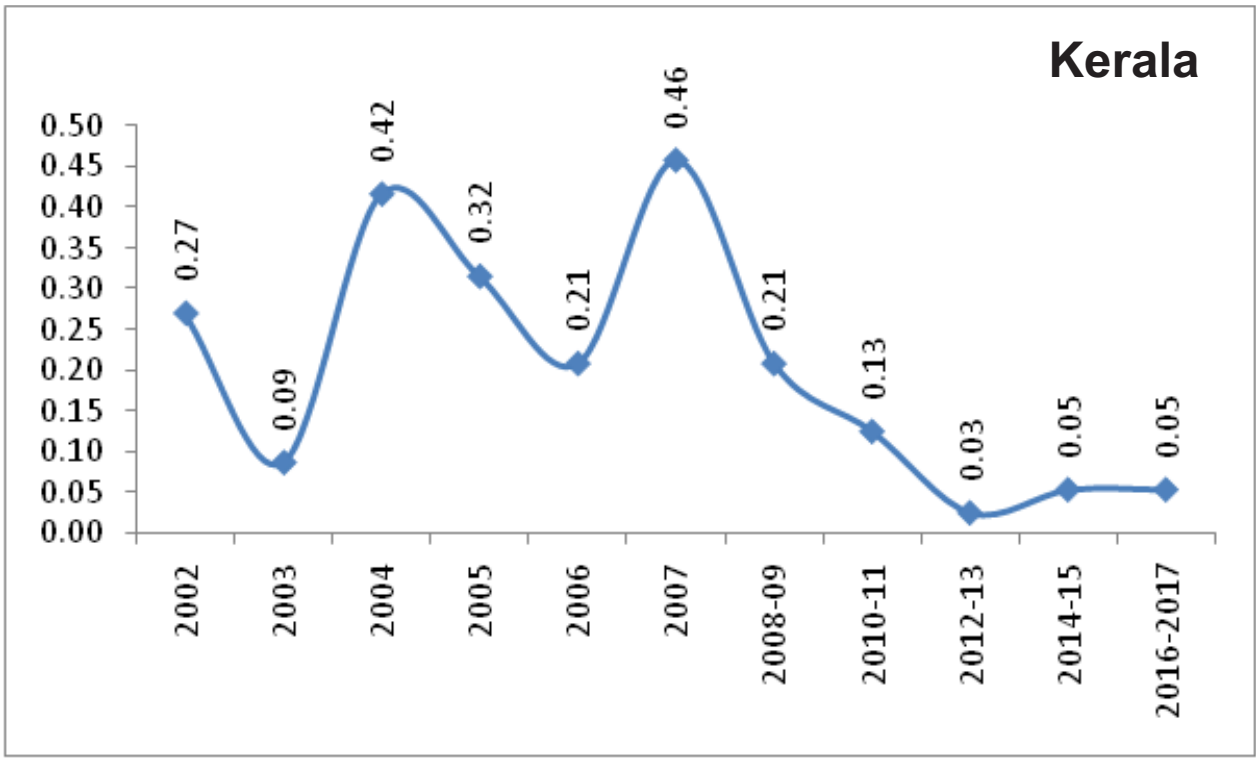
6.1 HIV Prevalence trend at State and District Level

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 2002-2017 using moving average technique.

Figure 26: HIV prevalence trend at Kerala



6.2 HIV Prevalence trend at district level

Figure 27

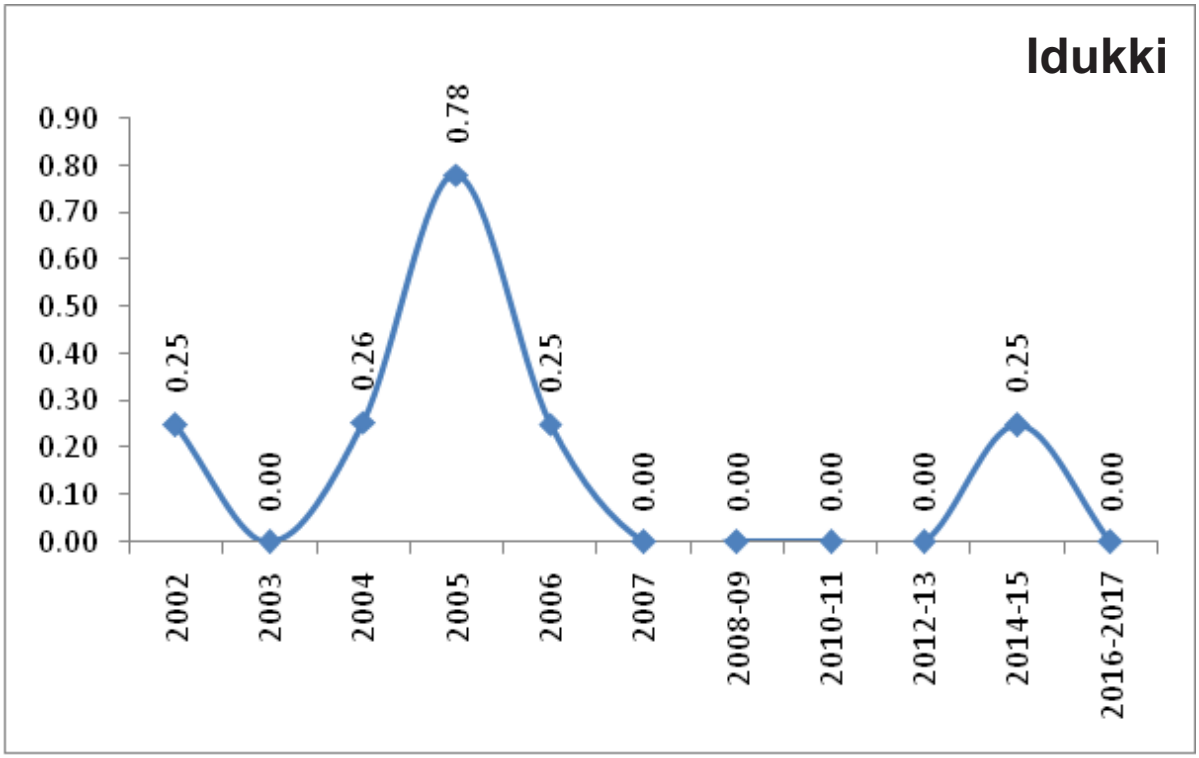


Figure 28

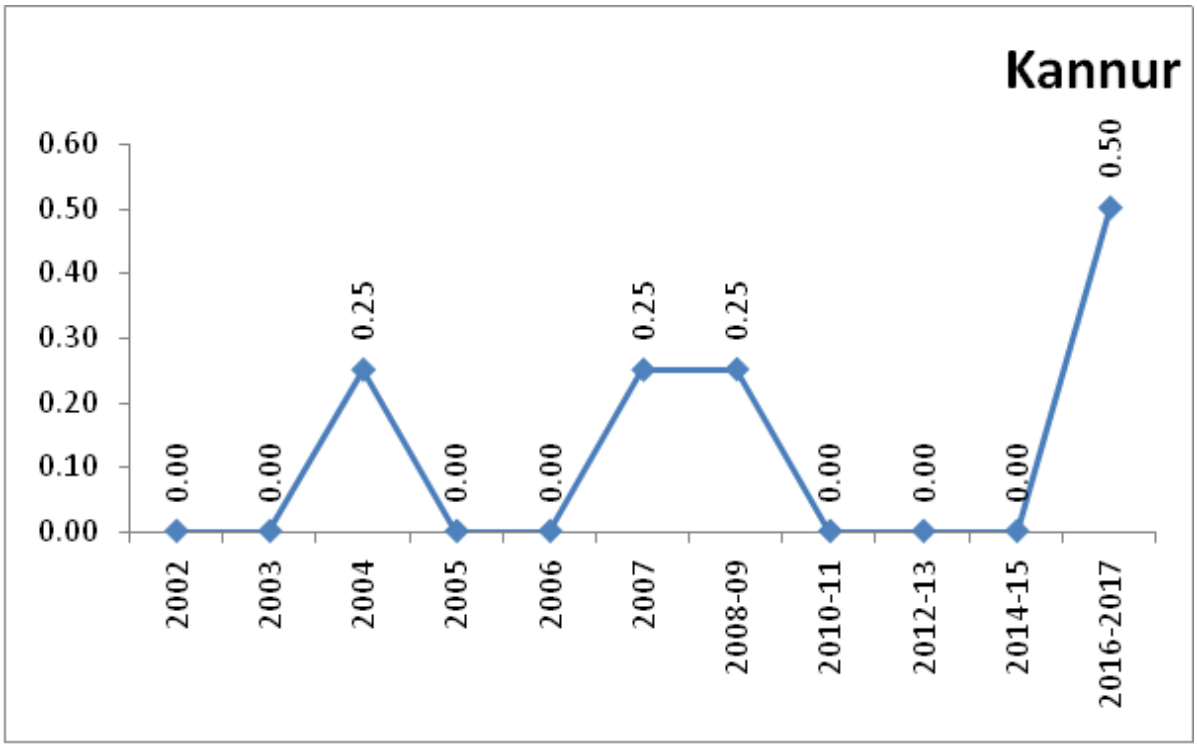


Figure 29

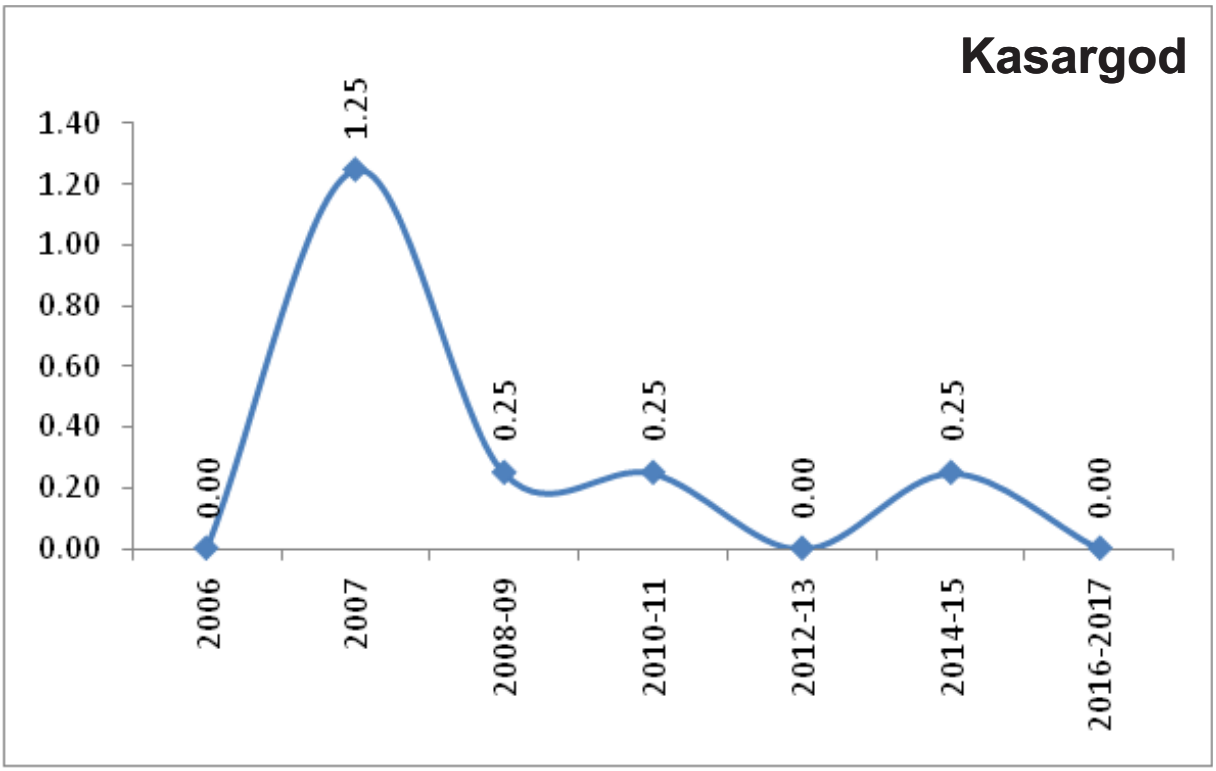


Figure 30

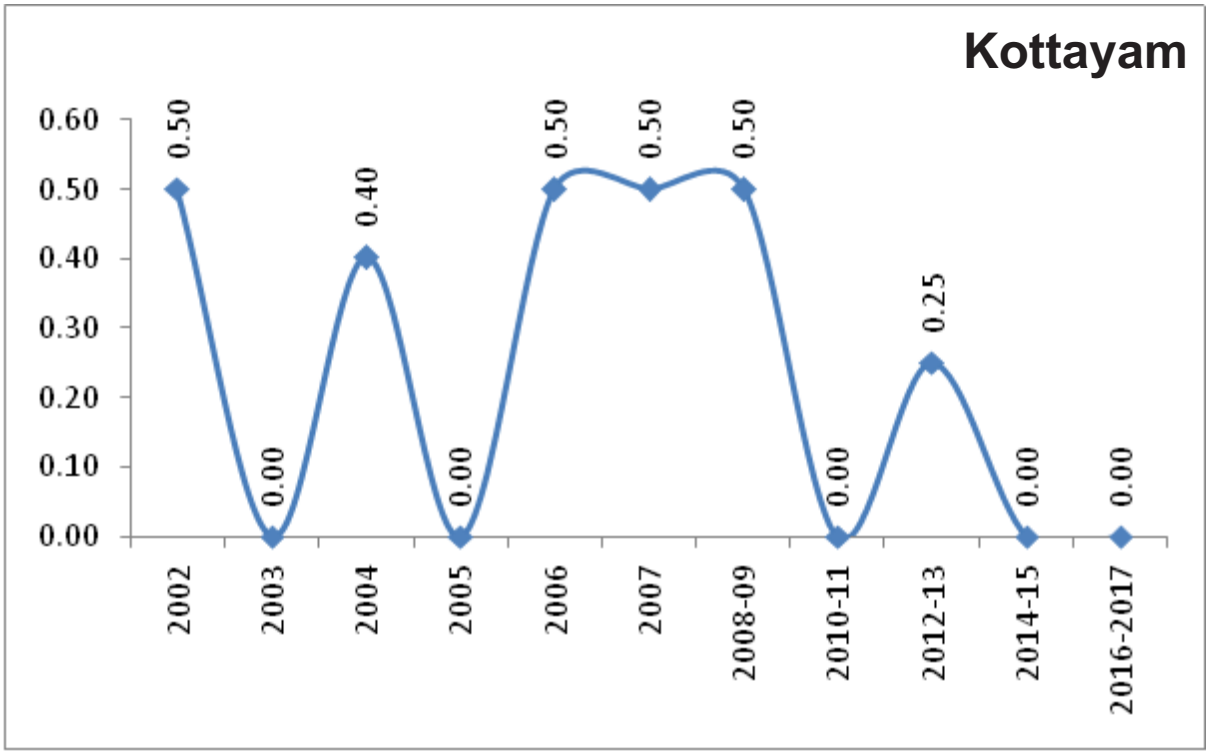


Figure 31

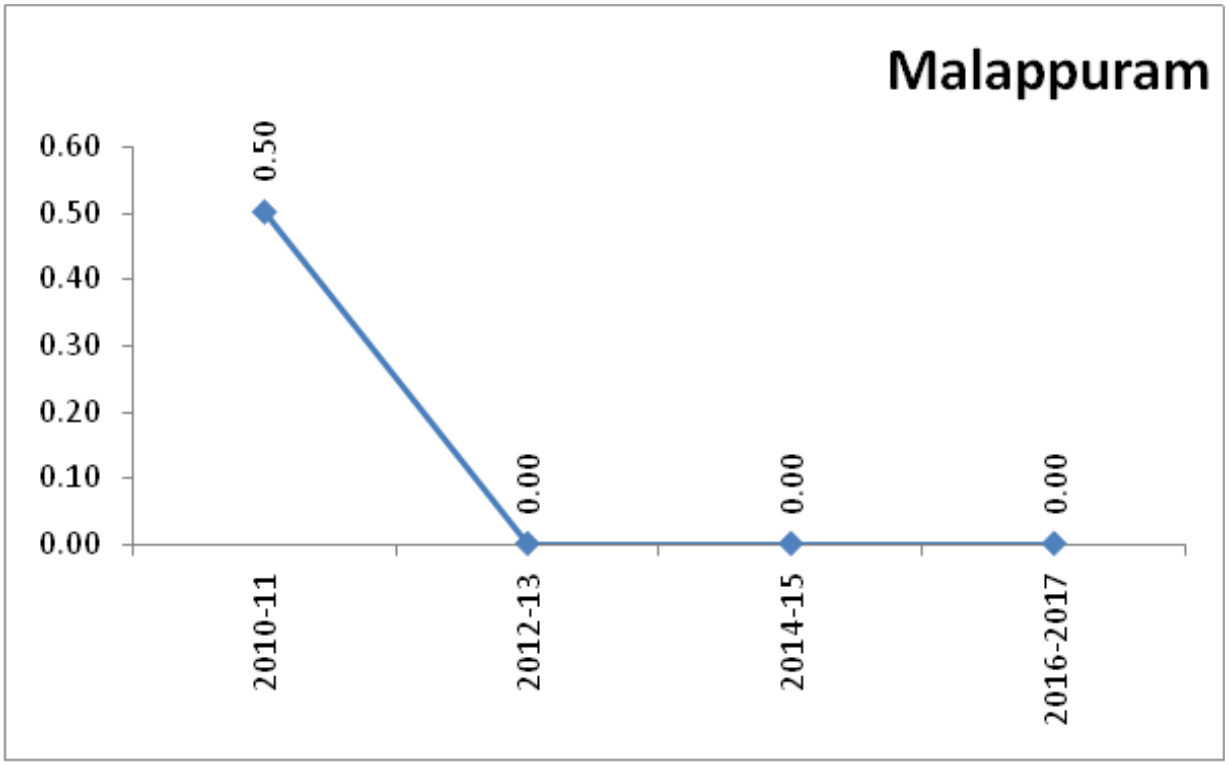


Figure 32

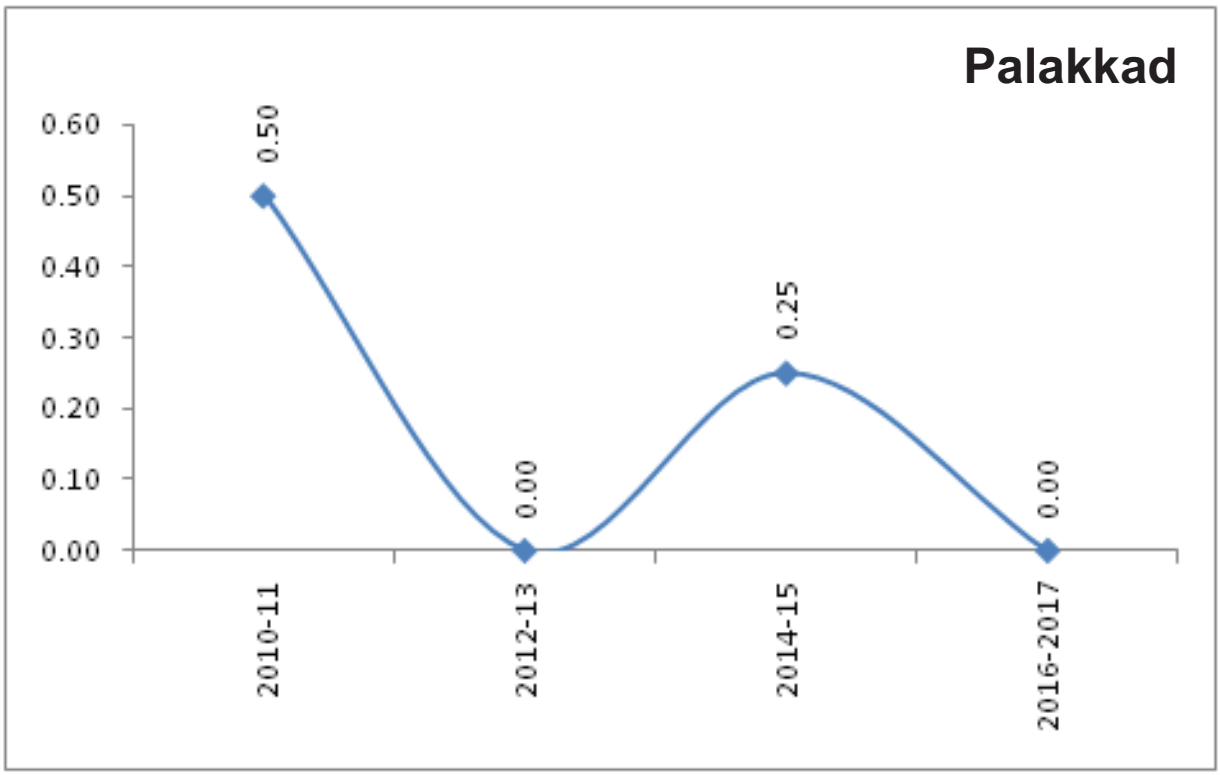


Figure 33

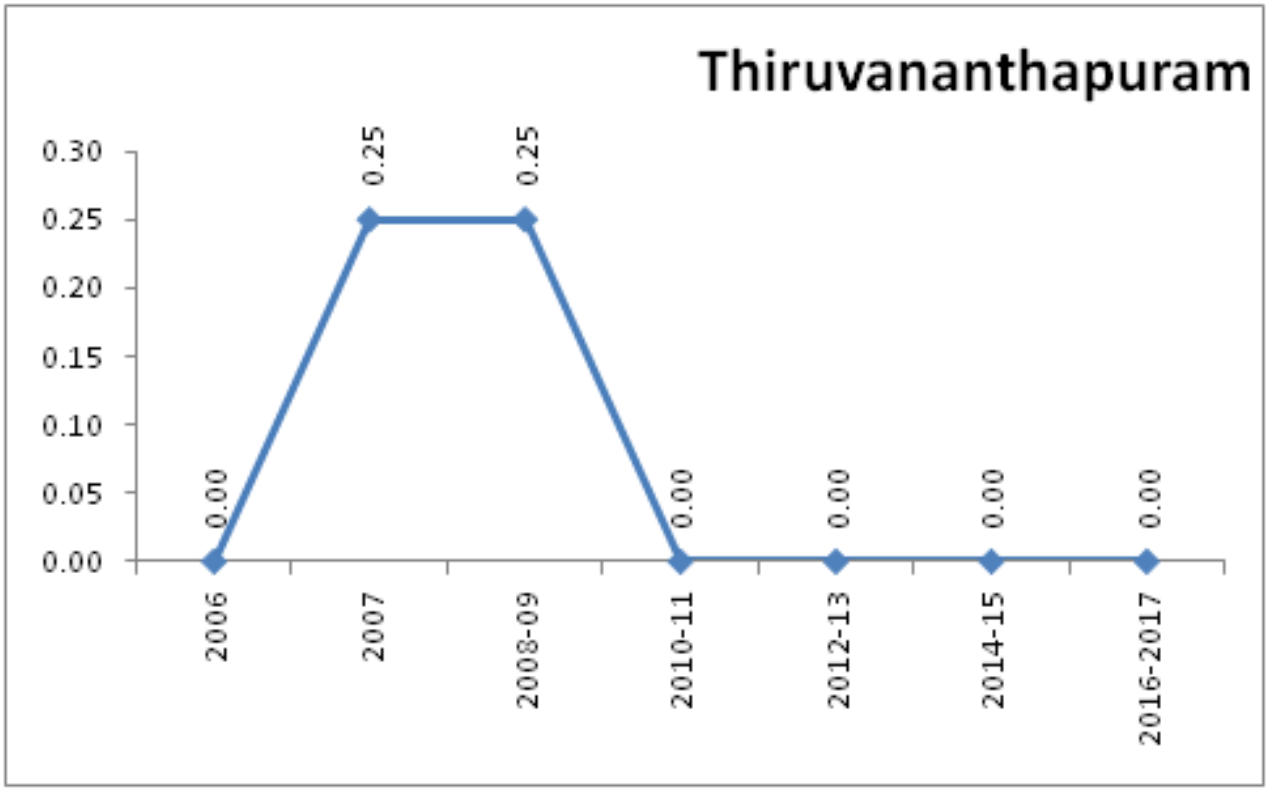
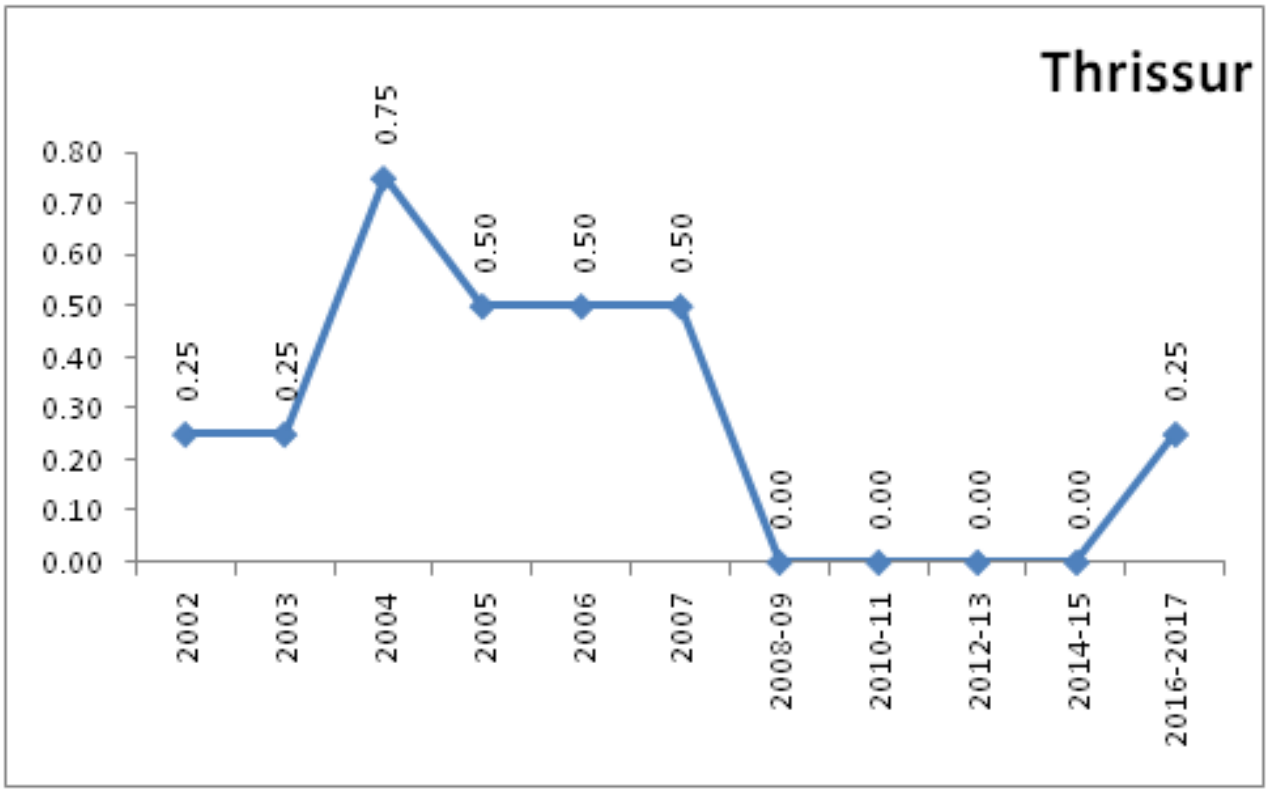


Figure 34



Chapter 7

Summary

- The total sample of ANC analyzed was 5599 across 14 districts in Kerala. The median age of respondents were 26 years in the state and ranged between 15 and 49 years across different districts.
- State level HIV prevalence among ANC respondents (n=5599) was 0.05%.
- HIV Prevalence among the age group of 25-34 was 0.1%, whereas remaining age groups (15-24, 35-44, 45-49) showed zero prevalence at the state level.
- The proportion of illiterate ANC was 0.6% at the state level and the HIV prevalence among them was zero percent. Whereas high prevalence of HIV (1.43%) was reported in the category of literate and till 5th standard.
- Majority of the respondents (58.9%) were falls under the category of 11th to graduation. HIV prevalence among them was zero percent.
- At the state level, 41.7% of the respondents reported being pregnant for the first time and 39.1% of respondents were reported as second time pregnancy.
- The state level HIV prevalence among ANC clinic attendees in primi-gravida was 0.0%, second gravida was 0.05%, third gravida was 0.13% and in fourth gravida it was 0.36%.
- At the state level, 46.4% of the respondents belonged to the First trimester followed by 28.9% were belonged to the second trimester and 24.7% of respondents were belonged to the Third trimester.
- Highest HIV prevalence (0.14%) was seen in respondents with Third trimester.
- At the state level, 40.7% of the respondents reported that they received ANC services during their current pregnancy.
- Self-referral was identified as the major source of referral to ANC clinics, accounting for 68% of respondents, followed by family/relatives/neighbour/friends (17.6%). Only close to 8.8% had been referred by Government hospital/ANM/ASHA at the state level. Private service providers accounted for 5.5% off referrals totally.
- Highest HIV prevalence (0.10%) was seen in people referred by family/relatives/neighbour/friends and 0.05% of HIV prevalence was seen in people those who were reported as Self-referral.
- At the state level, 75.5% of respondents reported to be currently residing in rural areas.
- The HIV Prevalence in Urban was 0.07% and Rural was calculated as 0.05%.
- At the state level, the majority of the respondents (86.7%) were housewives. 54.3% were tested before current pregnancy.
- At state level, 0.06% of HIV prevalence was seen among the pregnant mothers whose occupations were reported as Housewives category.
- At the state level, the spouses of ANC attendees accounting for 25.3% were in service (Govt./Pvt.) and 24.7% were skilled/semi skilled worker. HIV prevalence among the ANC attendees was calculated as 0.22% in spouses with skilled/semi skilled worker category.
- At the state level, 11.1% of respondents reported that their spouses were migrants. HIV Prevalence among migrant was 0.16% and among non-migrants was 0.04%.
- At the state level, 45.7% of respondents were tested for HIV during current pregnancy whereas, 54.3% were tested before current pregnancy.

Annexure 1 Sitewise HIV Prevalence in Kerala from the year 2002-2017

S.No.	State	District_name	Site_Type	Sentinel Site	2002 (%)	2003 (%)	2004 (%)	2005 (%)	2006 (%)	2007 (%)	2008-09 (%)	2010-11 (%)	2012-13 (%)	2014-15 (%)	2016-2017 (%)
1	Kerala	Alappuzha	ANC	W & C Hospital Alappuzha (New 15)										0.00	0.00
2	Kerala	Ernakulam	ANC	Lekshmi HospitalPVT (New10)								0.00	0.00	0.00	0.00
3	Kerala	Idukki	ANC	Thodupuzha_Taluk Hospital	0.25	0.00	0.26	0.78	0.25	0.00	0.00	0.00	0.00	0.25	0.00
4	Kerala	Kannur	ANC	MCH Kannur / Kannur_District Hospital	0.00	0.00	0.25	0.00	0.00	0.25	0.25	0.00	0.00	0.00	0.50
5	Kerala	Kannur	ANC(R)	Thaliparamba, Kannur		0.00									
6	Kerala	Kasargod	ANC	THQ Hospital,Kasargode					0.00	1.25	0.25	0.25	0.00	0.25	0.00
7	Kerala	Kollam	ANC	Govt.Victoria Hospital (New 15)										0.00	0.00
8	Kerala	Kottayam	ANC	Kottayam_Medical College Hospital	0.50	0.00	0.40	0.00	0.50	0.50	0.50	0.00	0.25	0.00	0.00
9	Kerala	Kottayam	ANC(R)	Kajirapally, Kottayam		0.00									
10	Kerala	Kozhikode	ANC	Baby Memorial Hospital PVT (New10)								0.00	0.00	0.00	0.00
11	Kerala	Malappuram	ANC	THQH Nilambur (New10)								0.50	0.00	0.00	0.00
12	Kerala	Palakkad	ANC	DH Palakkad (New10)								0.50	0.00	0.25	0.00
13	Kerala	Pthanamthitta	ANC	District Hospital Kozhencherry (New 15)										0.00	0.00
14	Kerala	Thiruvananthapuram	ANC	W&C Hospital, Thycaud, Thiruvananthapuram					0.00	0.25	0.25	0.00	0.00	0.00	0.00
15	Kerala	Thrissur	ANC	Thrissur_Medical College Hospital	0.25	0.50	0.75	0.50	0.50	0.50	0.00	0.00	0.00	0.00	0.25
16	Kerala	Thrissur	ANC(R)	Kodungalloor, Thrissur		0.00									
17	kerala	wayanad	ANC	District Hospital Mananthawady(New 15)										0.00	0.00

National Institute of Epidemiology (ICMR)
R 127, 3rd Avenue, Second Main Road,
Tamil Nadu Housing Board, Ayapakkam,
Near Ambattur, Chennai, Tamil Nadu 600077