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Ministry of Health & Family Welfare
Government of India

# Technical Report

# HIV

## Sentinel Surveillance Plus 2023

## Antenatal Clinic Attendees

**National AIDS Control Organization**
**And**
**All India Institute of Medical Sciences, New Delhi**

Ministry of Health & Family Welfare, Government of India

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GoI/NACO/Surveillance & Epidemiology/HIV Sentinel Surveillance Plus 2023:ANC Sites/09092024

सत्यमेव जयते


वी. हेकाली झिमोमी, भा.प्र.से.
अपर सचिव एवं महानिदेशक
**V. Hekali Zhimomi, IAS**
**Additional Secretary & Director General**


आज़ादी का अमृत महोत्सव


राष्ट्रीय एड्स नियंत्रण संगठन
स्वास्थ्य और परिवार कल्याण मंत्रालय
भारत सरकार
**National AIDS Control Organisation**
**Ministry of Health & Family Welfare**
**Government of India**


## Foreword

HIV epidemic in India is extremely diverse with each State having their own drivers of the epidemic. In certain States, the epidemic is primarily fuelled by unsafe injecting practices, while in others, the sexual route—particularly heterosexual route—remains the main transmission route. In some States, a combination of unsafe injecting and sexual practices propel the epidemic.

Regardless of the transmission route, sentinel surveillance among pregnant women attending antenatal clinics has been used to monitor the levels and trends of HIV in the general population. The WHO and UNAIDS classify an HIV epidemic as "generalized" when the prevalence among pregnant women is consistently at 1% or higher. Within this framework, HIV sentinel surveillance among pregnant women has been core for monitoring the level and trends of the HIV epidemic under the national AIDS and STD Control Programme in India since 1998.

The 18th round of HIV Sentinel Surveillance (HSS) among pregnant women was implemented in 2023 at 889 sites across 690 districts in 35 States/Union Territories (UTs) of India. Approximately 3.51 lakh bio-behavioural samples were collected with an overall national HIV prevalence of 0.23%. The north-eastern States of Mizoram, Meghalaya, Nagaland, and Tripura continue to show significantly higher prevalence rates compared to the rest of India. In Assam, HIV sero-prevalence for 2023 (0.24%) has nearly doubled from the prevalence recorded in 2021. High syphilis sero-positivity observed in Arunachal Pradesh (0.52%), Madhya Pradesh (0.31%), Manipur (2.68%), Meghalaya (2.01%), Odisha (0.30%), Sikkim (0.33%), and Uttarakhand (0.33%) indicates prevalence of high-risk behaviour.

Findings from 2023 round of HIV sentinel surveillance demonstrate that there is no place for complacency in the national response for the HIV/AIDS epidemic. Some states have established HIV epidemic among the general population, while others are witnessing rapid spread. I am confident that the evidence and insights provided in this report will be utilised by all stakeholders to achieve Sustainable Development Goal 3.3 of ending the epidemic of AIDS as a public health threat by 2030.

(V. HEKALI ZHIMOMI)


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## Message

The HIV Sentinel Surveillance (HSS) in India, the most extensive survey across the globe, not only provides the prevalence and trend of HIV at National and State levels but also provides information regarding service uptake, behaviours and impact assessment. It has been the mainstay of epidemic monitoring among ANC, High Risk Group and Bridge population under the National AIDS and STD Control Programme (NACP).

HIV Sentinel Surveillance (HSS) was started in India to monitor the spread of disease in different population subgroups in 1998 at total 176 sites which included 92 Antenatal Care Clinic (ANC) sites. The 18$^{th}$ round of the HIV Sentinel Surveillance (HSS) among pregnant women was meticulously implemented at 889 sites spread across 690 districts in 35 States/Union Territories (UTs) of India. HSS has been evolving gradually and for the 18$^{th}$ round of HSS Plus a few enhancements have been made to the already existing methodology with the inclusion of TPHA followed by RPR, allowing more accurate estimates of syphilis.

I would like to acknowledge the contribution of the Ministry of Health and Family Welfare (MOHFW), National AIDS Control Organisation (NACO) team, which has been ably led by Dr. Chinmoyee Das and Dr. Pradeep Kumar, and guided by the technical expertise of Dr. D. C. S. Reddy, Late Dr. Arvind Pandey and Dr. Shashi Kant. I would also like to acknowledge the contribution of the National Institute (NI), all the Regional Institutes (RIs), all the State AIDS Control Societies (SACS), the entire field teams and the associated HSS testing laboratories for their support in effectively implementing this round of HSS.

The findings from this report will offers detailed evidence of the socio demographic and behavioural characteristics related to HIV/ AIDS epidemic, as well as syphilis, which have critical policy implication. It will be instrumental in strengthening the HIV/AIDS response in India and to meet the targets of the programme in the future. It will also aid in planning services and allocating resources.

I extend my appreciation to all the stakeholders involved for the successful conduction of this round of HSS and timely publication of this technical report.

[Sanjay K. Rai]

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## Acknowledgement

The 18th round of HIV Sentinel Surveillance (HSS) was implemented at 889 sentinel sites among pregnant women in the year 2023 by National AIDS Control Organization (NACO) under the Ministry of Health and Family Welfare, Government of India. NACO extends its gratitude to all stakeholders for their invaluable support and timely efforts in ensuring the successful implementation of this surveillance round.

Leadership to the surveillance and epidemiology under NACP is provided by Ms V. Hekali Zhimomi (Addl. Secretary & DG, NACO, MoHFW, GoI), Dr. Sanjay Mehendale (Former Addl. DG, ICMR and Co-Chair, TRG-S&E) and Shri Nikhil Gajraj (Joint Secretary, NACO, MoHFW, GoI). We place on record our sincere gratitude to the leadership for their continuous advice and support, enabling a continuously evolving system. NACP's Technical Working Group (S&E), under the Chairpersonship of Dr. DCS Reddy (Former HoD, Community Medicine, BHU, UP), and Co-Chairpersonship of Dr. Shobini Rajan (CMO-SAG, NACO) was instrumental in reviewing and recommending the method and findings of the 2023 round. Late Prof. Arvind Pandey (Former Director, ICMR NIMS, New Delhi), Dr. Shashi Kant (Former Head, CCM, AIIMS, New Delhi), and Dr Sanjay Kumar Rai (Focal Person, National Institute for NACO's S&E, AIIMS New Delhi) provided critical inputs and technical guidance in all phases since conceptualization till publication of results and beyond.

Programmatic context for the exercise and valuable insights provided by Dr. Anoop Kumar Puri (DDG, NACO), Dr. Uday Bhanu Das (Sr. CMO-SAG, NACO), Dr. Shobini Rajan (CMO-SAG, NACO), Dr. Bhawani Singh Kushwaha (Deputy Director, NACO), and Dr. Sai Prasad Bhavsar (Deputy Director, NACO) have been critical in completion of the activity. As the role of laboratories evolved significantly since 2021 round; contribution of Dr. Bhawna Rao (DD, NACO) and Dr Shivali Kamal (NACO) in completion of the activity is acknowledged. Dr Pradeep Kumar (NACO) anchored the implementation of the 18th round of HSS among pregnant women and developed this technical report with support from Dr Subrata Biswas (NACO) and Dr Nidhi Priyam (NACO). Ms Shreena Ramanathan and Mr Lalit KS. Kharyat (Technical Experts) reviewed the data to ensure accuracy.

During the process, HIV Surveillance team at AIIMS, New Delhi (Dr. Sanjay K. Rai, Dr. Shreya Jha, Mr. Nishakar Thakur), ICMR-NITVAR (Dr. Sheela Godbole, Dr. Rashmi Sindhe, Dr. Garima Meena), ICMR-NIE (Dr. A. Elangovan, Dr. Santhakumar Aridoss), ICMR-NIRBI (Dr. Shanta Dutta, Dr. Alok K. Deb, Ms Piyali Ghosh, Mr Pankaj Kumar Khan), PGIMER (Dr. P.V.M. Lakshmi, Dr. Chandrakanta, Dr Shivani), RIMS (Dr. H. Sanayaima Devi, Dr. Tamphasana, Mr Rishikesh), ICMR NIRDHDS (Dr H K Chaturvedi, Dr Vishal Deo, Dr Barnali Deka), AIIMS Bhubaneswar (Dr Arvind Kumar Singh, Dr Subhakanta Sahu, Dr Hrushikesh Das), and AIIMS Jodhpur (Dr Pankaj Bhardwaj, Dr Vibha Joshi) shared field experiences, critically reviewed the documents, tools and technical report towards their finalization, led the regional training and supervision and guided State training. Dr Sandhya Kabra, Dr Partha Rakshit and Dr Hema Gogia (National Programme for Surveillance of Viral Hepatitis, MoHFW, GoI) provided inputs on Hepatitis B and Hepatitis C-related aspects.

The SIMU team at SACS under the leadership of their Project Directors coordinated with all stakeholders ensuring successful and smooth implementation, led the site-level training, arranged required consumables for HSS sites and designated testing laboratories and took leadership for trouble shootings of various operational aspects at the State level. NACO acknowledges the contribution of Project Directors of SACS, Prison authority, State HSS focal persons, Apex laboratory at ICMR NARI, Pune (Dr Ashwini Shete and Ms Varsha Kale), Central Team Members (CTM), State Supervisory Team Members (SST) and all stakeholders in the successful implementation of the 3rd round of HSS Plus among prison inmates.

Last but not the least, the credit for successful implementation goes to our Prison site personnel and designated HSS testing laboratories for timely completion of this activity, while adhering to best possible quality standards. NACO sincerely thanks all the field personnel engaged in this activity for their contribution in implementing the 2023 round of HSS among prison inmates.

(Dr. Chinmoyee Das)

# Contents

## ABBREVIATIONS

| | |
|---|---|
| **AIDS** | Acquired Immuno-Deficiency Syndrome |
| **AIIMS** | All India Institute of Medical Sciences |
| **ANC** | Antenatal Clinic |
| **ART** | Anti-Retroviral Therapy |
| **BMW** | Bio-Medical Waste |
| **BP** | Bridge Population |
| **CI** | Confidence Interval |
| **COE** | Centre of Excellence |
| **DAPCU** | District AIDS Prevention and Control Unit |
| **DFTS** | Data Form Transportation Sheet |
| **EC** | Ethics Committee |
| **EQAS** | External Quality Assurance System |
| **FSW** | Female Sex Worker |
| **HBV** | Hepatitis B Virus |
| **HCTS** | HIV Counselling and Testing Services |
| **HCV** | Hepatitis C Virus |
| **HRI** | High Risk Individuals |
| **HIV** | Human Immuno-deficiency Virus |
| **HRG** | High Risk Group |
| **HSS** | HIV Sentinel Surveillance |
| **H/TG** | Hijra/ Transgender people |
| **IBBS** | Integrated Biological and Behavioural Surveillance |
| **ICMR** | Indian Council of Medical Research |
| **ICTC** | Integrated Counselling and Testing Centre |
| **ICF** | Informed Consent Form |
| **IDU** | Injecting Drug User |
| **ILC** | Inter Laboratory Comparison |
| **LAT** | Linked Anonymous Testing |
| **LT** | Laboratory Technician |
| **LDT** | Long Distance Trucker |

| | |
|---|---|
| **M&S** | Monitoring and Supervision |
| **MSM** | Men Who Have Sex with Men |
| **NACO** | National AIDS Control Organization |
| **NACP** | National AIDS & STD Control Programme |
| **NGO** | Non-Governmental Organization |
| **NI** | National Institute |
| **NIE** | National Institute of Epidemiology |
| **NIRBI** | National Institute for Research in Bacterial Infections |
| **NIRDHDS** | National Institute for Research in Digital Health and Data Science |
| **NITVAR** | National Institute of Translational Virology and AIDS Research |
| **NRL** | National Reference Laboratory |
| **NSP** | National Strategic Plan |
| **PGIMER** | Post Graduate Institute of Medical Education and Research |
| **PIS** | Participant Information Sheet |
| **PrEP** | Pre-Exposure Prophylaxis |
| **RI** | Regional Institute |
| **RIMS** | Regional Institute of Medical Sciences |
| **RPR** | Rapid Plasma Reagin |
| **SACS** | State AIDS Control Society |
| **S &D** | Stigma & Discrimination |
| **SIMS** | Strategic Information Management System |
| **SMM** | Single Male Migrant |
| **SOP** | Standard Operating Procedure |
| **SRL** | State Reference Laboratory |
| **STD** | Sexually Transmitted Disease |
| **STI** | Sexually Transmitted Infection |
| **STS** | Sample Transportation Sheet |
| **TI** | Targeted Intervention |
| **TRG** | Technical Resource Group |
| **TWG** | Technical Working Group |
| **UNAIDS** | Joint United Nations Programme on HIV and AIDS |
| **UT** | Union Territory |

## EXECUTIVE SUMMARY

The HIV surveillance, initiated in 1985, has evolved over the years as one of the most fundamental strategic information functions, facilitating evidence-based decision-making under the National AIDS and STD Control Programme (NACP) of the Government of India. The 18th round of HIV Sentinel Surveillance (HSS) among pregnant women was implemented during 2023 at 889 sites spread across 690 districts in 35 States/Union Territories (UTs) of India. This represents an expansion from the 17th round of HSS, which covered 856 sites in 659 districts in 2021. The methodology remained the same as that in earlier rounds with few enhancements, i.e., inclusion of informed consent for all ANC attendees, and inclusion of treponemal test followed by RPR to get more accurate estimates of syphilis prevalence among pregnant women. The bio-specimen collected from eligible and consenting pregnant women were tested for four biomarkers: HIV, Syphilis, Hepatitis B Virus (HBV), and Hepatitis C Virus (HCV).

Overall, around 3.51 lakh bio-behavioural samples were collected. The majority of the respondents (77.4%) were in the age group of 20-29 years, while around 7.3% were aged 15-19 years old. Most (around 93.5%) were literate, with two-fifths (42.3%) having more than 10 years of education. Almost two-thirds (66.5%) of total respondents in HSS 2023 reported to residing in rural areas. Around 5.6% of the total respondents reported their spouse/partner resided alone in another place/town for work for a period longer than six months in past one year. The demographic and social profiles of the respondents varied significantly by States/UTs.

Nationally, among the pregnant women, the weighted HIV prevalence was 0.23% (95% CI: 0.21-0.25). HIV prevalence among pregnant women has shown an increasing trend with age, with prevalence among the 35+ years age group almost twice that among the 20-29 years. Moreover, HIV prevalence exhibited an inverse association with education; as education level increased, the prevalence decreased. Higher HIV prevalence was noted among illiterate individuals and those with education up to the 10th standard, while the lowest prevalence was noted among those with post-graduate education (0.08%). HIV prevalence was at 0.24% among pregnant women residing in urban areas compared to 0.21% among those in rural areas. Pregnant women with spouses working as truck drivers/helpers also had a higher prevalence. Additionally, HIV prevalence was higher among pregnant women with migrant spouses compared to those with non-migrant spouses.

HIV prevalence of 1% or more was noted at 44 sites spread across 43 districts of the country, marking the lowest occurrence since 2003. In Karnataka, eight districts had at least one site reporting HIV prevalence of 1% or more, followed by five in Maharashtra, four in Nagaland, and three each in Odisha, Telangana, and Uttar Pradesh. The highest HIV prevalence was noted in state of Mizoram [0.63%, 95% CI: 0.39-0.86], followed by Meghalaya [0.58%, 95% CI: 0.36-0.80], Karnataka [0.57%, 95% CI: 0.48-0.67], Nagaland [0.51%, 95% CI: 0.30-0.72], Tripura [0.43%, 95% CI: 0.19-0.67], Maharashtra [0.36%, 95% CI: 0.30-0.43], Odisha [0.33%, 95% CI: 0.24-0.43], Manipur [0.32%, 95% CI: 0.16-0.47], Telangana [0.32%, 95% CI: 0.23-0.41], and Andhra Pradesh [0.30%, 95% CI: 0.22-0.38].

HIV prevalence continues to show a declining trend nationwide. The decline is mirrored in the southern and western regions, following the national trend. However, concerning is the apparent rise in HIV prevalence among pregnant women in the north-eastern region.

In the central, eastern and northern regions, the HIV prevalence was significantly lower than the national average during 2002-05. While there has been a decline in HIV prevalence in these regions, the rate of decline appears to be relatively slower compared to the southern and western regions.

In this round of HSS, reverse testing algorithm was employed for syphilis detection. Initially, all serum samples underwent treponemal assay. Subsequently, RPR (semiquantitative) testing was conducted on samples that tested positive by TPHA. The TPHA-reactive sero-positivity (weighted) was found to be 0.24% (95% CI: 0.22-0.26) and sero-prevalence of syphilis (TPHA followed by RPR reactive) was 0.11% (95% CI: 0.10-0.12). In terms of co-morbidities/co-infections, the prevalence of HIV-Syphilis (TPHA-reactive) was 0.0091% (95% CI: 0.0060-0.0123), while the sero-prevalence of HIV-HBV was 0.0046%. (95% CI: 0.0023-0.0068). The sero-prevalence of HIV-HCV among pregnant women was noted to be 0.0034% (95% CI:0.0015-0.0053). Among the HIV-positive respondents, the sero-positivity for Syphilis (TPHA-reactive) was 4.06% (95% CI: 2.68-5.44). Furthermore, the sero-prevalence for HBV and HCV among the HIV-positive respondents was 2.03% (95% CI:1.05-3.02) and 1.52% (95% CI:0.67-2.38), respectively.

The HSS Plus 2023 corroborates that the HIV prevalence among pregnant women continues to be low with a declined trend nationally. However, there is no place for complacency as 43 districts across the country had at least one site with HIV prevalence more than 1%. Notably, select states in the north-eastern region exhibited considerably higher HIV prevalence rates compared to the national average with a rising trend. Additionally, states in the north-eastern region reported higher sero-positivity for Syphilis, HBV, and HCV compared to other regions in the country.

The HSS Plus 2023 report presents data on the level and trend of HIV among pregnant women, continuing the methodology from previous rounds. Additionally, it includes the treponemal test followed by RPR to improve the accuracy of syphilis prevalence detection among pregnant women. Notably, since 17$^{th}$ round of HSS, the report has also included data on the current level of co-infection of HBV and HCV among HIV pregnant women. While in-depth analysis of this data will further enhance the insights into the epidemic of HIV, Syphilis, HBV and HCV, the current report provides critical evidence for coordinated actions aimed at delivering holistic and comprehensive care, aligning with the objectives outlined in NACP-Phase V.

# 1. INTRODUCTION

## 1.1 Background

India's response to the HIV/AIDS pandemic dates back to 1985 when sero-surveillance was initiated, leading to the detection of the first case in April 1986. As sero-surveillance efforts expanded, HIV presence was identified in various regions across the country. Responding to the growing concern, the first phase of the National AIDS and STD Control Programme (NACP) was launched in 1992. The primary objective of this initiative was to combat the spread of HIV infection and reduce morbidity, mortality, and the overall impact of HIV/AIDS in the country. Since its inception, the NACP has progressed through four phases of effective implementation, each tailored to address the evolving challenges posed by the HIV/AIDS epidemic in the country. Currently, India is in the midst of the fifth phase of NACP, which commenced on 1st April 2021 and is slated to conclude on 31st March 2026. This phase has been allocated an outlay of Rs. 15471.94 crore, reflecting the governments continued commitment to combating HIV/AIDS through comprehensive strategies and interventions.

The HIV sero-surveillance, initiated in 1985, gradually evolved into HIV Sentinel Surveillance (HSS) under NACP. Initially introduced in 1994, HSS was formally established as an annual surveillance system in 1998. Over time, it has developed into one of the largest and most comprehensive HIV surveillance systems globally, offering valuable insights into the prevalence and trends of HIV, syphilis and related behaviours. The specific objectives of the HSS are mentioned below:

1. To provide the latest status of the level and trend of the HIV epidemic among the surveillance population
2. To provide evidence on the geographical spread of the HIV infection and to identify emerging pockets
3. To provide information for prioritization of programme resources and evaluation of programme impact, and
4. To contribute to the estimation and projection of HIV epidemic at the National, State and District level

The methodology for the 18$^{th}$ round of HSS among ANC clinic attendees remained consistent with the previous rounds, with a few notable enhancements: 1) inclusion of Informed consent for all ANC attendees, 2) inclusion of treponemal test followed by RPR to get more accurate estimates of syphilis prevalence among pregnant women.

This report presents the findings from the 18$^{th}$ round of HSS among pregnant women, conducted during 2023. The round was implemented at 889 sites spread across 690 districts in 35 States/Union Territories (UTs) of India[1]. This is the highest since the inception of HSS under NACP (Figure 1.1). Uttar Pradesh had the highest number of ANC HSS sites (85) in 2023, followed by Tamil Nadu (82), Maharashtra (77), Karnataka (62) and Madhya Pradesh (52). Erstwhile high HIV prevalence States of Tamil Nadu, Karnataka, Andhra Pradesh, and Telangana had almost 25% of total sites in 2023 (Figure 1.2).

[1]No surveillance sites in UT of Lakshadweep.

**Figure 1.1. Expansion of ANC HSS sites in India, 1998-2023**

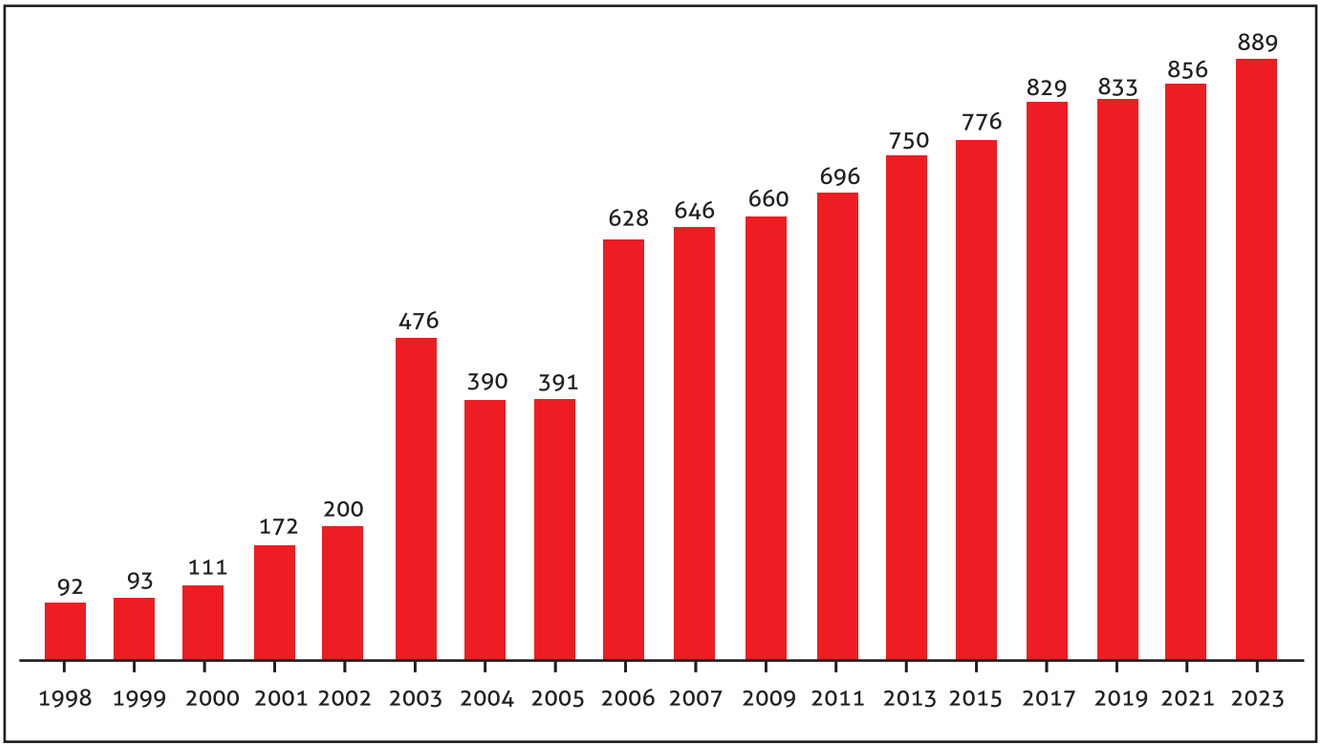
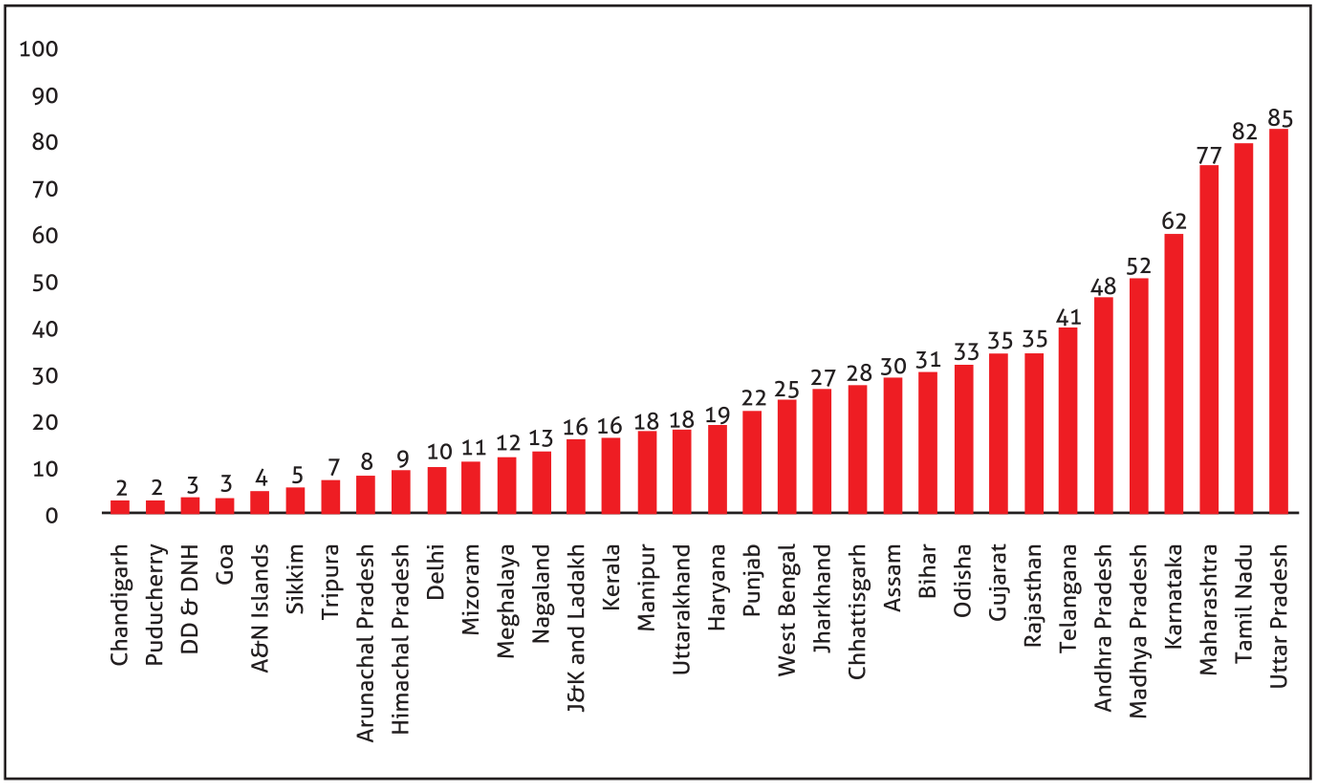



**Figure 1.2. State/UT wise ANC HSS sites 2023[2]**




[2]*A&N Islands is Andaman & Nicobar Islands,* DD&DNH refers to UT of Daman & Diu and Dadra and Nagar Haveli; J&K and Ladakh refers to UTs of Jammu & Kashmir and Ladakh.

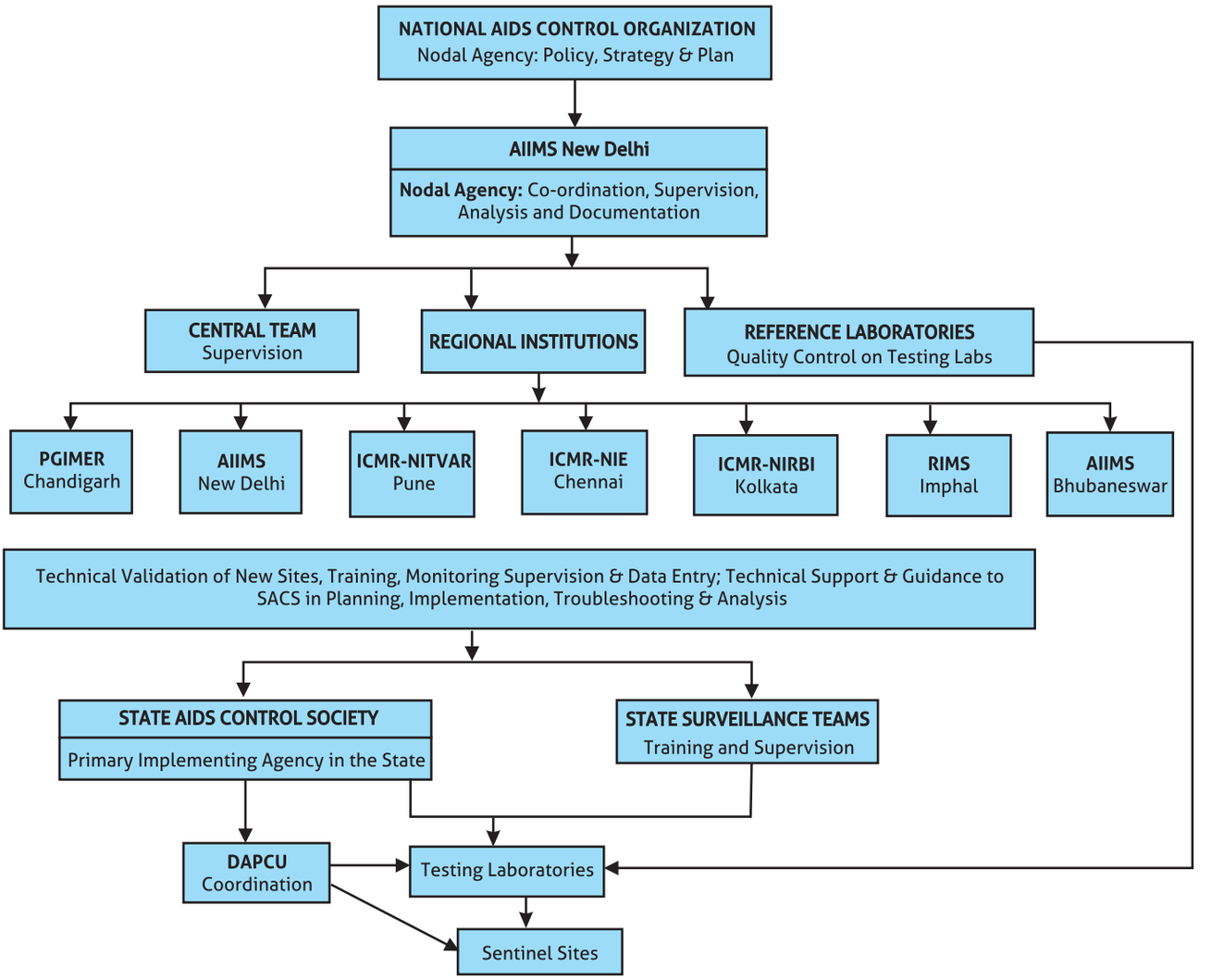
### 1.2 Implementation Structure

HIV Surveillance & Epidemiology (S&E) under NACP are governed by robust institutional arrangements at various levels including national, regional, state and district levels (Figure 1.3). The Surveillance & Epidemiology Division, part of Strategic Information at NACO is the nodal division for overseeing HIV surveillance within the framework of NACP. NACO's Technical Resource Group (TRG) and Technical Working Group (TWG), having multi-disciplinary independent and institutional experts, play pivotal role in steering the S&E efforts under NACP.

Seven government public health institutes [AIIMS-New Delhi, ICMR-NITVAR-Pune, ICMR-NIE-Chennai, ICMR-NIRBI-Kolkata, PGIMER-Chandigarh, RIMS-Imphal, AIIMS-Bhubaneswar) lead the technical support for implementation through training and supportive supervision. These Institutes ensure high quality of implementation by providing reference materials like operational manuals, wall charts and data collection tools. Additionally,they support the analysis and dissemination of HIV burden estimation reports as one of the final outcomes under each cycle of HSS.

State AIDS Control Societies (SACS) in States/UTs are the primary agency responsible for the implementation of HIV Surveillance activities. Under the leadership of SACS, District AIDS Prevention and Control Units (DAPCUs) coordinates the implementation of HSS activities. Laboratory support for Surveillance is provided by a network of testing and reference laboratories. The reference laboratories provide external quality assurance by repeat testing of all positive blood specimens and 5% of the negative specimens collected during surveillance for a given biomarker.

**Figure 1.3.HSS implementation framework under NACP**



## 2. METHODOLOGY

The methodology for the 18th round of HSS among ANC clinic attendees remained the same as that in earlier rounds with a few enhancements: (1) inclusion of Informed consent for all ANC attendees, (2) inclusion of treponemal test followed by RPR to get more accurate estimates of syphilis prevalence among pregnant women. Key elements of the HSS methodology have been presented in the sections below.

### 2.1 Eligibility criteria

| | |
|---|---|
| Inclusion criteria | • Pregnant women of age between 15-49 year,<br>• Attending the antenatal clinic for the first time during the current round of surveillance |
| Exclusion criteria | • Pregnant women of age between 15-49 year, or<br>• Any pregnant woman attending the antenatal clinic for the second or more times during the current round of surveillance. |

### 2.2 Sample size and sampling duration

The sample size at each of the ANC HSS sites was 400 to be achieved during the surveillance period of three months[3]. However, the data collection period was extended at some sites, on a case-to-case basis, after reviewing the reasons for any delay and the feasibility of achieving the desired sample size within a reasonable extended period.

### 2.3 Sampling methodology

The HSS Plus 2023, among ANC clinic sites, continued to use consecutive sampling methods, consistent with the approach adopted in the previous rounds. After the start of the surveillance, all individuals attending the sentinel site facility (ANC clinic) were approached, assessed for eligibility and if eligible, administered informed consent. All sampled and eligible pregnant women who consented to participate were recruited in HSS Plus 2023.

### 2.4 Questionnaire

A concise bilingual data form with 26 questions organized into three sections including background characteristics, HIV/AIDS-related testing and treatment service uptake, and Viral Hepatitis, was used for the collection of information (annexure 1). Structured questionnaires were used by the facility counselor/nurse responsible for implementing the HSS Plus to collect the data through one-to-one interviews in a confidential setting. The questionnaire utilized for surveillance did not include any personal identifiers; instead it only contained a surveillance sample ID. However, this surveillance sample ID was linked with ANC unique ID

[3]National AIDS Control Organisation and National Institute for HIV Surveillance, All India Institute of Medical Sciences, New Delhi (2023). HIV Sentinel Surveillance Plus 2023: Operational Manual for ANC sites

code in a separate confidential register. This linkage was established to enable the provision of counselling, testing or treatment services to pregnant women in accordance with the respective programme guidelines, with a focus on maintaining their overall health and well-being.

In the questionnaire, the first section had nine questions pertaining to age, literacy, occupation (self and spouse), residence location, pregnancy order & trimester, ANC service uptake history and spouse migration history in the last one year.

The second section had four questions about HIV/AIDS-related testing and treatment services uptake. The third section had 13 questions on viral hepatitis. This included questions on Hepatitis in general, followed by questions on Hepatitis B and Hepatitis C.

**2.5 Blood specimen collection methods and testing approach**

Under HSS Plus 2023, samples were collected from the respondents who provided their consent for both blood samples and questionnaire administration. Following the interview process, the interviewer accompanied the respondent to the Laboratory Technician (LT), responsible for collecting blood samples. No personal identifiers were recorded either on the surveillance serum specimen or data form. While no personal identifier was obtained under HSS, provisions were made to allow linking of HSS test results to the ANC clinic records through codes to facilitate the provision of care, support, and treatment services to those in need.

The biospecimen collected during the 18$^{th}$ round of HSS among pregnant women were tested for four diseases: HIV, Syphilis, HBV, and HCV. The testing was done at 114 State Reference Laboratories (SRL) established under NACP across the country. In exceptional scenarios, depending upon the local need, non-SRL laboratories were used in HSS 2023.

For HIV, a two-test strategy was adopted, as in the earlier rounds (Figure 2.1). The first test is of high sensitivity and the second one is of high specificity and confirmatory in nature. The second test was done only if the first test was found to be reactive. A sample was declared as positive only when both the test results were reactive.

Reverse testing algorithm was followed for Syphilis testing. TPHA test was done on all the serum samples. RPR (semiquantitative) was performed on samples found positive by TPHA. The exact titre of RPR test was reported.

For HBV, one test strategy was followed. Serum samples were tested for Hepatitis B surface antigen (HBsAg) using rapid test kits. If the test result was reactive, the sample was reported as HBV positive. For HCV also, one test strategy was followed. The samples were tested for anti-hepatitis C virus (HCV) antibodies using rapid test kits. If the test result was reactive, the sample was reported as HCV-positive.

**Figure 2.1. Testing protocol for HIV among ANC attendees, ANC HSS Plus 2023**

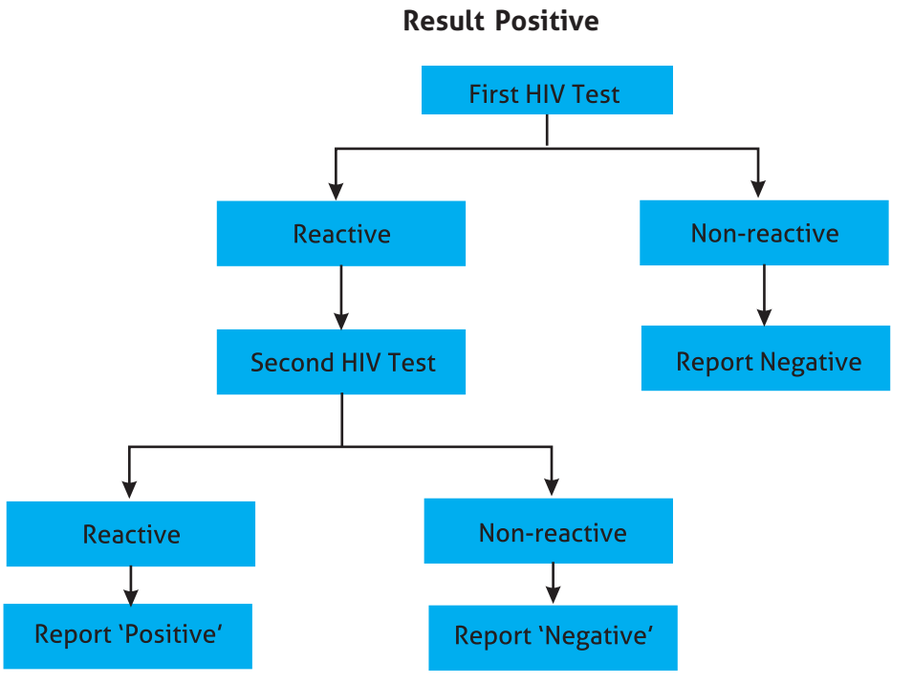
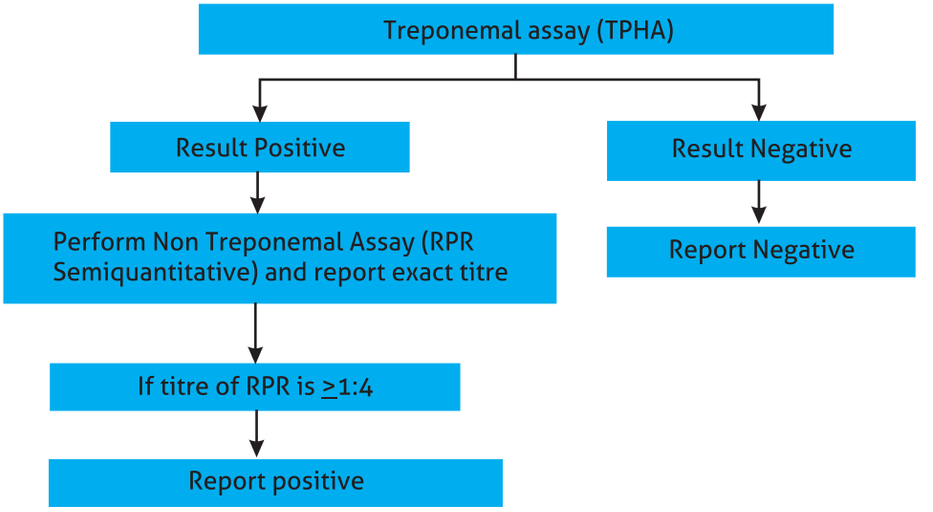



**Figure 2.2. Testing protocol for Syphilis among ANC attendees, ANC HSS Plus 2023**




### 2.6 Inter-laboratory comparison (ILC)

ILC is a key component of the quality assurance mechanism under HSS. Under ILC, all positive specimens for any of the bio-markers (HIV, HBV, HCV and Syphilis) and 5% of negative specimens are transported to a mapped reference laboratory (annexure 2). At the reference laboratory, all positive specimens are tested for the biomarkers for which they have been reported as positive. The negative samples (those not reported as positive for any of the fourbiomarkers) are tested for all four biomarkers using the same testing protocols.

Table 2.1 presents the results of ILC among pregnant women for four biomarkers in HSS 2023. Specifically, for Syphilis (TPHA followed by RPR), nearly 95% of the total positive samples subjected to ILC by reference laboratory showed concordant results.

**Table 2.1: ILC results among ANC attendees, ANC HSS Plus 2023**

| Biomarkers | Positive Samples | | Negative Samples | |
|---|---|---|---|---|
| | Subjected to ILC (Number) | Concordant Results (Percentage) | Subjected to ILC (Number) | Concordant Results (Percentage) |
| HIV | 848 | 99.17% | 17,913 | 99.97% |
| Syphilis | 625 | 94.56% | 15,180 | 99.96% |
| HBV | 2066 | 98.74% | 15,801 | 99.95% |
| HCV | 568 | 97.54% | 15,102 | 99.95% |

For a given biomarker, if the discordant results were more than 10% for a given testing laboratory in ILC, the test results for all the sites associated with that laboratory were considered invalid for the biomarker concerned. There was no such case observed in this round of HSS.

### 2.7 Ethical considerations

Under the HSS 2023 among ANC clinic attendees, written Informed consent was obtained from eligible pregnant women aged 18 years or older who were willing to participate in HSS. Assent was taken from pregnant women between 15-17 years of age along with informed consent from guardian/legally authorized/ acceptable representative. Participant Information Sheet (PIS), in local language, covered objectives of the sentinel surveillance, expectation from the respondent; return of blood sample results, confidentiality and voluntariness. As a part of the process, respondents were shown all the consumables/ items used for blood sample collection and were assured that confidentiality would be maintained since any individual's name was not linked to the HSS specimen or data form. No pressure of any form was put on the eligible inmate, and he was given free choice to agree or refuse to participate in surveillance.

If the eligible respondent was literate, PIS and the Informed Consent Form (ICF) were given to her to read through them (annexure 3). If the eligible respondent was illiterate, PIS and ICF were read out to her in the presence of a literate witness.

A respondent was asked if she had any questions/ doubts or required clarifications; if in case she did have something to clarify, it was done immediately and adequately. After addressing all the concerns raised by the respondent, if the respondent did not agree to participate in the surveillance, the reason for refusal was enquired and documented.

HSS data form of the consented pregnant women was handled with utmost confidentiality. Neither filled nor blank data form were handled by anyone outside the surveillance team.

### 2.8 Data Management, Weighting and Analysis

Data collection in ANC HSS 2023 was carried out through paper-based tools. While data recording was done by counsellor/nurse/ANM, all data forms were checked for completeness and accuracy in the field by the site in-charge on a daily basis before signing the data forms. These forms were also checked by the field supervisors during their field monitoring and supportive visits. The data forms were then transported to regional institutes periodically where they were first checked for completeness and accuracy and then entered into the HSS module of Integrated and Enhanced Surveillance and Epidemiology (IESE) web portal under NACO.

Laboratory results were entered by the concerned testing laboratory into the IESE web portal. The IESE web-portal did the linking of laboratory results with the data forms using the unique sample IDs assigned.

Double data entry of each data form was done by two data entry operators in IESE web portal; the entries were then compared by an in-built tool in the portal and all discrepancies identified between the two entries were corrected by consulting the original paper tool. Following this the database was 'frozen' and a cleaned master file was created. For the analysis, only valid records (age as per the eligibility criteria and HIV test results), were considered. The data was then analyzed using Statistical Package for Social Sciences (SPSS).

The weighting protocol addressed the differential probabilities of selection of respondents, was used to present biological prevalence in the report since the HSS sites were not selected using PPS. Information required for calculating weights was collected through the ANC/HSS register during field work, where number of potential respondents and among them how many were interviewed, was recorded. Selection probability of individual respondents in the HSS site was used to calculate site level weights. The weights were standardized to allow the observations to be equal to the sample size. The standardized weight was calculated taking into account the total sample size, using the general standardized weight calculation.

Based on the design, weights for State and national analysis were calculated and applied as required. Finally analysis of HSS data was conducted using SPSS. Weighted prevalence was presented for biological indicators in state and national level. The sample size (N) provided in all the tables of this report are unweighted counts at the state and national level. Behavioural indicators are unweighted whereas the proportions/ estimates of biological indicators provided in all tables are weighted. State estimates have been weighted using state level weights and national estimates have been weighted using national level weights.

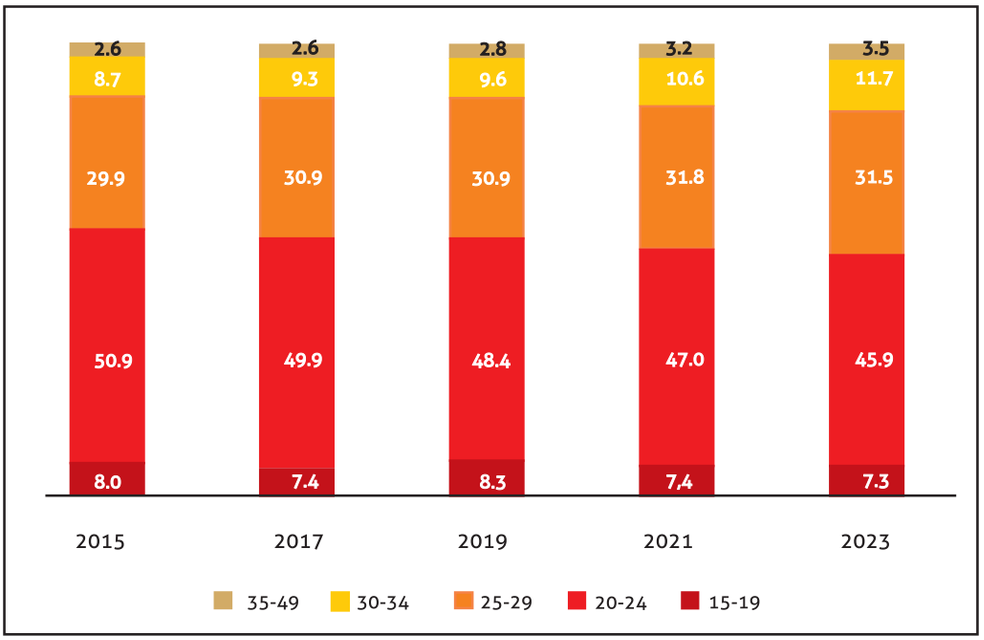
## 3. FINDINGS

This section presents key findings from the 2023 round of sentinel surveillance among the antenatal clinic attendees. Initially, the respondents' demographic profile has been presented including background, current pregnancy characteristics and respondents' spouse/partner migration. The service uptake for HIV testing and treatment services has been presented next followed by the prevalence/sero-positivity of all four biomarkers among ante-natal clinic attendees to provide the big picture perspective. Further, the level and trend of HIV prevalence nationally and by State/UTs and finally, the correlation between respondent's background characteristics and HIV prevalence/ syphilis sero-positivity have been presented.

### 3.1 Background Characteristics

Overall, a total of 3,51,252 complete valid data forms were received from 889 Antenatal clinic sites in 2023 round of Surveillance[4]. The mean age of the pregnant women was 24.8 years (SD 4.26) (Table 3.1). The majority, around 77.4%, were in the age group of 20-29 years, while around 7.3% were 15-19 years old. A small proportion (3.5%) were 35 years or older (Figure 3.1). Though this pattern is broadly similar to the pattern seen in previous rounds, there is increase in proportion of older respondents recruited in HSS. In 2014-15, almost 41.2% of the respondents were of age 25 years or older. In comparison, in 2023, almost 46.7% of the pregnant women recruited in HSS were 25 years or older.

**Figure 3.1: Distribution (in %) of ANC attendees by age group, ANC HSS 2015, 2017, 2019, 2021 and 2023**




State/UT-wise, the mean age of the pregnant women was highest in Sikkim (28.6 years), followed by Mizoram (28.3 years), J&K and Ladakh (27.6 years), Manipur (27.5 years), Arunachal Pradesh (27.2 years), and Nagaland (27.2 years). Kerala, A&N Islands, Goa, Chandigarh, Meghalaya, and Himachal Pradesh were other States/UTs where the mean age of respondents was more than 26 years. The respondents were youngest in West Bengal (23.3 years) and Andhra Pradesh (23.3 years), followed by Bihar (23.6 years), Telangana (23.6 years), Jharkhand (23.7 years), and Tripura (23.8 years).

[4]Valid data forms included those where the respondent's age and results for at least one of the biomarkers is documented.

**Table 3.1 Age profile of ANC attendees by State/UTs, ANC HSS Plus 2023**

| State/UT | N | Mean Age (In Years) | Respondents' distribution (in %) by age group | | | | |
|---|---|---|---|---|---|---|---|
| | | | 15-19 | 20-24 | 25-29 | 30-34 | 35-49 |
| A&N Islands | 1562 | 26.8 | 5.7 | 31.8 | 34.4 | 19.5 | 8.7 |
| Andhra Pradesh | 19200 | 23.3 | 10.1 | 59.4 | 23.6 | 5.7 | 1.3 |
| Arunachal Pradesh | 2886 | 27.2 | 8.3 | 27.7 | 30.4 | 22.3 | 11.3 |
| Assam | 12000 | 25.1 | 9.9 | 40.8 | 30.9 | 13.9 | 4.5 |
| Bihar | 12399 | 23.6 | 8.6 | 54.5 | 27.2 | 7.4 | 2.3 |
| Chandigarh | 800 | 26.5 | 3.0 | 33.3 | 39.5 | 19.4 | 4.9 |
| Chhattisgarh | 11197 | 25.0 | 4.9 | 45.9 | 34.7 | 12.0 | 2.5 |
| DD&DNH | 1200 | 25.3 | 6.0 | 41.6 | 34.7 | 14.4 | 3.3 |
| Delhi | 4000 | 25.3 | 4.4 | 44.0 | 34.2 | 14.2 | 3.2 |
| Goa | 1200 | 26.6 | 3.3 | 33.0 | 38.2 | 19.1 | 6.4 |
| Gujarat | 13995 | 24.7 | 5.5 | 48.6 | 31.4 | 11.3 | 3.1 |
| Haryana | 7612 | 24.8 | 7.7 | 45.0 | 33.2 | 11.5 | 2.6 |
| Himachal Pradesh | 3600 | 26.3 | 4.0 | 34.2 | 38.1 | 18.8 | 4.9 |
| J&K and Ladakh | 6400 | 27.6 | 2.7 | 26.3 | 37.1 | 23.0 | 10.9 |
| Jharkhand | 10799 | 23.7 | 16.1 | 47.1 | 25.6 | 8.7 | 2.5 |
| Karnataka | 24799 | 24.5 | 7.8 | 49.0 | 30.4 | 10.1 | 2.7 |
| Kerala | 6400 | 26.9 | 3.6 | 31.2 | 38.1 | 19.8 | 7.3 |
| Madhya Pradesh | 20828 | 24.2 | 6.0 | 53.9 | 29.5 | 8.8 | 1.8 |
| Maharashtra | 30761 | 24.4 | 7.5 | 50.6 | 29.0 | 10.5 | 2.3 |
| Manipur | 5039 | 27.5 | 6.5 | 26.3 | 31.3 | 22.6 | 13.3 |
| Meghalaya | 4669 | 26.6 | 8.5 | 32.7 | 28.9 | 19.7 | 10.2 |
| Mizoram | 4159 | 28.3 | 7.8 | 22.3 | 27.8 | 25.3 | 16.9 |
| Nagaland | 4492 | 27.2 | 7.3 | 28.8 | 29.8 | 21.8 | 12.3 |
| Odisha | 13171 | 25.1 | 7.6 | 42.2 | 33.2 | 12.7 | 4.2 |
| Puducherry | 800 | 25.7 | 4.5 | 36.9 | 40.8 | 15.1 | 2.8 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Punjab | 8822 | 25.6 | 5.1 | 38.5 | 37.0 | 15.6 | 3.7 |
| Rajasthan | 13998 | 25.0 | 4.8 | 44.9 | 35.1 | 12.1 | 3.1 |
| Sikkim | 1875 | 28.6 | 4.7 | 19.6 | 31.4 | 31.3 | 13.0 |
| Tamil Nadu | 32600 | 24.6 | 8.2 | 47.3 | 31.7 | 10.5 | 2.4 |
| Telangana | 15999 | 23.6 | 5.9 | 59.1 | 28.6 | 5.5 | 0.9 |
| Tripura | 2800 | 23.8 | 24.1 | 36.7 | 24.4 | 11.9 | 3.0 |
| Uttar Pradesh | 33992 | 25.0 | 2.0 | 46.2 | 38.0 | 11.2 | 2.5 |
| Uttarakhand | 7200 | 25.4 | 3.2 | 41.3 | 40.4 | 12.5 | 2.6 |
| West Bengal | 9998 | 23.3 | 23.2 | 42.1 | 23.7 | 9.2 | 1.8 |
| **India** | **351252** | **24.8** | **7.3** | **45.9** | **31.5** | **11.7** | **3.5** |

In the current round of HSS, around 93.5% of the respondents were literate (Figure 3.2). Moreover, two-fifths (42.3%) of the respondents had more than 10 years of education. In comparison, in 2015, around 84.3% of the respondents were literate, while around one-fourth (26.3%) reported having education up to 11$^{th}$ standard or higher (Table 3.2).

In Puducherry, Kerala, Tamil Nadu, Andaman & Nicobar Islands and Mizoram, the literacy among pregnant women was almost universal with 98% or more reporting to be literate. Illiteracy among respondents was highest in J&K and Ladakh ( 15.2%). Rajasthan, Delhi, Arunachal Pradesh, Gujarat, Bihar, and Uttar Pradesh were other States with higher illiteracy (10.5% to 13.1%).

**Table 3.2 Education profile of ANC attendees by State/UTs, ANC HSS Plus 2023**

| State/UT | N | Respondents' distribution (in %) by education group | | | | |
|---|---|---|---|---|---|---|
| | | Illiterate | Literate and till 5th standard | 6th to 10th standard | 11th to graduation | Post-Graduation |
| A&N Islands | 1550 | 1.4 | 3.7 | 27.6 | 56.8 | 10.5 |
| Andhra Pradesh | 19163 | 5.4 | 12.6 | 38.7 | 38.9 | 4.4 |
| Arunachal Pradesh | 2883 | 11.9 | 10.6 | 35.2 | 37.2 | 5.1 |
| Assam | 11979 | 5.8 | 11.1 | 53.3 | 28.7 | 1.0 |
| Bihar | 12384 | 12.5 | 20.3 | 36.8 | 28.7 | 1.8 |
| Chandigarh | 800 | 4.0 | 11.5 | 30.4 | 46.0 | 8.1 |
| Chhattisgarh | 11178 | 4.3 | 9.5 | 40.7 | 36.7 | 8.8 |
| DD & DNH | 1200 | 4.7 | 7.7 | 49.2 | 34.1 | 4.4 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Delhi | 3998 | 11.8 | 13.2 | 32.2 | 36.4 | 6.4 |
| Goa | 1200 | 3.7 | 4.8 | 48.6 | 39.9 | 3.0 |
| Gujarat | 13986 | 12.3 | 17.3 | 50.5 | 16.6 | 3.3 |
| Haryana | 7602 | 9.0 | 13.8 | 36.7 | 34.1 | 6.4 |
| Himachal Pradesh | 3599 | 2.7 | 5.1 | 24.7 | 53.7 | 13.9 |
| J&K and Ladakh | 6386 | 15.2 | 14.8 | 39.9 | 24.5 | 5.5 |
| Jharkhand | 10765 | 5.4 | 14.4 | 43.6 | 31.7 | 4.9 |
| Karnataka | 24786 | 4.9 | 6.0 | 47.5 | 38.5 | 3.2 |
| Kerala | 6397 | 0.3 | 0.8 | 14.3 | 71.6 | 13.0 |
| Madhya Pradesh | 20813 | 6.5 | 16.8 | 44.9 | 24.1 | 7.7 |
| Maharashtra | 30750 | 3.7 | 7.0 | 41.6 | 44.3 | 3.4 |
| Manipur | 5022 | 2.9 | 7.6 | 49.9 | 36.1 | 3.6 |
| Meghalaya | 4661 | 6.2 | 17.3 | 51.0 | 22.4 | 3.2 |
| Mizoram | 4139 | 1.5 | 6.5 | 54.4 | 33.7 | 3.9 |
| Nagaland | 4466 | 6.7 | 16.9 | 53.2 | 21.1 | 2.1 |
| Odisha | 13158 | 5.6 | 12.8 | 53.2 | 26.7 | 1.8 |
| Puducherry | 800 | 0.1 | 0.3 | 17.9 | 67.9 | 13.9 |
| Punjab | 8805 | 6.9 | 16.4 | 42.1 | 30.7 | 3.9 |
| Rajasthan | 13983 | 10.5 | 24.2 | 35.1 | 22.7 | 7.5 |
| Sikkim | 1872 | 2.5 | 11.0 | 42.4 | 37.0 | 7.2 |
| Tamil Nadu | 32578 | 0.9 | 2.2 | 27.0 | 59.1 | 10.9 |
| Telangana | 15969 | 8.4 | 7.4 | 32.1 | 47.2 | 4.9 |
| Tripura | 2796 | 2.4 | 8.6 | 63.3 | 23.8 | 1.9 |
| Uttar Pradesh | 33922 | 13.1 | 16.2 | 30.5 | 33.2 | 7.0 |
| Uttarakhand | 7189 | 3.4 | 9.9 | 25.8 | 49.5 | 11.5 |
| West Bengal | 9991 | 3.0 | 17.9 | 49.7 | 27.6 | 1.8 |
| **India** | **350770** | **6.5** | **11.6** | **39.6** | **36.7** | **5.6** |

In HSS 2023, almost two-thirds (66.5%) of total respondents reported residing in rural areas. In 2014-15 round, this figure was slightly lower at 63.9% (Figure 3.3). In UT of Chandigarh and Delhi, more than 90% of the respondents were from urban areas (Table 3.3). Almost half of respondents in Mizoram reported to be residing in urban areas. Conversely, in Himachal Pradesh, more than 90% of the pregnant women were from rural areas followed by Assam (87.6%), J&K and Ladakh (87.2%), Meghalaya (84.3%), Tripura (82.2%), and West Bengal (80.8%).

**Figure 3.2: Distribution (in %) of ANC attendees by education, ANC HSS 2015, 2017, 2019, 2021 and 2023**

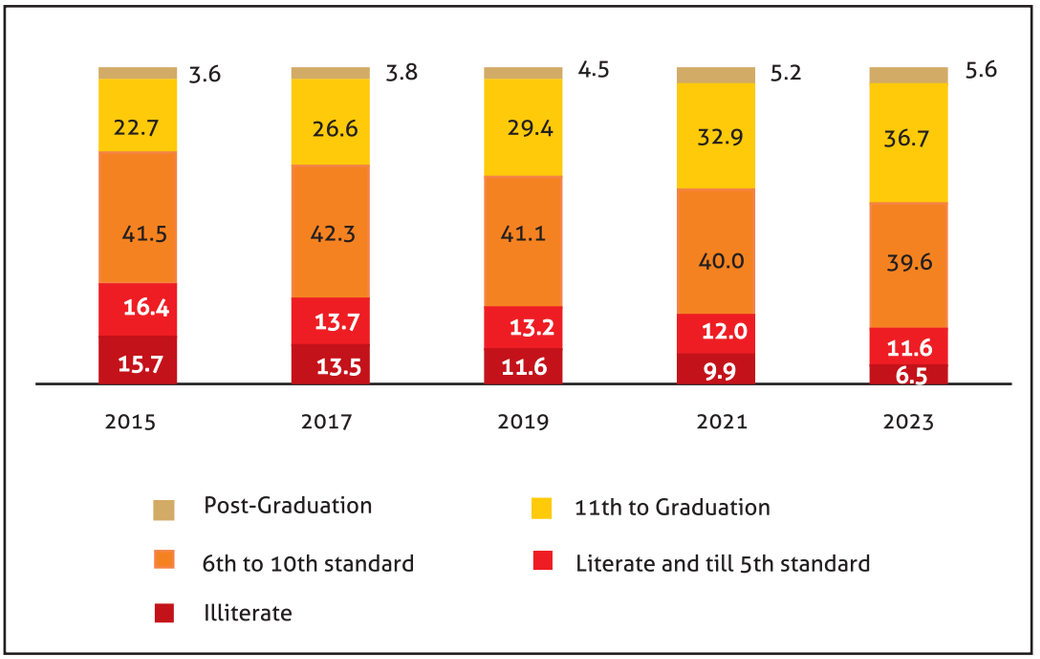



**Figure 3.3: Distribution (in %) of ANC attendees by place of residence, ANC HSS 2015, 2017, 2019, 2021 and 2023**

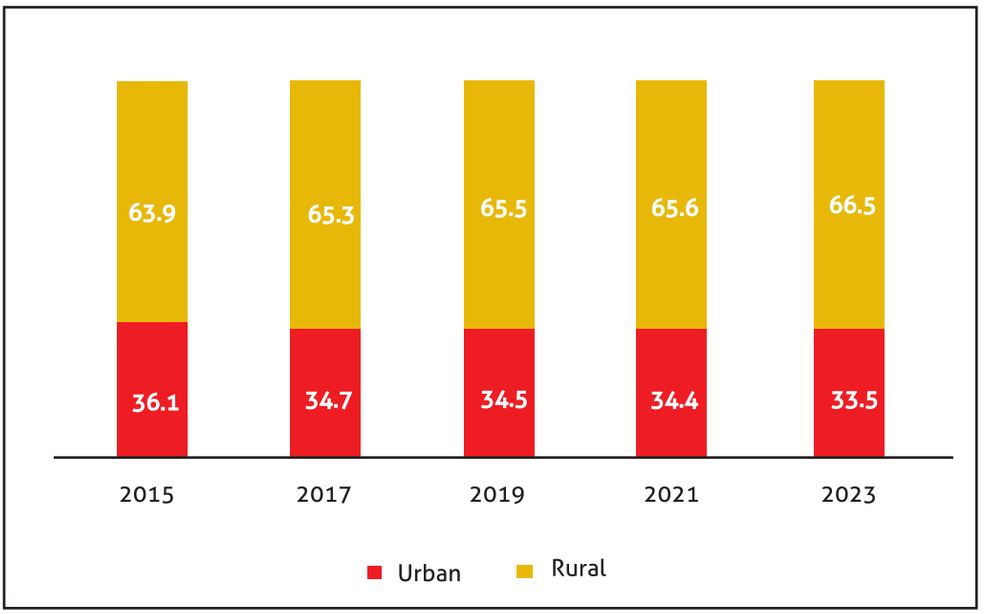


**Table 3.3: Residence profile of ANC attendees by State/UTs, ANC HSS Plus 2023**

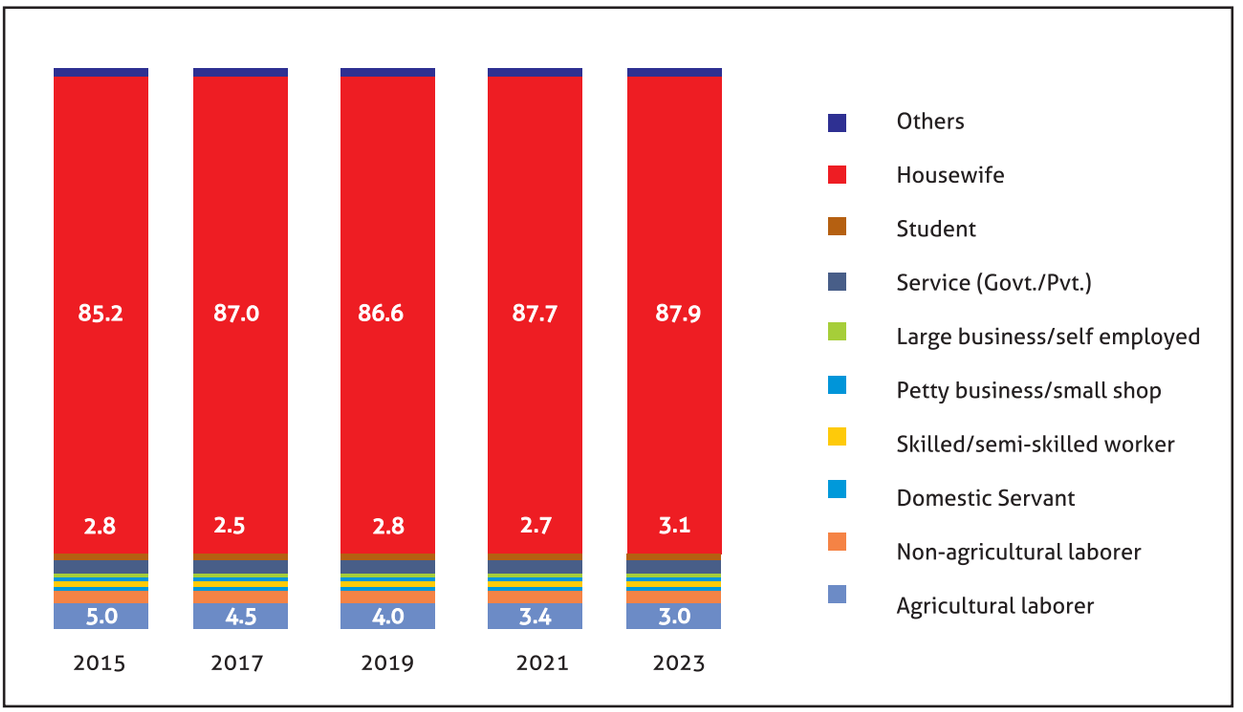
| State/UT | N | Respondents' distribution (in %) by place of residence | |
|---|---|---|---|
| | | Rural | Urban |
| A&N Islands | 1500 | 68.7 | 31.3 |
| Andhra Pradesh | 18851 | 70.2 | 29.8 |
| Arunachal Pradesh | 2878 | 56.8 | 43.2 |
| Assam | 11877 | 87.6 | 12.4 |
| Bihar | 12180 | 77.1 | 22.9 |
| Chandigarh | 798 | 2.9 | 97.1 |
| Chhattisgarh | 10942 | 66.4 | 33.6 |
| DD & DNH | 1155 | 72.2 | 27.8 |
| Delhi | 3921 | 7.8 | 92.2 |
| Goa | 1198 | 66.1 | 33.9 |
| Gujarat | 13864 | 58.4 | 41.6 |
| Haryana | 7536 | 59.1 | 40.9 |
| Himachal Pradesh | 3502 | 90.5 | 9.5 |
| J&K and Ladakh | 6344 | 87.2 | 12.8 |
| Jharkhand | 10464 | 66.0 | 34.0 |
| Karnataka | 24688 | 64.8 | 35.2 |
| Kerala | 6397 | 66.9 | 33.1 |
| Madhya Pradesh | 20716 | 59.0 | 41.0 |
| Maharashtra | 30446 | 51.1 | 48.9 |
| Manipur | 4916 | 78.4 | 21.6 |
| Meghalaya | 4577 | 84.3 | 15.7 |
| Mizoram | 4129 | 49.6 | 50.4 |
| Nagaland | 4386 | 55.3 | 44.7 |
| Odisha | 13133 | 76.3 | 23.7 |
| Puducherry | 800 | 73.6 | 26.4 |
| Punjab | 8767 | 63.1 | 36.9 |

| | | | |
|---|---|---|---|
| Rajasthan | 13889 | 58.7 | 41.3 |
| Sikkim | 1851 | 61.9 | 38.1 |
| Tamil Nadu | 32559 | 74.1 | 25.9 |
| Telangana | 15738 | 69.0 | 31.0 |
| Tripura | 2786 | 82.2 | 17.8 |
| Uttar Pradesh | 33177 | 68.1 | 31.9 |
| Uttarakhand | 7071 | 60.0 | 40.0 |
| West Bengal | 9955 | 80.8 | 19.2 |
| **India** | **346991** | **66.5** | **33.5** |

Like in previous rounds, the pregnant women recruited in HSS Plus 2023 were predominantly housewives with more than 87.9% of them reporting so. All other occupations were reported by less than 4% of the respondents (Figure 3.4).

In terms of occupation profiles, most of the States/UTs exhibit a similar pattern to the national trend. In 28 States/UTs, at least 80% of the respondents reported being housewives. However, in north-eastern States of Arunachal Pradesh, Meghalaya and Sikkim, only around two-thirds reported being housewives. In Sikkim, one-fourth of the respondents (27.5%) reported being in service (Govt./Pvt.), followed by that in Arunachal Pradesh (14.5%), Kerala (11.8%) and A&N Islands (10.4%). In Mizoram, Nagaland and Meghalaya, 7-10% of the respondents reported being in service. Additionally, in Goa and Chandigarh, 7.9% of respondents reported being in service (Table 3.4).

**Figure 3.4: Distribution (in %) of ANC attendees by her occupation, ANC HSS 2015, 2017, 2019, 2021 and 2023**



Spouse's occupation of the respondents continues to exhibit a wide range, with national patterns remaining consistent with previous rounds. Almost one-third (32.1%) of respondents reported their spouses occupation as labourers: agricultural or non-agricultural. Another 21.1% indicated that their spouse were in service (Govt. / Pvt.). A small proportion (2.3%) reported their spouses working as Truck drivers/helpers, while an additional 6.1% were engaged in local transportation work (such as auto/taxi drivers, hand cart pullers/ rickshaw pullers). The diverse pattern in occupation of spouses was also noted at the State/UT level (Table 3.5).

**Figure 3.5:Distribution (in %) of ANC attendees by spouse occupation, ANC HSS 2015, 2017, 2019, 2021 and 2023**

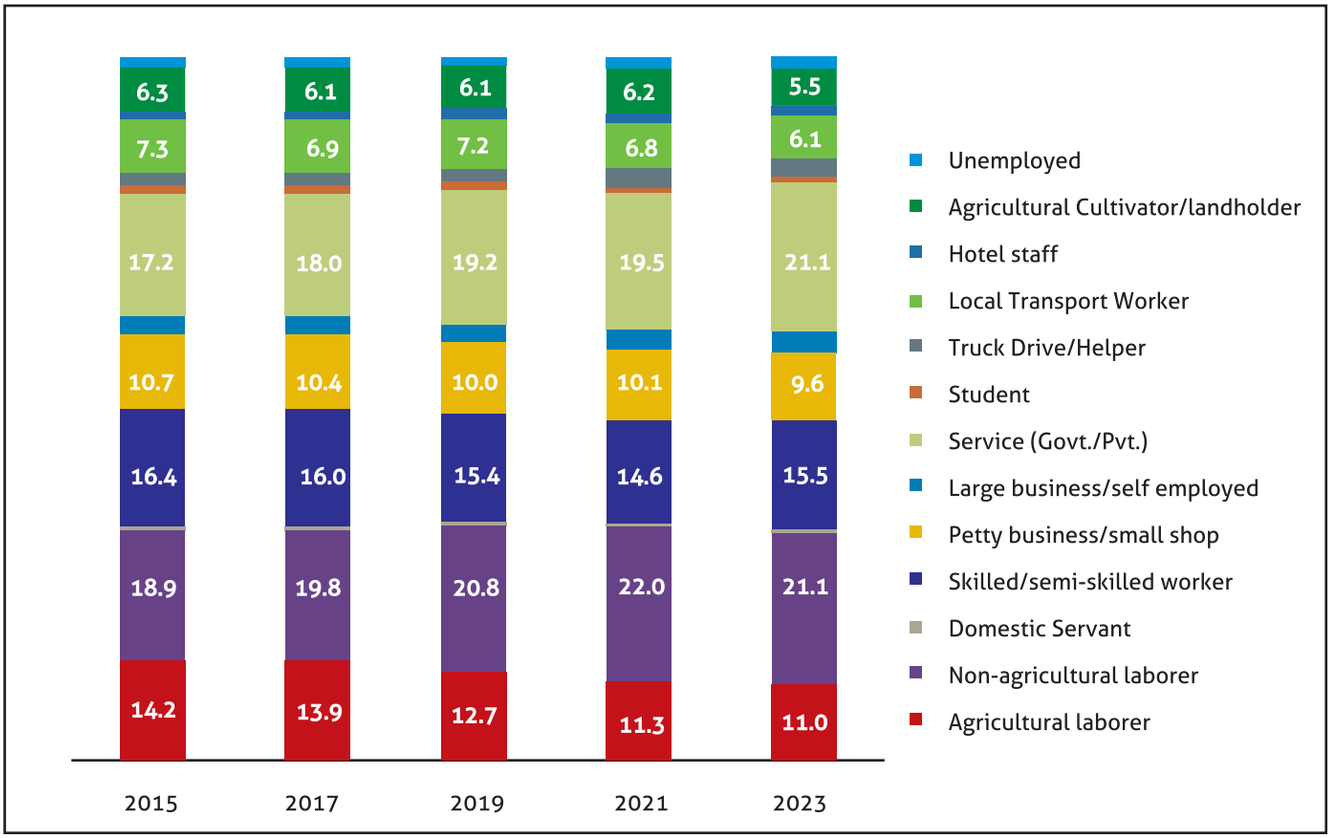



**Table 3.4: Occupation profile of ANC attendees, ANC HSS Plus 2023**

| State/UTs | N | Respondents' distribution (in %) by occupation | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Agricultural Labourer | Housewife | Non-Agricultural Labourer | Domestic Servant | Skilled/ Semi-skilled worker | Petty business/ small shop | Large Business/ Self-employed | Service (Govt./ Pvt.) | Student | Unemployed |
| A&N Islands | 1562 | 0.1 | 86.9 | 0.3 | 0.0 | 0.1 | 0.1 | 0.6 | 10.4 | 0.4 | 0.9 |
| Andhra Pradesh | 19158 | 7.1 | 79.7 | 4.3 | 0.3 | 1.1 | 0.5 | 0.2 | 4.3 | 0.7 | 0.2 |
| Arunachal Pradesh | 2886 | 7.2 | 63.9 | 1.1 | 0.3 | 0.5 | 3.0 | 1.4 | 14.5 | 3.1 | 0.5 |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Assam | 11986 | 0.6 | 94.4 | 0.2 | 0.0 | 0.5 | 0.8 | 0.1 | 2.6 | 0.5 | 0.1 |
| Bihar | 12362 | 0.4 | 94.9 | 0.4 | 0.0 | 0.3 | 0.2 | 0.0 | 0.8 | 2.9 | 0.0 |
| Chandigarh | 800 | 0.0 | 90.8 | 0.3 | 0.5 | 0.1 | 0.1 | 0.3 | 7.9 | 0.0 | 0.0 |
| Chhattisgarh | 11182 | 8.7 | 80.1 | 3.1 | 0.3 | 1.1 | 0.7 | 0.3 | 2.8 | 0.4 | 0.1 |
| DD & DNH | 1200 | 0.3 | 94.5 | 0.3 | 0.3 | 2.1 | 0.3 | 0.0 | 2.2 | 0.1 | 0.0 |
| Delhi | 3997 | 0.0 | 94.8 | 0.8 | 0.6 | 0.8 | 0.2 | 0.4 | 2.1 | 0.2 | 0.0 |
| Goa | 1200 | 0.1 | 86.1 | 0.7 | 1.3 | 2.1 | 0.9 | 0.3 | 7.9 | 0.1 | 0.1 |
| Gujarat | 13981 | 4.7 | 83.3 | 6.2 | 0.7 | 1.3 | 0.4 | 0.2 | 2.1 | 0.3 | 0.0 |
| Haryana | 7599 | 0.2 | 94.5 | 1.1 | 0.1 | 0.2 | 0.1 | 0.1 | 2.2 | 1.3 | 0.1 |
| Himachal Pradesh | 3596 | 0.3 | 92.1 | 0.6 | 0.1 | 0.4 | 0.2 | 0.1 | 5.4 | 0.7 | 0.1 |
| J&K and Ladakh | 6399 | 0.1 | 86.3 | 0.7 | 0.0 | 1.3 | 0.4 | 0.3 | 4.3 | 2.6 | 0.8 |
| Jharkhand | 10765 | 1.1 | 91.2 | 0.6 | 0.2 | 0.6 | 0.4 | 0.1 | 1.6 | 1.5 | 0.2 |
| Karnataka | 24773 | 5.3 | 86.7 | 2.4 | 1.1 | 0.8 | 0.4 | 0.1 | 2.5 | 0.3 | 0.0 |
| Kerala | 6399 | 0.0 | 80.3 | 0.7 | 0.1 | 0.7 | 0.3 | 0.2 | 11.8 | 2.5 | 3.5 |
| Madhya Pradesh | 20791 | 4.4 | 87.3 | 2.9 | 0.1 | 0.6 | 0.5 | 0.1 | 1.5 | 0.6 | 0.1 |
| Maharashtra | 30752 | 5.4 | 86.3 | 0.9 | 0.3 | 0.5 | 0.5 | 0.1 | 2.7 | 0.4 | 0.1 |
| Manipur | 5033 | 3.0 | 80.1 | 0.4 | 0.3 | 4.5 | 2.0 | 0.5 | 4.7 | 0.7 | 0.3 |
| Meghalaya | 4661 | 6.2 | 66.8 | 8.3 | 1.0 | 0.9 | 3.0 | 0.2 | 8.5 | 1.9 | 1.2 |
| Mizoram | 4146 | 3.2 | 73.9 | 1.4 | 0.2 | 2.6 | 3.3 | 0.9 | 8.8 | 1.0 | 3.9 |
| Nagaland | 4481 | 3.1 | 80.2 | 0.8 | 0.1 | 0.1 | 2.7 | 1.4 | 7.2 | 0.1 | 1.0 |
| Odisha | 13164 | 0.9 | 94.7 | 0.8 | 0.1 | 0.3 | 0.3 | 0.1 | 2.4 | 0.2 | 0.0 |
| Puducherry | 800 | 0.0 | 91.6 | 0.8 | 0.0 | 0.3 | 0.0 | 0.3 | 6.5 | 0.6 | 0.0 |
| Punjab | 8811 | 0.2 | 96.1 | 0.8 | 0.2 | 0.5 | 0.2 | 0.1 | 1.6 | 0.1 | 0.1 |
| Rajasthan | 13974 | 3.2 | 91.3 | 0.5 | 0.1 | 0.6 | 0.3 | 0.1 | 1.4 | 2.3 | 0.0 |
| Sikkim | 1871 | 0.7 | 64.8 | 0.2 | 0.1 | 0.3 | 3.1 | 0.4 | 27.5 | 0.4 | 1.7 |
| Tamil Nadu | 32556 | 0.7 | 92.0 | 0.8 | 1.2 | 0.5 | 0.1 | 0.0 | 3.5 | 0.8 | 0.0 |
| Telangana | 15973 | 8.0 | 75.6 | 4.9 | 0.3 | 2.6 | 0.5 | 0.1 | 2.7 | 1.1 | 0.1 |
| Tripura | 2795 | 0.3 | 96.2 | 0.6 | 0.0 | 0.3 | 0.2 | 0.0 | 1.7 | 0.6 | 0.0 |
| Uttar Pradesh | 33871 | 0.7 | 95.4 | 0.4 | 0.1 | 0.6 | 0.2 | 0.1 | 1.1 | 0.8 | 0.1 |
| Uttarakhand | 7186 | 0.1 | 93.0 | 0.3 | 0.2 | 1.0 | 0.5 | 0.1 | 3.0 | 0.4 | 0.1 |
| West Bengal | 9980 | 0.9 | 92.0 | 1.9 | 0.6 | 0.9 | 0.5 | 0.3 | 1.2 | 1.5 | 0.1 |
| **India** | 350690 | 3.0 | 87.9 | 1.7 | 0.4 | 0.8 | 0.5 | 0.2 | 3.1 | 0.9 | 0.2 |

## Table 3.5: Spouse occupation, ANC HSS Plus 2023

| State/UT | N | Spouse Occupation Recoded | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Agricultural Labourer | Auto/ Taxi Driver | Hotel staff | Agricultural cultivator/ landholder | Unemployed | Non-Agricultural Labourer | Domestic Servant | Skilled/ Semi-skilled worker | Petty business/ small shop | Large Business/ Self-employed | Service (Govt./ Pvt.) | Student | Truck Driver/ Helper |
| A&N Islands | 1558 | 0.8 | 5.8 | 0.6 | 5.9 | 0.7 | 7.4 | 0.1 | 8.8 | 4.1 | 11.5 | 51.9 | 0.2 | 1.0 |
| Andhra Pradesh | 19110 | 18.6 | 7.5 | 0.8 | 2.6 | 0.7 | 17.1 | 0.2 | 18.3 | 4.5 | 2.5 | 24.6 | 0.2 | 2.1 |
| Arunachal Pradesh | 2886 | 10.6 | 3.2 | 0.0 | 9.5 | 11.5 | 4.0 | 0.3 | 8.5 | 11.4 | 8.7 | 29.2 | 1.9 | 1.1 |
| Assam | 11993 | 11.2 | 7.6 | 0.4 | 6.2 | 1.4 | 18.7 | 0.1 | 16.1 | 16.7 | 3.3 | 14.4 | 0.2 | 1.8 |
| Bihar | 12377 | 8.0 | 5.4 | 0.9 | 2.5 | 1.4 | 26.6 | 0.4 | 20.9 | 11.4 | 2.8 | 14.4 | 2.9 | 1.7 |
| Chandigarh | 800 | 1.0 | 6.0 | 2.8 | 0.6 | 0.6 | 15.0 | 1.0 | 5.0 | 4.3 | 6.6 | 55.8 | 0.0 | 1.1 |
| Chhattisgarh | 11187 | 23.0 | 3.9 | 0.6 | 8.5 | 1.2 | 17.2 | 0.3 | 13.1 | 10.1 | 2.5 | 17.2 | 0.3 | 1.9 |
| DD & DNH | 1199 | 1.2 | 3.0 | 0.8 | 0.1 | 0.3 | 13.7 | 0.8 | 52.8 | 6.4 | 1.3 | 18.3 | 0.0 | 1.2 |
| Delhi | 3997 | 0.5 | 5.9 | 1.4 | 0.1 | 1.1 | 13.6 | 0.8 | 17.1 | 8.9 | 4.5 | 41.3 | 0.6 | 2.1 |
| Goa | 1200 | 0.6 | 4.8 | 4.4 | 0.1 | 1.3 | 10.7 | 0.3 | 22.2 | 12.5 | 0.8 | 39.5 | 0.2 | 2.3 |
| Gujarat | 13986 | 14.7 | 4.9 | 0.6 | 4.1 | 0.3 | 26.1 | 0.5 | 15.6 | 8.5 | 1.9 | 19.5 | 0.5 | 2.1 |
| Haryana | 7607 | 4.7 | 3.4 | 0.4 | 2.1 | 2.8 | 27.7 | 0.2 | 10.2 | 9.2 | 3.3 | 31.1 | 1.8 | 2.2 |
| Himachal Pradesh | 3598 | 8.3 | 3.7 | 1.8 | 7.0 | 1.4 | 8.0 | 0.3 | 14.5 | 7.0 | 2.8 | 42.9 | 0.4 | 1.8 |
| J&K and Ladakh | 6398 | 6.4 | 7.3 | 1.1 | 7.6 | 2.4 | 17.2 | 0.3 | 13.5 | 14.3 | 7.0 | 19.0 | 1.4 | 1.9 |
| Jharkhand | 10772 | 8.0 | 5.3 | 1.9 | 6.6 | 1.8 | 22.3 | 0.4 | 13.5 | 9.6 | 2.4 | 23.0 | 1.2 | 3.6 |
| Karnataka | 24756 | 13.4 | 8.9 | 1.6 | 7.8 | 0.1 | 26.0 | 0.3 | 12.6 | 8.9 | 2.1 | 16.0 | 0.0 | 2.2 |
| Kerala | 6399 | 3.6 | 11.8 | 2.0 | 0.5 | 0.1 | 23.2 | 0.3 | 18.3 | 8.1 | 2.5 | 28.3 | 0.0 | 1.1 |
| Madhya Pradesh | 20794 | 15.7 | 3.9 | 0.8 | 8.8 | 1.0 | 23.9 | 0.6 | 12.6 | 11.1 | 2.5 | 15.3 | 1.3 | 1.7 |
| Maharashtra | 30737 | 13.0 | 5.6 | 1.2 | 7.6 | 0.6 | 16.8 | 0.2 | 13.0 | 11.0 | 2.7 | 25.1 | 0.2 | 2.5 |
| Manipur | 5029 | 9.7 | 6.5 | 0.2 | 9.0 | 8.0 | 8.4 | 0.2 | 19.2 | 9.5 | 4.6 | 19.2 | 0.9 | 4.5 |
| Meghalaya | 4660 | 10.0 | 6.5 | 0.2 | 2.7 | 5.0 | 34.7 | 0.9 | 13.4 | 9.9 | 2.0 | 11.7 | 0.8 | 2.0 |
| Mizoram | 4131 | 11.0 | 7.4 | 0.0 | 4.6 | 6.3 | 23.1 | 1.2 | 12.6 | 3.7 | 2.7 | 20.2 | 1.3 | 4.0 |
| Nagaland | 4482 | 6.6 | 6.2 | 0.1 | 15.0 | 12.9 | 10.9 | 0.1 | 5.5 | 11.2 | 4.2 | 25.7 | 0.1 | 1.3 |
| Odisha | 13156 | 8.8 | 6.7 | 2.0 | 10.1 | 0.6 | 19.8 | 0.1 | 13.6 | 15.6 | 2.4 | 18.2 | 0.1 | 1.8 |
| Puducherry | 800 | 4.9 | 9.3 | 1.6 | 0.8 | 0.0 | 13.8 | 0.0 | 22.8 | 4.5 | 3.3 | 36.3 | 0.0 | 3.0 |
| Punjab | 8807 | 6.4 | 2.9 | 0.5 | 3.7 | 0.6 | 38.8 | 0.1 | 19.6 | 9.0 | 1.8 | 14.9 | 0.1 | 1.4 |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Rajasthan | 13991 | 8.6 | 3.7 | 1.8 | 3.5 | 1.3 | 24.0 | 0.3 | 18.8 | 10.7 | 2.5 | 17.3 | 5.4 | 1.5 |
| Sikkim | 1872 | 5.2 | 14.4 | 1.9 | 8.0 | 2.2 | 4.3 | 0.0 | 3.6 | 8.1 | 5.3 | 45.3 | 0.3 | 1.3 |
| Tamil Nadu | 32573 | 8.7 | 7.7 | 2.3 | 1.6 | 0.3 | 19.7 | 0.8 | 22.0 | 4.3 | 2.3 | 25.3 | 0.1 | 4.7 |
| Telangana | 15948 | 12.8 | 9.7 | 1.1 | 11.2 | 0.6 | 14.8 | 0.3 | 13.1 | 6.9 | 2.8 | 22.9 | 0.6 | 2.7 |
| Tripura | 2797 | 7.9 | 9.9 | 0.9 | 1.2 | 3.8 | 27.5 | 0.4 | 16.6 | 13.2 | 3.6 | 12.5 | 0.1 | 1.6 |
| Uttar Pradesh | 33915 | 11.3 | 4.3 | 0.8 | 3.6 | 2.5 | 23.0 | 0.7 | 16.4 | 11.4 | 4.0 | 16.9 | 1.5 | 1.7 |
| Uttarakhand | 7191 | 2.9 | 4.8 | 11.5 | 0.9 | 2.5 | 10.1 | 1.3 | 10.2 | 10.2 | 3.2 | 39.8 | 0.4 | 1.4 |
| West Bengal | 9972 | 11.5 | 6.0 | 1.4 | 5.5 | 0.5 | 34.2 | 0.1 | 13.6 | 13.1 | 2.4 | 8.8 | 0.1 | 1.6 |
| India | 350678 | 11.0 | 6.1 | 1.4 | 5.5 | 1.5 | 21.1 | 0.4 | 15.5 | 9.6 | 2.9 | 21.1 | 0.8 | 2.3 |

### 3.2 Current Pregnancy Characteristics

Nationally, 45.2% of the pregnant women in ANC HSS 2023 were primigravida while another one-third (35.6%) were second gravida. Rest (19.2%) were pregnant for the third time or higher. This is similar to the pattern seen in previous rounds of HSS among pregnant women (Figure 3.6).

Around 29% of the respondents were in their first trimester, 34.9% were in the second trimester and 36.1% were in the third trimester (Figure 3.7). Around 58.9% reported that they had already received antenatal care services during the current pregnancy.

**Figure 3.6: Distribution (in %) of ANC attendees by gravidity, ANC HSS 2015, 2017, 2019, 2021 and 2023**

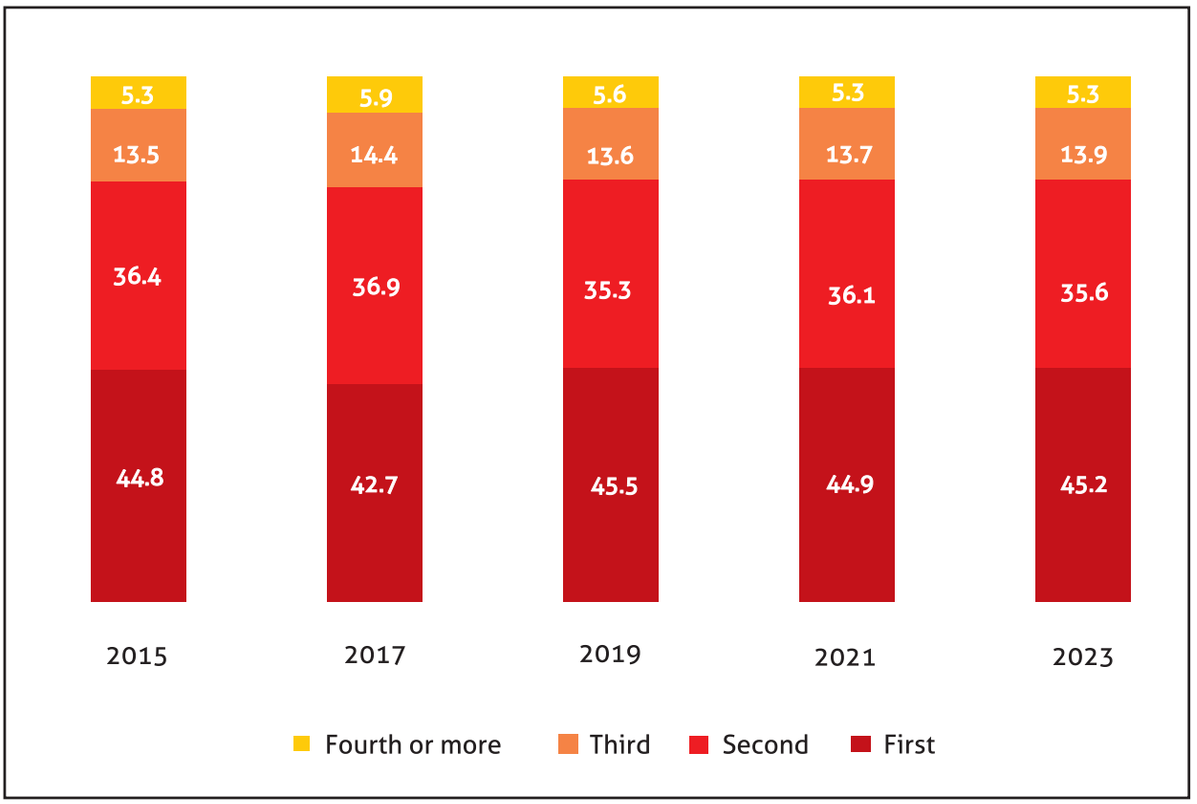
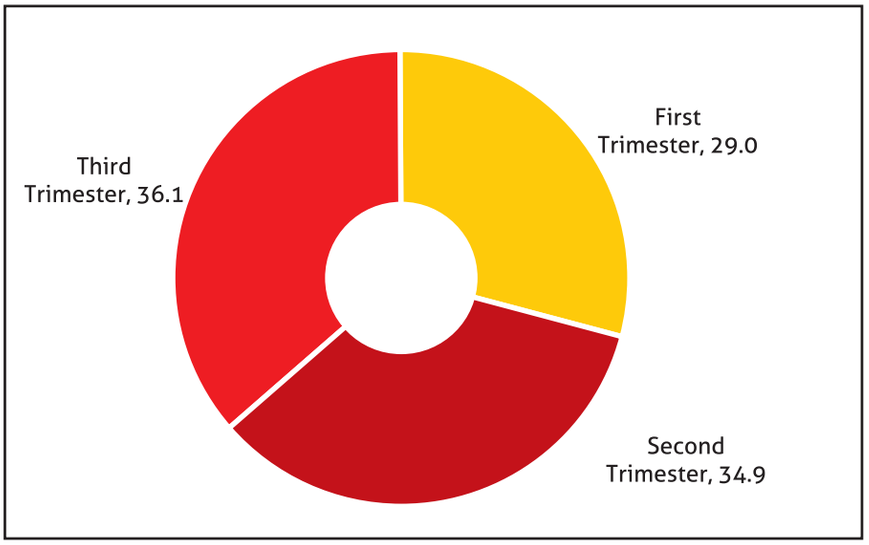


**Figure 3.7: Distribution (in %) of ANC attendees by duration of pregnancy, ANC HSS Plus 2023**




In three States (Manipur, Meghalaya and Mizoram), at least 10% of the respondents reported a gravidity of four or more when recruited in ANC HSS (Table 3.6). In Meghalaya, almost two-fifths (41%) of the total respondents had a pregnancy order of three or higher followed by 37.5% in Mizoram, 28.9% in Bihar, 28.3% in Manipur, and 25.3% in both Haryana and Nagaland. Around one-fourth of respondents in UTs of J&K and Ladakh (26.5%) had pregnancy orders of three or higher.

**Table 3.6: Order of current pregnancy, ANC HSS Plus 2023**

| State/UTs | N | Order of Current Pregnancy (in %) | | | |
|---|---|---|---|---|---|
| | | First | Second | Third | Fourth or more |
| A&N Islands | 1562 | 46.2 | 34.4 | 12.4 | 7.0 |
| Andhra Pradesh | 19184 | 46.9 | 37.7 | 11.9 | 3.5 |
| Arunachal Pradesh | 2883 | 39.4 | 35.5 | 17.0 | 8.1 |
| Assam | 11993 | 47.8 | 39.1 | 10.6 | 2.5 |
| Bihar | 12380 | 40.8 | 30.2 | 19.1 | 9.8 |
| Chandigarh | 800 | 43.9 | 34.6 | 17.4 | 4.1 |
| Chhattisgarh | 11193 | 48.3 | 35.0 | 12.5 | 4.2 |
| DD & DNH | 1200 | 42.7 | 35.7 | 15.4 | 6.3 |
| Delhi | 3998 | 42.0 | 38.8 | 15.0 | 4.2 |
| Goa | 1199 | 42.5 | 36.4 | 16.2 | 4.9 |
| Gujarat | 13990 | 44.7 | 33.1 | 15.6 | 6.6 |
| Haryana | 7609 | 41.5 | 33.1 | 16.3 | 9.0 |

| | | | | | |
|---|---|---|---|---|---|
| Himachal Pradesh | 3596 | 50.8 | 36.6 | 9.9 | 2.7 |
| J&K and Ladakh | 6399 | 37.2 | 36.3 | 19.0 | 7.5 |
| Jharkhand | 10782 | 49.8 | 32.6 | 13.1 | 4.5 |
| Karnataka | 24785 | 43.7 | 37.3 | 14.7 | 4.3 |
| Kerala | 6392 | 39.1 | 40.4 | 15.3 | 5.2 |
| Madhya Pradesh | 20813 | 49.7 | 34.4 | 11.8 | 4.0 |
| Maharashtra | 30753 | 45.8 | 36.0 | 13.7 | 4.4 |
| Manipur | 5030 | 39.9 | 31.8 | 17.5 | 10.8 |
| Meghalaya | 4662 | 33.5 | 25.5 | 16.6 | 24.3 |
| Mizoram | 4153 | 34.4 | 28.1 | 19.4 | 18.1 |
| Nagaland | 4486 | 42.2 | 32.5 | 16.6 | 8.7 |
| Odisha | 13163 | 49.7 | 35.6 | 11.1 | 3.7 |
| Puducherry | 799 | 51.8 | 36.8 | 9.4 | 2.0 |
| Punjab | 8814 | 42.8 | 39.7 | 13.8 | 3.8 |
| Rajasthan | 13993 | 44.7 | 33.9 | 14.6 | 6.7 |
| Sikkim | 1873 | 50.9 | 38.7 | 8.6 | 1.7 |
| Tamil Nadu | 32588 | 46.5 | 39.3 | 11.1 | 3.2 |
| Telangana | 15987 | 46.6 | 37.2 | 13.4 | 2.9 |
| Tripura | 2795 | 56.7 | 35.2 | 6.2 | 1.9 |
| Uttar Pradesh | 33941 | 42.9 | 33.5 | 16.7 | 6.9 |
| Uttarakhand | 7186 | 43.3 | 37.5 | 14.5 | 4.7 |
| West Bengal | 9994 | 50.4 | 37.3 | 10.0 | 2.4 |
| **India** | **350975** | **45.2** | **35.6** | **13.9** | **5.3** |

In Chandigarh, more than two-thirds (69.4%) of pregnant women were in their first trimester. Sikkim (57.4%), Himachal Pradesh (56.3%), DD & DNH (54.3%), and Manipur (52.3%) were other States/UTs with more than half of the respondents in the first trimester. In Telangana (56%), Tamil Nadu (48.8%), and Puducherry (48.4%); around half of the pregnant women recruited in HSS were in the third trimester. Karnataka, Andhra Pradesh, Bihar, Maharashtra, and Mizoram were other States with at least 40% of the pregnant women in the third trimester (Table 3.7).

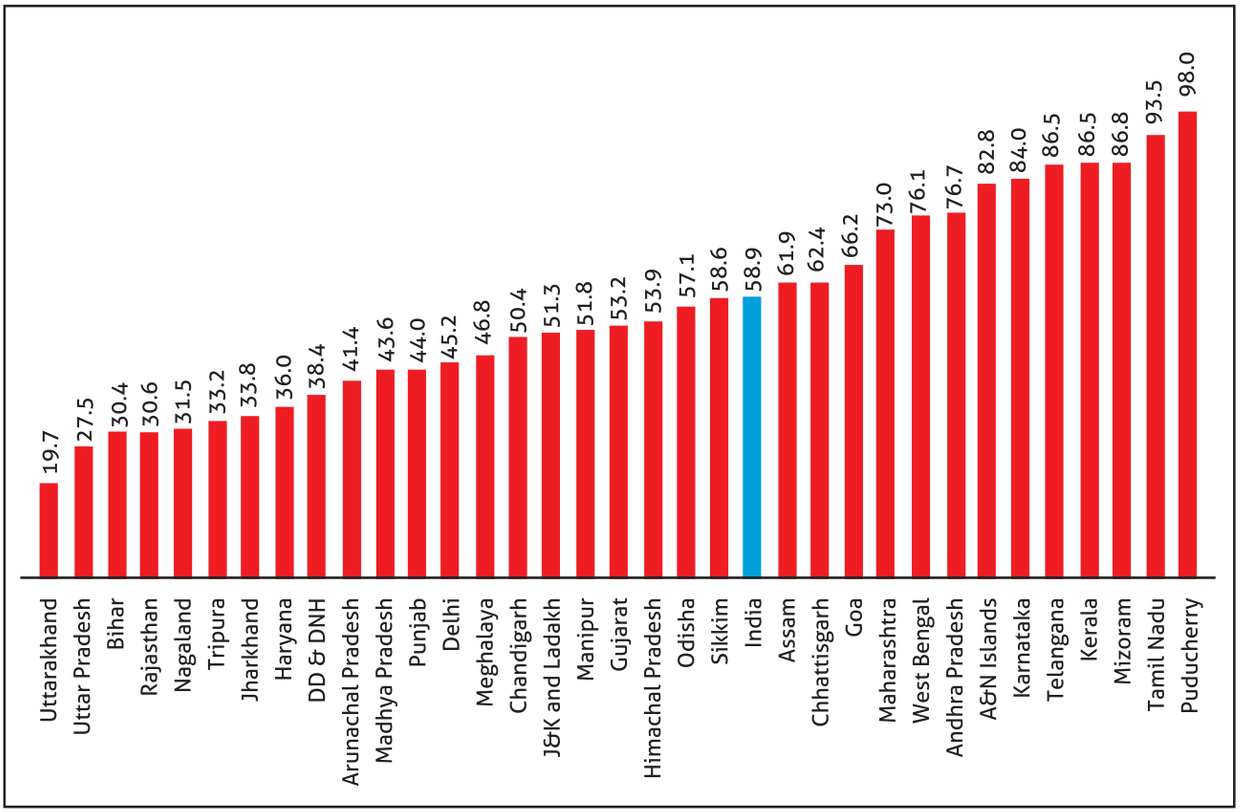
**Table 3.7: Duration of current pregnancy, ANC HSS Plus 2023**

| State/UT | N | Trimester | | |
|---|---|---|---|---|
| | | First | Second | Third |
| A&N Islands | 1562 | 43.7 | 30.8 | 25.5 |
| Andhra Pradesh | 19189 | 20.5 | 37.2 | 42.4 |
| Arunachal Pradesh | 2881 | 48.5 | 31.7 | 19.9 |
| Assam | 11996 | 33.8 | 33.7 | 32.5 |
| Bihar | 12370 | 22.7 | 36.1 | 41.2 |
| Chandigarh | 800 | 69.4 | 14.6 | 16.0 |
| Chhattisgarh | 11183 | 31.7 | 37.8 | 30.5 |
| DD & DNH | 1200 | 54.3 | 26.1 | 19.7 |
| Delhi | 3996 | 28.0 | 42.1 | 29.9 |
| Goa | 1200 | 40.3 | 32.3 | 27.4 |
| Gujarat | 13989 | 37.1 | 32.5 | 30.4 |
| Haryana | 7608 | 43.5 | 32.6 | 23.9 |
| Himachal Pradesh | 3600 | 56.3 | 30.6 | 13.2 |
| J&K and Ladakh | 6397 | 40.9 | 29.7 | 29.4 |
| Jharkhand | 10774 | 31.2 | 41.1 | 27.6 |
| Karnataka | 24787 | 25.6 | 28.7 | 45.6 |
| Kerala | 6392 | 36.7 | 25.3 | 38.0 |
| Madhya Pradesh | 20815 | 23.8 | 38.1 | 38.2 |
| Maharashtra | 30749 | 27.7 | 31.2 | 41.0 |
| Manipur | 5023 | 52.3 | 30.1 | 17.6 |
| Meghalaya | 4665 | 34.4 | 39.4 | 26.2 |
| Mizoram | 4154 | 32.0 | 27.6 | 40.4 |
| Nagaland | 4481 | 44.6 | 35.3 | 20.1 |
| Odisha | 13151 | 36.4 | 35.6 | 28.1 |
| Puducherry | 798 | 8.1 | 43.5 | 48.4 |

| | | | | |
|---|---|---|---|---|
| Punjab | 8809 | 37.5 | 32.0 | 30.5 |
| Rajasthan | 13991 | 33.1 | 39.5 | 27.5 |
| Sikkim | 1875 | 57.4 | 25.0 | 17.6 |
| Tamil Nadu | 32568 | 17.8 | 33.3 | 48.8 |
| Telangana | 15994 | 14.9 | 29.0 | 56.0 |
| Tripura | 2791 | 41.7 | 38.7 | 19.6 |
| Uttar Pradesh | 33940 | 23.4 | 41.2 | 35.4 |
| Uttarakhand | 7180 | 33.0 | 38.6 | 28.4 |
| West Bengal | 9991 | 27.9 | 45.5 | 26.6 |
| **India** | **350899** | **29.0** | **34.9** | **36.1** |

There was significant inter-State variation regarding the receipt of antenatal care services by respondents prior to their current visit (Figure 3.8). In Puducherry, Tamil Nadu, Mizoram, Kerala, Telangana, Karnataka, A&N Islands, Andhra Pradesh, and West Bengal; at least three-fourths of women reported receiving prior care. In Uttarakhand, less than one-fourth of pregnant women reported receiving the same. Uttar Pradesh, Bihar, Rajasthan, Nagaland, Tripura, and Jharkhand were also States where less than one-third of pregnant women reported receiving prior care.

**Figure 3.8: Received antenatal care services prior to current visit; ANC HSS Plus 2023**

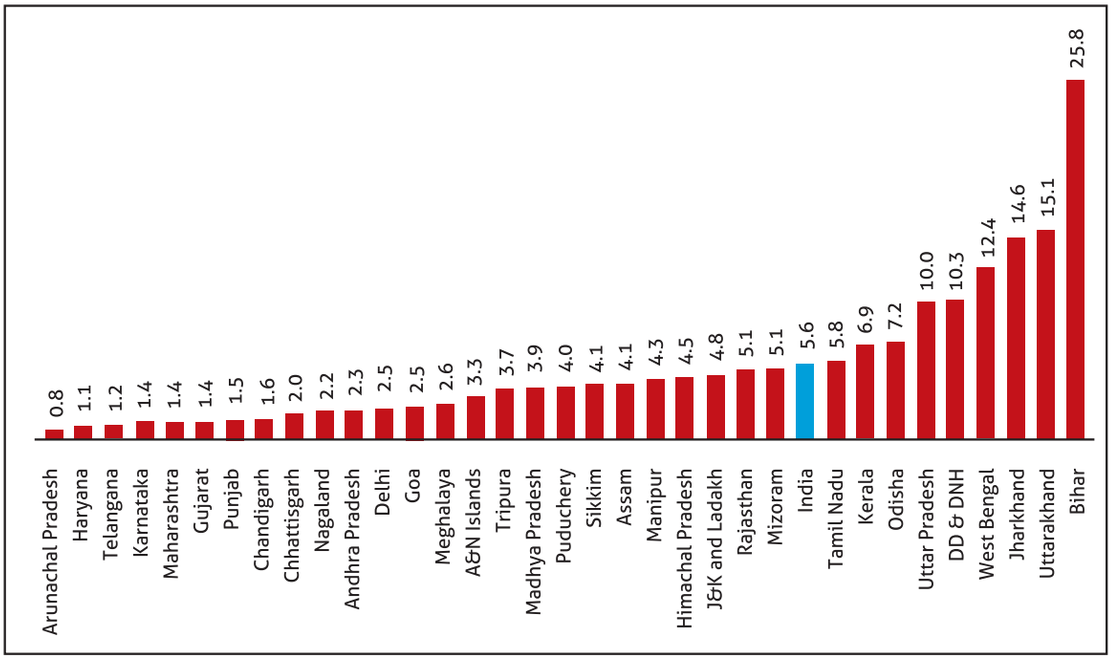


### 3.3 Spouse Migration Status

HSS among ANC attendees enquires if the spouse/partner resided alone in another place/town for work for a period longer than six months in past one year to understand the migration status of the spouse/partner.

Overall, around 5.6% of total respondents reported their spouse/partner resided alone in another place/ town for work for more than six months in the past one year. Out-migration was reported most in Bihar (25.8%), followed by Uttarakhand (15.1%). Further, Jharkhand, West Bengal, DD & DNH, and Uttar Pradesh were other States/UTs where the out-migration of spouses for work was reported by 10-15% of respondents. In eight states (Arunachal Pradesh, Haryana, Telangana, Karnataka, Maharashtra, Gujarat, Punjab, and Chandigarh) out-migration of spouses/partners was reported by less than 2% of the respondents (Figure 3.9).

**Figure 3.9 Spouse migration history; ANC HSS Plus 2023**




### 3.4 HIV Testing and Treatment Services Uptake

Overall, more than half (52.6%) of the pregnant women recruited in HSS Plus 2023 reported being tested for HIV at least once in their life-time before their current visit to the clinic. In Puducherry, more than 95% of the pregnant women reported being tested for HIV, followed by Tamil Nadu (89.3%) and A&N Islands (83.3%). Kerala, Mizoram, Karnataka, Andhra Pradesh, Telangana, and Chhattisgarh were other States where at least two-thirds of respondents reported a history of HIV tests. In Rajasthan, Uttar Pradesh, Bihar and Tripura, one-third or less of the pregnant women reported HIV testing services uptake (Figure 3.10).

Pregnant women, who reported a history of HIV testing, were enquired about the timing of their last pregnancy. The responses were captured as 'Tested during current pregnancy' or 'Tested before current pregnancy'. More than 95% of the respondents in Puducherry reported HIV testing during current pregnancy followed by those in Tamil Nadu (91%). Further, West Bengal, DD & DNH, A&N Islands, Andhra Pradesh, Kerala and Karnataka were other States/UTs where at least two-thirds of the respondents reported HIV testing during the current pregnancy. In the States/UTs of Tripura, Chandigarh, and Manipur; at least two-thirds of pregnant women reported last being tested for HIV prior to the current pregnancy (Figure 3.11).

**Figure 3.10 Testing for HIV before current visit; ANC HSS Plus 2023**

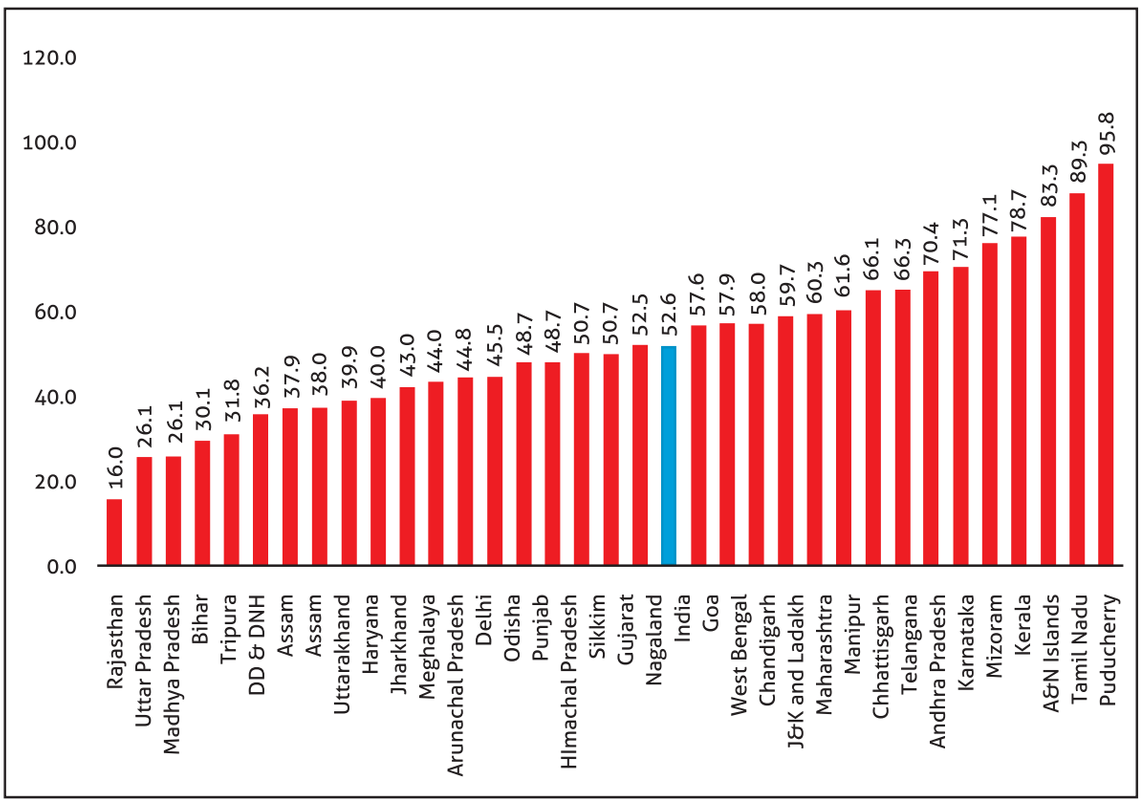
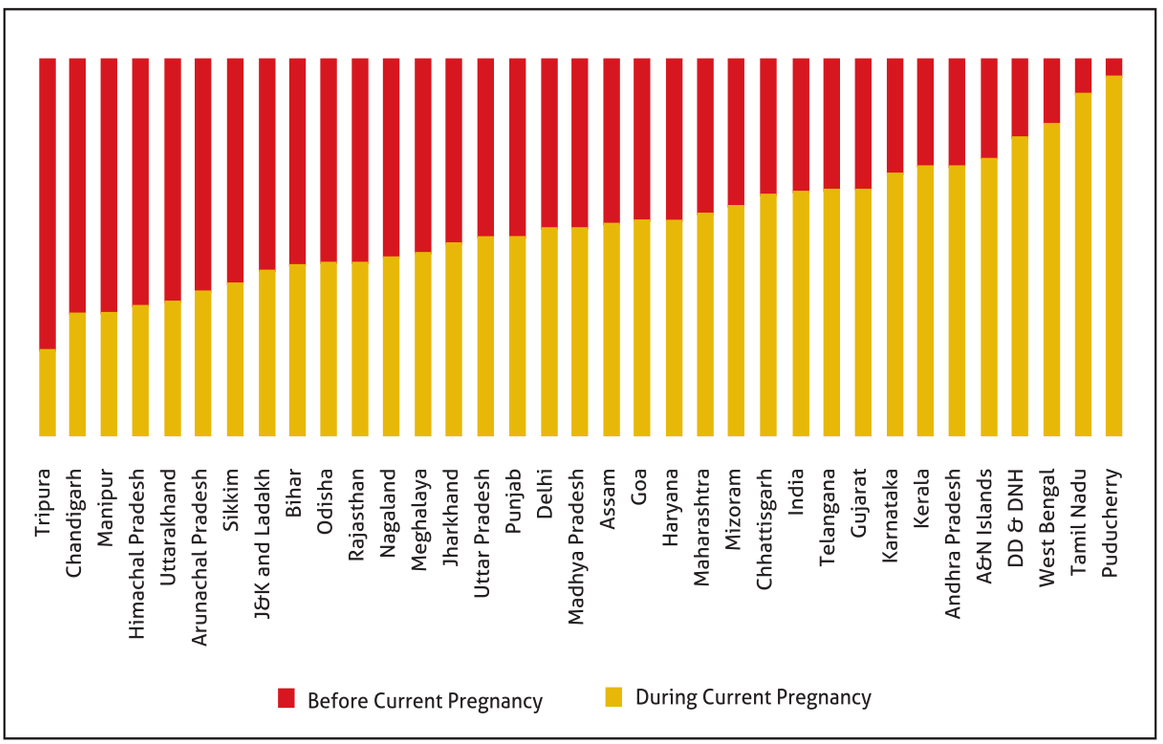



**Figure 3.11 Timing of last test among pregnant women who were ever tested for HIV: ANC HSS Plus 2023**




Among respondents who tested positive for HIV in HSS Plus 2023, almost two-thirds (69%) reported being tested for HIV at least once. Overall, half (48.7%) of the respondents who tested positive for HIV were taking antiretroviral medications/HIV tablets.

### 3.5 Levels of HIV, Syphilis, and related co-infections

Nationally, the observed HIV prevalence was 0.23% (95% CI: 0.21-0.25) among the pregnant women. Reverse testing algorithm was followed for syphilis testing in this round of HSS. Treponomal assay was performed first for all serum samples. RPR (semiquantitative) was done on samples found positive by TPHA. TPHA-reactive sero-positivity (weighted) was found at 0.24% (95% CI: 0.22-0.26) and weighted sero-prevalence of syphilis (TPHA followed by RPR reactive) was 0.11% (95% CI: 0.10-0.12). Table 3.8 and Figure 3.12 depict the sero-prevalence of HIV and sero-positivity for Syphilis among pregnant women at the national level.

In terms of co-morbidities/co-infections, the prevalence of HIV-Syphilis (TPHA-reactive) among pregnant women was 0.0091% (95% CI: 0.0060-0.0123), while the sero-prevalence of HIV-HBV was 0.0046%. (95% CI: 0.0023-0.0068). The sero-prevalence of HIV-HCV among pregnant women was 0.0034% (95% CI:0.0015-0.0053).

Among the HIV-positive respondents, the sero-positivity for Syphilis (TPHA-reactive) was 4.06% (95% CI: 2.68-5.44). The sero-prevalence for HBV and HCV among the HIV-positive respondents was 2.03% (95% CI:1.05-3.02) and 1.52% (95% CI:0.67-2.38), respectively.

Highest HIV prevalence (weighted) was noted in State of Mizoram [0.63%, 95% CI: 0.39-0.86], followed by Meghalaya [0.58%, 95% CI: 0.36-0.80], Karnataka [0.57%, 95% CI: 0.48-0.67], Nagaland [0.51%, 95% CI: 0.30-0.72], Tripura [0.43%, 95% CI: 0.19-0.67], Maharashtra [0.36%, 95% CI: 0.30-0.43], Odisha [0.33%, 95% CI: 0.24-0.43], Manipur [0.32%, 95% CI: 0.16-0.47], Telangana [0.32%, 95% CI: 0.23-0.41], and Andhra Pradesh [0.30%, 95% CI: 0.22-0.38] (Table 3.8). HIV prevalence of 1% or more was noted at 44 sites spread across 43 districts of the country which is the lowest since 2003 (Figure 3.13). In Karnataka, eight districts had at least one site reporting HIV prevalence of 1% or more followed by five in Maharashtra, four in Nagaland, three each in Odisha, Telangana, and Uttar Pradesh (Table 3.9). Syphilis sero-positivity was highest in Manipur [2.68%, 95% CI: 2.33-3.17], followed by Meghalaya [2.01%, 95% CI: 1.61-2.42]. (Table 3.8).

**Figure 3.12: State/UT-wise weighted sero-prevalence (%) of HIV among pregnant women, ANC HSS Plus 2023**

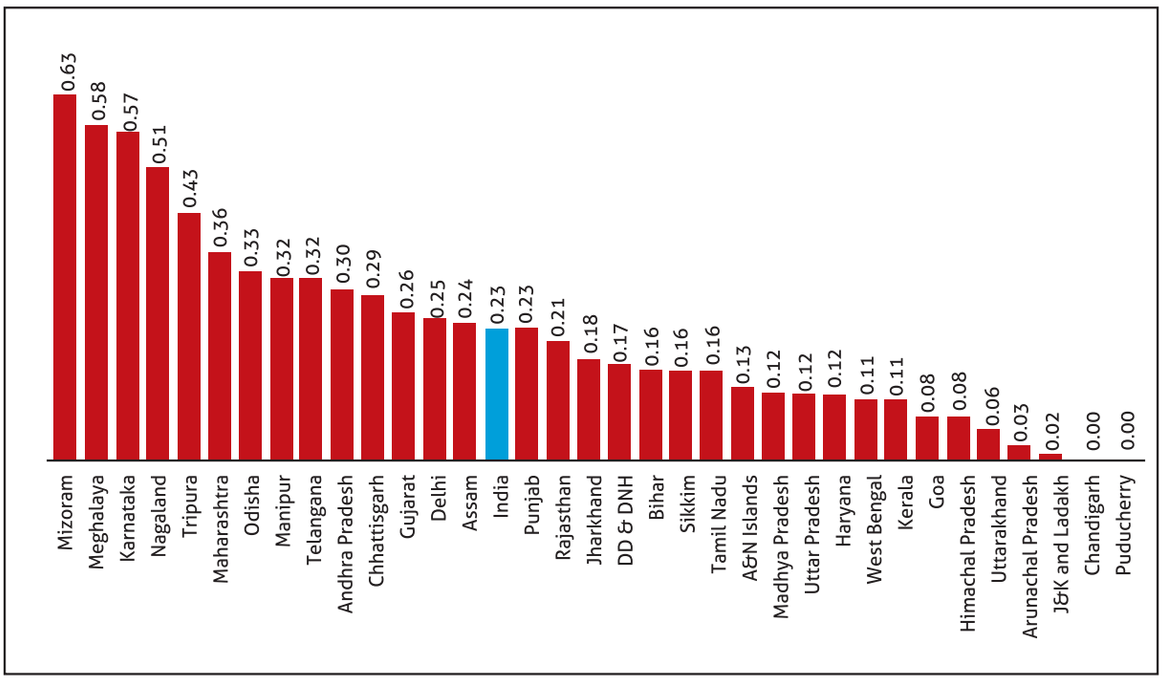


**Table 3.8: State/UT-wise weighted sero-prevalence (%)/sero-positivity (%) of HIV, and Syphilis among pregnant women, ANC HSS Plus 2023**

| State/UT | HIV | | Syphilis | |
|---|---|---|---|---|
| | N | Sero-prevalence | N | Sero-prevalence |
| A&N Islands | 1562 | 0.13 (0.00-0.31) | 1562 | 0.00 (0.00-0.00) |
| Andhra Pradesh | 19200 | 0.30 (0.22-0.38) | 19200 | 0.05 (0.02-0.08) |
| Arunachal Pradesh | 2886 | 0.03 (0.00-0.10) | 2886 | 0.52 (0.26-0.78) |
| Assam | 12000 | 0.24 (0.15-0.33) | 12000 | 0.04 (0.01-0.08) |
| Bihar | 12399 | 0.16 (0.09-0.23) | - | - |
| Chandigarh | 800 | 0.00 (0.00-0.00) | 800 | 0.00 (0.00-0.00) |
| Chhattisgarh | 11197 | 0.29 (0.19-0.40) | 11197 | 0.08 (0.03-0.13) |
| DD & DNH | 1200 | 0.17 (0.00-0.40) | 1196 | 0.00 (0.00-0.00) |
| Delhi | 4000 | 0.25 (0.10-0.40) | 4000 | 0.03 (0.00-0.07) |
| Goa | 1200 | 0.08 (0.00-0.25) | 1200 | 0.17 (0.00-0.40) |
| Gujarat | 13995 | 0.26 (0.17-0.34) | - | - |
| Haryana | 7612 | 0.12 (0.04-0.20) | 7610 | 0.29 (0.17-0.41) |
| Himachal Pradesh | 3600 | 0.08 (0.00-0.18) | 3600 | 0.00 (0.00-0.00) |
| J&K and Ladakh | 6400 | 0.02 (0.00-0.05) | 6400 | 0.05 (0.00-0.10) |
| Jharkhand | 10799 | 0.18 (0.10-0.25) | 10799 | 0.01 (0.00-0.03) |
| Karnataka | 24799 | 0.57 (0.48-0.67) | 24799 | 0.10 (0.06-0.14) |
| Kerala | 6400 | 0.11 (0.03-0.19) | 6400 | 0.05 (0.00-0.10) |
| Madhya Pradesh | 20828 | 0.12 (0.07-0.16) | 20827 | 0.31 (0.23-0.38) |
| Maharashtra | 30761 | 0.36 (0.30-0.43) | 30723 | 0.04 (0.02-0.07) |
| Manipur | 5039 | 0.32 (0.16-0.47) | 5039 | 2.68 (2.33-3.17) |
| Meghalaya | 4669 | 0.58 (0.36-0.80) | 4669 | 2.01 (1.61-2.42) |
| Mizoram | 4159 | 0.63 (0.39-0.86) | 4159 | 0.29 (0.13-0.45) |
| Nagaland | 4492 | 0.51 (0.30-0.72) | 4492 | 0.24 (0.10-0.39) |

| | | | | |
|---|---|---|---|---|
| Odisha | 13171 | 0.33 (0.24-0.43) | 13171 | 0.30 (0.20-0.39) |
| Puducherry | 800 | 0.00 (0.00-0.00) | 800 | 0.00 (0.00-0.00) |
| Punjab | 8822 | 0.23 (0.13-0.33) | 8698 | 0.10 (0.04-0.17) |
| Rajasthan | 13998 | 0.21 (0.14-0.29) | 13998 | 0.15 (0.09-0.21) |
| Sikkim | 1875 | 0.16 (0.00-0.34) | 1818 | 0.33 (0.07-0.59) |
| Tamil Nadu | 32600 | 0.16 (0.11-0.20) | 32600 | 0.09 (0.05-0.12) |
| Telangana | 15999 | 0.32 (0.23-0.41) | 15999 | 0.17 (0.11-0.23) |
| Tripura | 2800 | 0.43 (0.19-0.67) | 2800 | 0.07 (0.00-0.17) |
| Uttar Pradesh | 33992 | 0.12 (0.08-0.16) | 28393 | 0.15 (0.10-0.19) |
| Uttarakhand | 7200 | 0.06 (0.00-0.11) | 7200 | 0.33 (0.20-0.47) |
| West Bengal | 9998 | 0.11 (0.05-0.18) | 9996 | 0.08 (0.02-0.14) |
| **India** | **351252** | **0.23 (0.21-0.25)** | **319031** | **0.11 (0.10-0.12)** |

**Figure 3.13: Year-wise distribution of valid sites in different HIV prevalence (%) categories among ANC clinic attendees, ANC HSS Plus 2023**

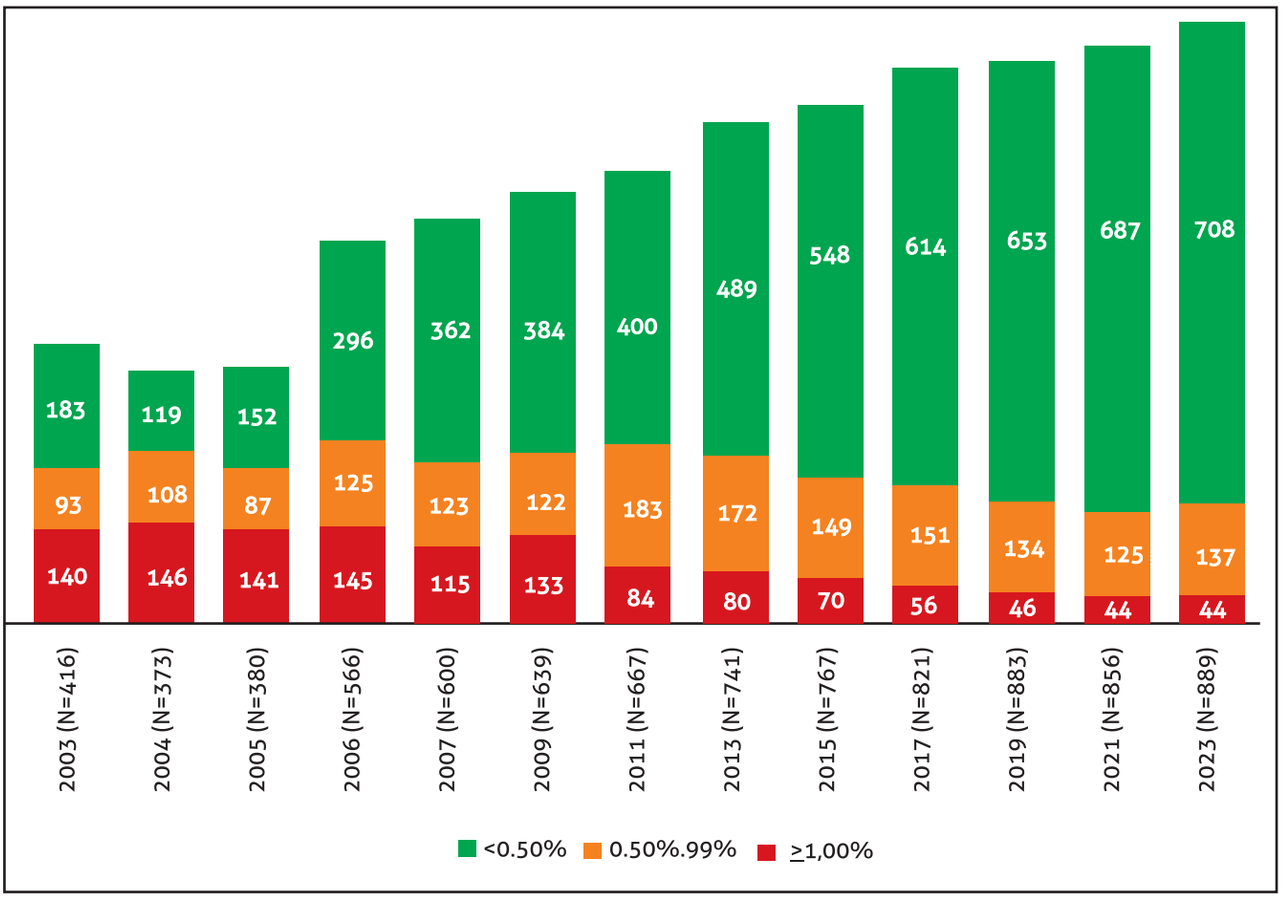


**Table 3.9: Districts with at least one site having HIV prevalence of 1% or more, ANC HSS Plus 2023**

| State/UT | Districts with at least one site having HIV prevalence of 1% or more | Name of Districts |
|---|---|---|
| Andhra Pradesh | 2 | Kadapa, Kakinada |
| Assam | 2 | Cachar, Karimganj |
| Bihar | 1 | Nalanda |
| Chhattisgarh | 2 | Bilaspur, Janjgir-Champa |
| Gujarat | 1 | Panchmahal |
| Karnataka | 8 | Bagalkot, Bangalore, Belgaum, Hassan, Kodagu, Kolar, Koppal, Raichur |
| Maharashtra | 5 | Akola, Nanded, Nashik, Pune, Raigad |
| Manipur | 1 | Churachandpur |
| Meghalaya | 2 | East Jaintia Hills, West Jaintia Hills |
| Mizoram | 2 | Aizawl, Mamit |
| Nagaland | 4 | Kiphire, Mokokchung, Noklak, Phek |
| Odisha | 3 | Anugul, Koraput, Nabarangapur |
| Rajasthan | 1 | Sirohi |
| Tamil Nadu | 1 | Sivaganga |
| Telangana | 3 | Hyderabad, Warangal, Yadadri Bhuvangiri |
| Tripura | 2 | North Tripura, West Tripura |
| Uttar Pradesh | 3 | Ambedkar Nagar, Mathura, Mao |

### 3.6 HIV Prevalence Trend

Since 2002, there were 858 sites with at least three data points till the 2023 round of HSS among pregnant women. The section below presents the HIV prevalence trend since 2002 at national level based on the data from these sites. Figure 3.14 below present the national trend. As evident, HIV prevalence continues to have a declining trend nationally.

The HIV prevalence trend in the southern (Andhra Pradesh, Karnataka, Kerala, Puducherry, Tamil Nadu, Telangana) and western (Maharashtra, Dadra and Nagar Haveli and Daman and Diu, Goa, and Gujarat) regions is also declining similar to the national trend. HIV prevalence in the central (Chhattisgarh, Madhya Pradesh, Uttar Pradesh), eastern (A&N Islands, Bihar, Jharkhand, Odisha, West Bengal) and northern region

(Chandigarh, Delhi, Haryana, Himachal Pradesh, J&K and Ladakh, Punjab, Rajasthan, Uttaranchal) was at a much lower level than the national averages in 2002. HIV prevalence in these regions has declined but appears to have a relatively lower decline than in the southern and western regions.

State-wise, the ANC prevalence has continued to decline in all states of the southern and western regions except in Maharashtra (Figure 3.15). In Maharashtra, HIV prevalence (unweighted) was noted at 0.32% in HSS 2015 and it became 0.33% in HSS 2023. In the central region, HIV prevalence has been declining in Chhattisgarh and Uttar Pradesh. Among the northern States, the HIV prevalence trend has been declining in the recent past in Punjab, Rajasthan, and Uttarakhand, while a stable trend was noted in Delhi (Figure 3.19). Among the eastern States, a declining trend is noted in Jharkhand, Bihar and West Bengal, while an increasing trend is noted in Odisha (Figure 3.20). Among the north-eastern States, a rising trend is being noted in Arunachal Pradesh, Assam, Meghalaya, Sikkim and Tripura (Figure 3.15).

**Figure 3.14: HIV prevalence trend among pregnant women in India, ANC HSS 2002-2023**

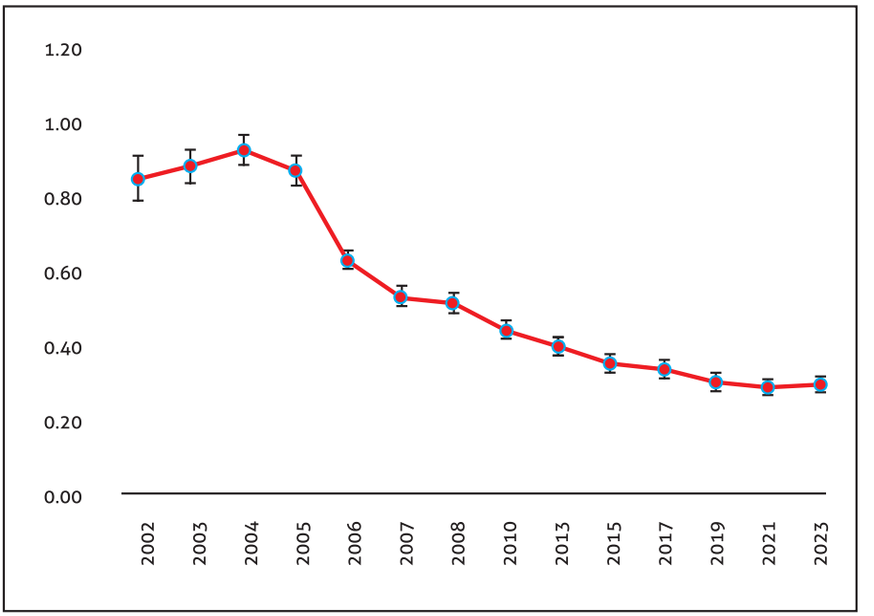
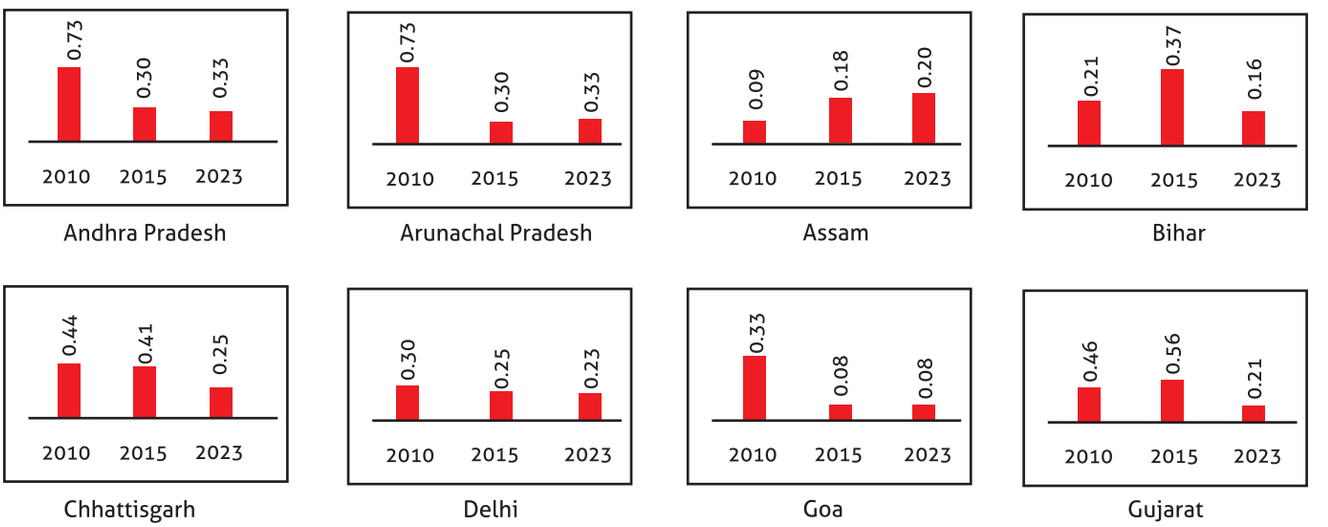
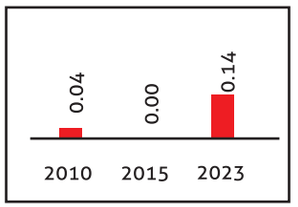
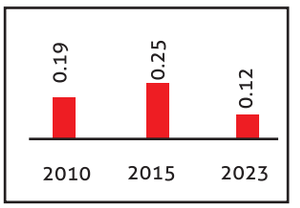



**Figure 3.15: State wise ANC HIV Prevalence based on consistent sites, ANC HSS 2010, 2015 and 2023**

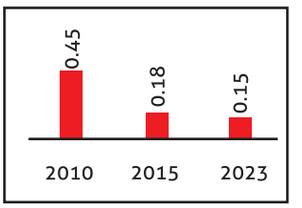




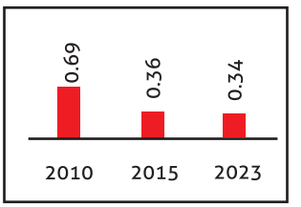
Himachal Pradesh



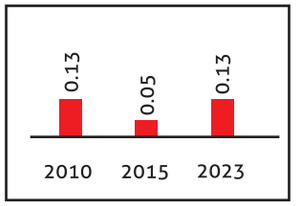
Haryana



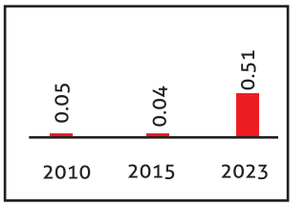
Jharkhand



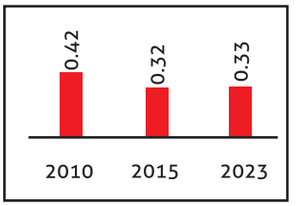
Karnataka



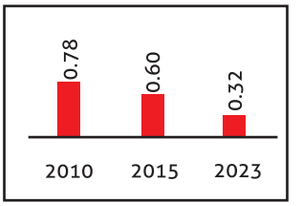
Kerala



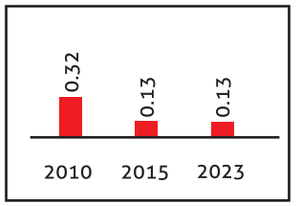
Meghalaya



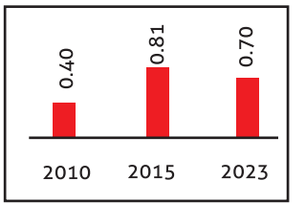
Maharashtra



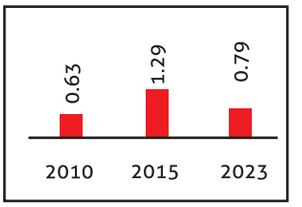
Manipur



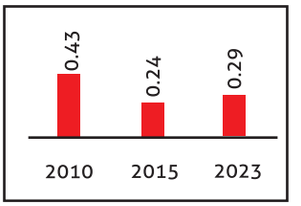
Madhya Pradesh



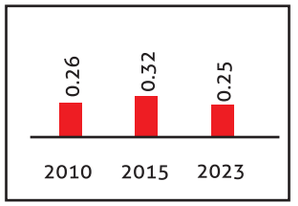
Mizoram



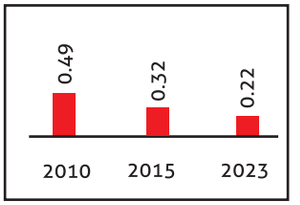
Nagaland



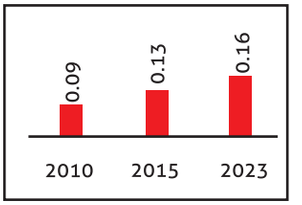
Odisha



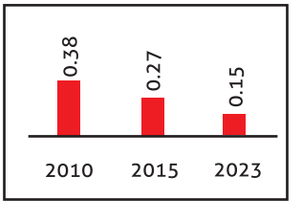
Punjab



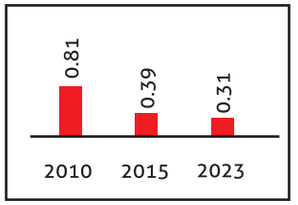
Rajasthan



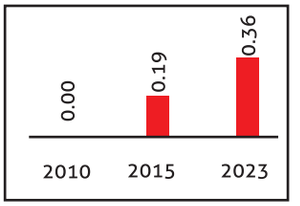
Sikkim



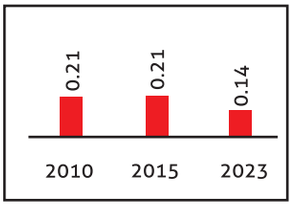
Tamil Nadu



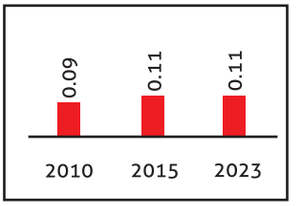
Telangana



Tripura



Uttar Pradesh



West Bengal

### 3.7 HIV Prevalence by respondent's characteristics

Table 3.10 presents the HIV prevalence by pregnant women's characteristics at the national level in HSS 2023. In general, HIV prevalence among pregnant women has been increasing with age with prevalence among the 35+ years age group almost twice that among the 20-29 years (Figure 3.16). HIV prevalence was inversely associated with education; the prevalence decreased as education level increased (Figure 3.17). Higher HIV prevalence was noted among illiterate and those who had education up to 10$^{th}$ standard, while the lowest prevalence was noted among those with post-graduate education (0.08%). HIV prevalence was at 0.24% among pregnant women belonging to urban areas in comparison to 0.21% among those who belonged to rural areas (Figure 3.18).

HIV prevalence was highest at 0.46% among those who reported having spouses occupation as a truck driver/helper, followed by 0.32% among ANC women with a spouse as a local transport worker and 0.28% as an unemployed (Figure 3.20). HIV prevalence was at 0.23% among respondents whose spouses migrate for work purposes in comparison to 0.22% among those whose spouses didn't migrate.

**Figure 3.16: HIV prevalence by age group, ANC HSS Plus 2023**

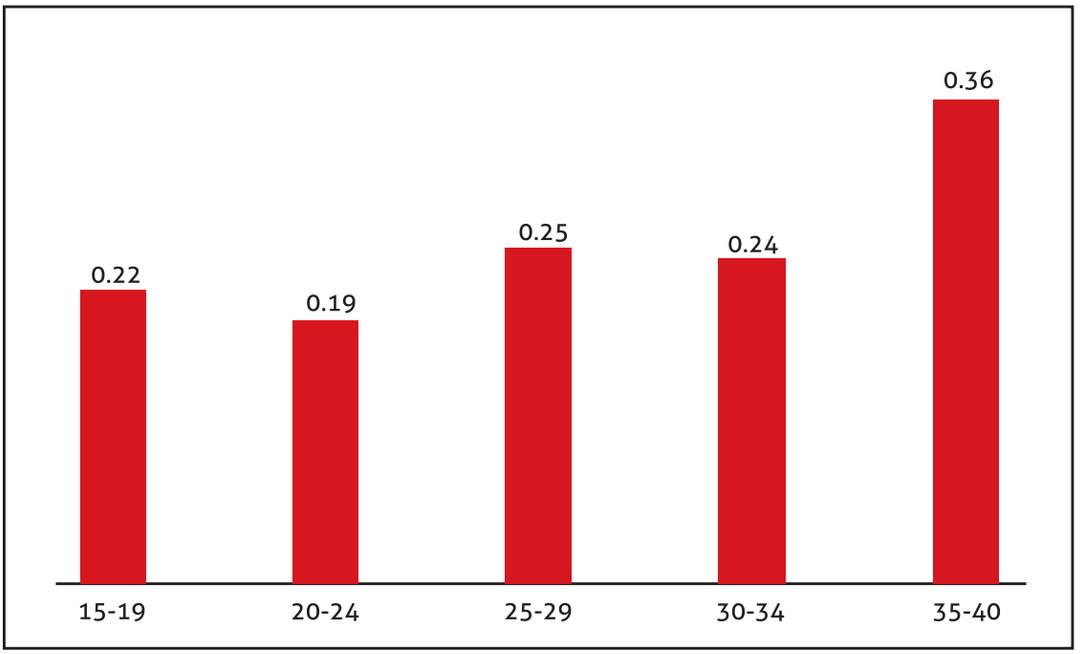



**Figure 3.17 HIV prevalence by education, ANC HSS Plus 2023**

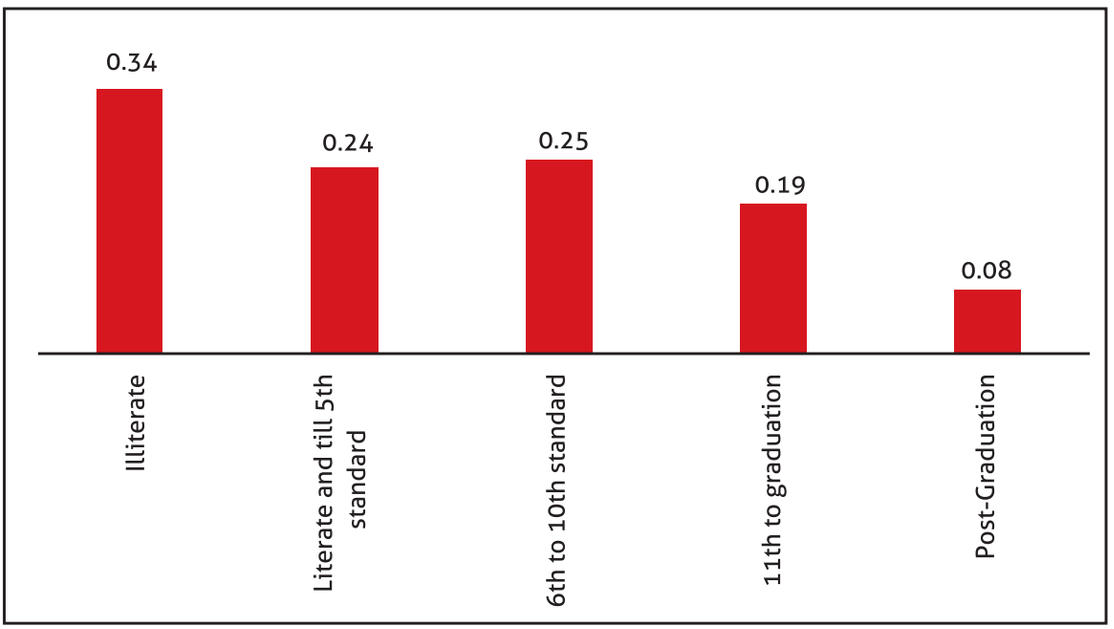


**Figure 3.18 HIV prevalence by place of residence, ANC HSS Plus 2023**

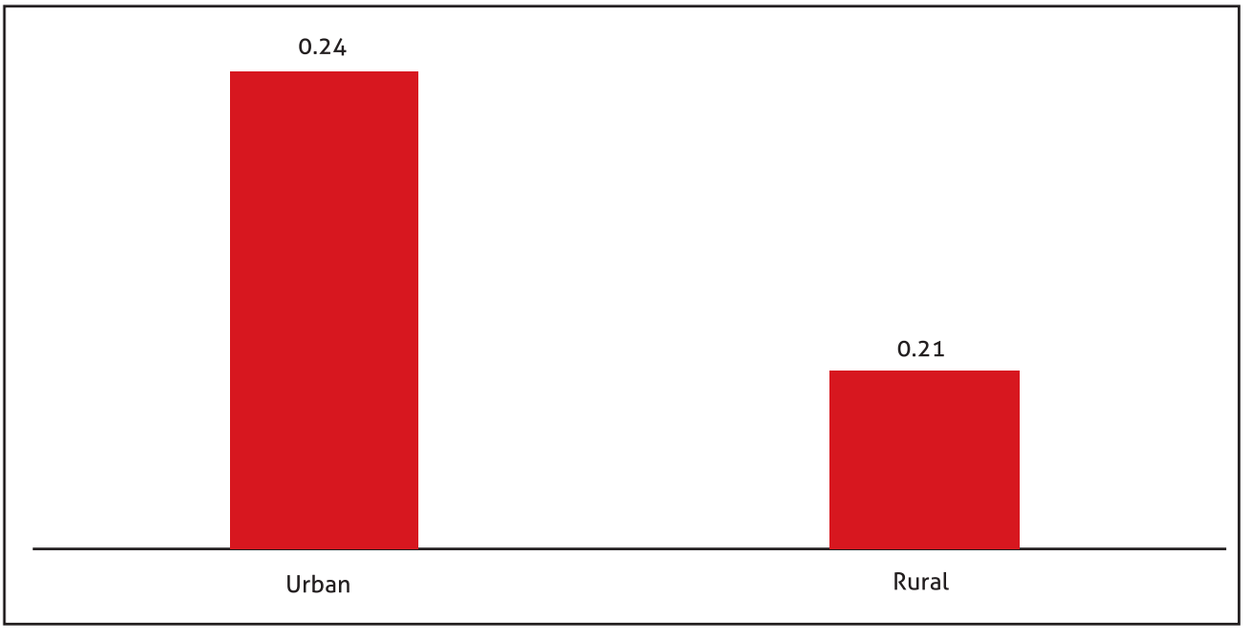



**Figure 3.19 HIV prevalence by occupation of pregnant women, ANC HSS Plus 2023**

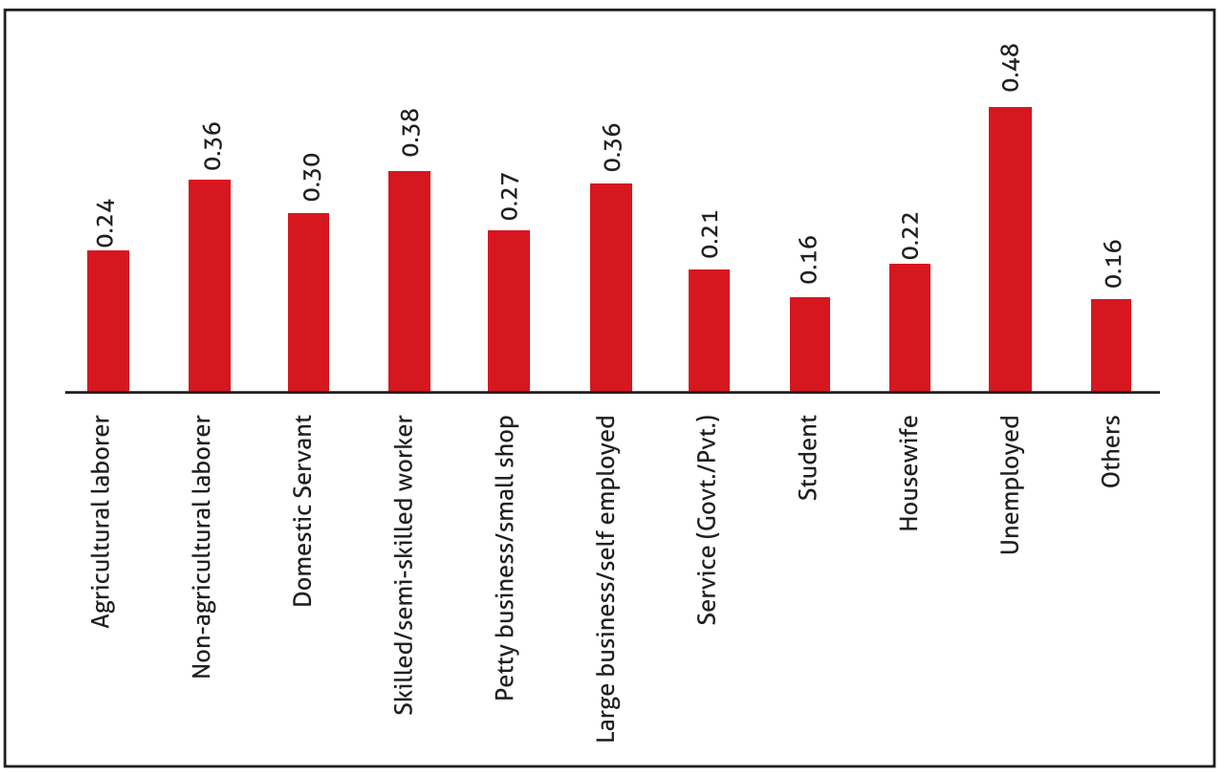


**Figure 3.20 HIV prevalence by occupation of spouse of pregnant women, ANC HSS Plus 2023**

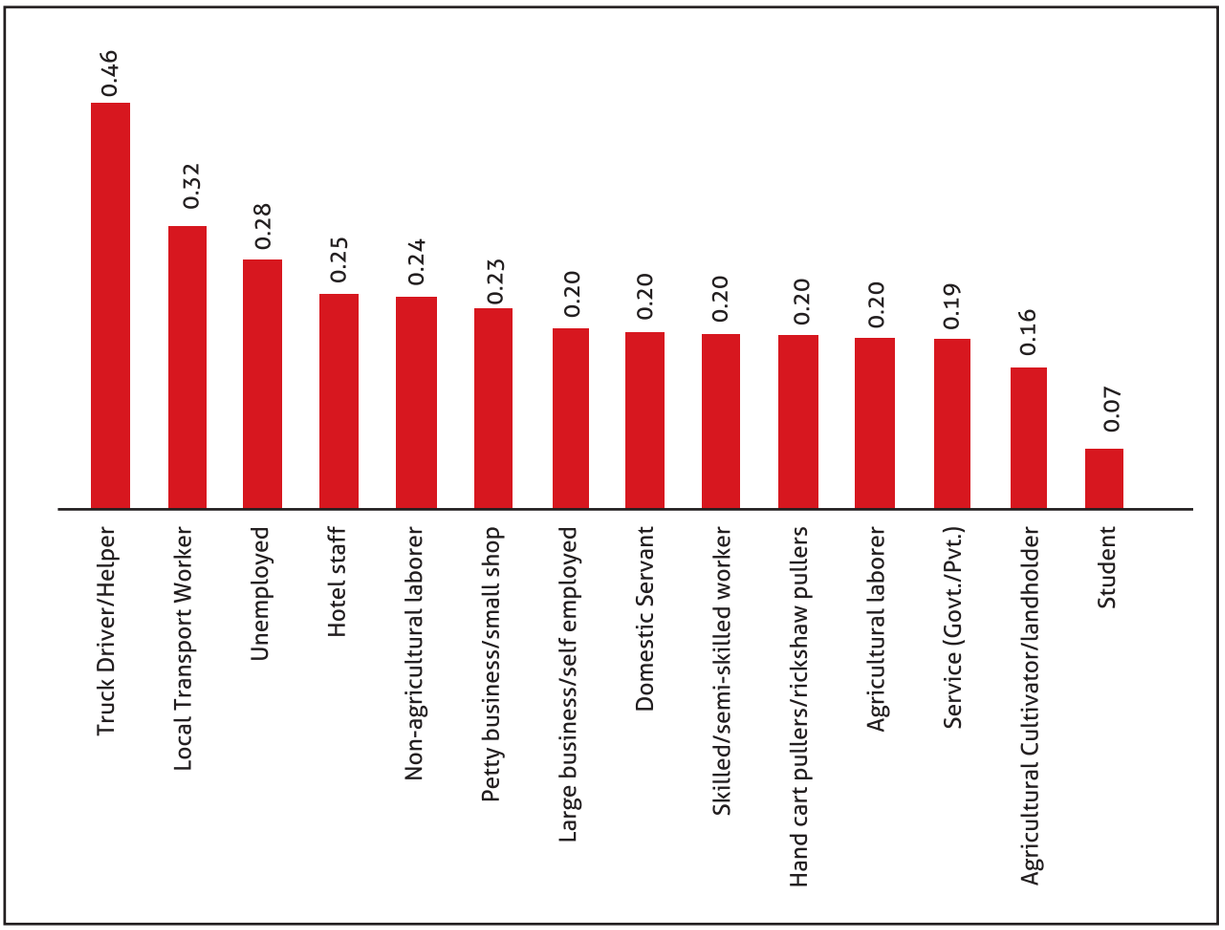



**Table 3.10 HIV prevalence by background characteristics of antenatal clinic attendees, ANC HSS Plus 2023**

| Background characteristics | Categories | Distribution | | HIV Prevalence |
|---|---|---|---|---|
| | | N* | (%) | (%) |
| Age | 15-19 | 25723 | 7.3 | 0.22 |
| | 20-24 | 161370 | 45.9 | 0.19 |
| | 25-29 | 110621 | 31.5 | 0.25 |
| | 30-34 | 41265 | 11.7 | 0.24 |
| | 35+ | 12273 | 3.5 | 0.36 |
| Residence | Urban | 116078 | 33.5 | 0.24 |
| | Rural | 230913 | 66.5 | 0.21 |
| Education | Illiterate | 22855 | 6.5 | 0.34 |
| | Literate and till 5th standard | 40813 | 11.6 | 0.24 |

| | | | | |
|---|---|---|---|---|
| | 6th to 10th standard | 138760 | 39.5 | 0.25 |
| | 11th to Graduation | 128629 | 36.6 | 0.19 |
| | Post-Graduation | 19713 | 5.6 | 0.08 |
| Respondent Occupation | Agricultural laborer | 10517 | 3.0 | 0.24 |
| | Non-agricultural laborer | 6085 | 1.7 | 0.36 |
| | Domestic Servant | 1329 | 0.4 | 0.30 |
| | Skilled/semi-skilled worker | 2931 | 0.8 | 0.38 |
| | Petty business/small shop | 1862 | 0.5 | 0.27 |
| | Large business/self employed | 563 | 0.2 | 0.36 |
| | Service (Govt./Pvt.) | 10853 | 3.1 | 0.21 |
| | Student | 3097 | 0.9 | 0.16 |
| | Housewife | 308316 | 87.9 | 0.22 |
| | Unemployed | 835 | 0.2 | 0.48 |
| | Others | 4302 | 1.2 | 0.16 |
| Spouse Occupation | Agricultural laborer | 38677 | 11.0 | 0.20 |
| | Non-agricultural laborer | 74043 | 21.1 | 0.24 |
| | Domestic Servant | 1490 | 0.4 | 0.20 |
| | Skilled/semi-skilled worker | 54309 | 15.5 | 0.20 |
| | Petty business/small shop | 33835 | 9.7 | 0.23 |
| | Large business/self employed | 10255 | 2.9 | 0.20 |
| | Service (Govt./Pvt.) | 74016 | 21.1 | 0.19 |
| | Student | 2909 | 0.8 | 0.07 |
| | Truck Driver/Helper | 8014 | 2.3 | 0.46 |
| | Local Transport Worker | 21502 | 6.1 | 0.32 |
| | Hand cart pullers/rickshaw pullers | 1998 | 0.6 | 0.20 |
| | Hotel staff | 4865 | 1.4 | 0.25 |
| | Agricultural Cultivator/landholder | 19132 | 5.5 | 0.16 |
| | Unemployed | 5283 | 1.5 | 0.28 |
| Migrant Spouse | Yes | 19520 | 5.6 | 0.23 |
| | No | 329595 | 94.4 | 0.22 |

*Total may not add up to 3,51,252 because of missing/not applicable response

## 4. DISCUSSION

The 18th round of HIV sentinel surveillance among antenatal care clinic attendees was implemented at 889 sites spread across 690 districts in the country. This round was not only the largest in terms of sites covered and samples collected but was also the first round ofinclusion of Informed consent for all ANC attendees, and inclusion of treponemal test followed by RPR to get more accurate estimates of syphilis prevalence among pregnant women. The findings indicate that the prevalence for HIV and Syphilis is low nationally among pregnant women. However, some States are disproportionately affected than the rest.

Incorporating weighted prevalence enhances the technical rigor of the report. The weighted prevalence is presented to reflect HIV prevalence levels at both the state and national levels. However, for time-trend analysis, unweighted prevalence was used. As evident from HSS 2023, HIV prevalence [0.23% (95% CI: 0.21-0.24)] trend among pregnant women continues to be low with a declining trend nationally [2015:0.29% (0.28-0.31), 2017:0.28% (0.26-0.29), 2019:0.24% (0.22-0.26), 2021:0.22% (0.21-0.24)] and in most of the States/UTs. In 2023 round, out of 889 sites, only 44 sites (around 5% of the total sites) had shown sero-prevalence of 1% or more. In comparison, there were 141 sites (out of 380 sites) in 2005, 84 sites (out of 667 sites) in 2010, and 70 sites (out of 767 sites) in 2015 where sero-prevalence of 1% or more was recorded.

The declining trend, as noted nationally, is also reflected among the erstwhile high HIV prevalence States of Andhra Pradesh, Tamil Nadu and Telangana. However, the other two high-prevalence states, Maharashtra and Karnataka show only slight changes in HIV prevalence. Notably, 13 districts within these states still have at least one ANC site with a sero-prevalence of 1% or more, indicating that complacency is not an option.

Magnitude and directions of HIV epidemic in select States of the north-eastern region continue to emphasize the need for sustained and intensified actions. Out of 43 districts having at least one ANC site with HIV sero-prevalence of 1% or more, 13 are in north-eastern States. State/UT-wise, HIV prevalence (weighted) of more than 0.5% among pregnant women was noted in three out of four states; in Mizoram [0.63%, (0.39-0.86)], Meghalaya [0.58%, (0.36-0.80)], and Nagaland [0.51%, (0.30-0.72)]. Tripura had the fifth highest HIV prevalence among pregnant women. Manipur, another north-eastern States, is ranked eighth. Other three low prevalent states (Arunachal Pradesh, Assam and Sikkim) in this region also had rising prevalence among pregnant women.

Meghalaya, Arunachal Pradesh, Manipur, Nagaland, and Mizoram also had higher sero-positivity of Syphilis than the national average. Mizoram is also among the top-ranking State in terms of sero-prevalence of HBV and HCV. Other north-eastern State, Arunachal Pradesh also showed one of the high Hepatitis B prevalent States. The high burden of HIV, Syphilis, HCV, and HBV in the north-eastern region is noteworthy. Considering the fact that these diseases share common modes of transmission and determinants, the integrated approach across the prevention, diagnosis, treatment, and care continuum reflected in NACP Phase-V is a critical step offering holistic and comprehensive package of services.

HSS 2023 documented lower prevalence of co-morbidities in general. However, prevalence of Syphilis, Hepatitis B and Hepatitis C infections among HIV infected pregnant women was relatively higher. This HSS 2023 corroborates the need for regular screening for Syphilis, Hepatitis B and Hepatitis C infection among HIV infected patients as a part of the client centric services under NACP.

The report for the HSS Plus 2023 among pregnant women provides data on the level and trend of HIV among pregnant women as in previous rounds. The report also provides data among the current level of sero-prevalence of HBV and HCV among the HIV pregnant women. While in-depth analysis of this data will further enhance the insights into the epidemic of HIV, Syphilis and related co-morbidities, the current report provides critical evidence for shared actions providing holistic and comprehensive care as reflected under NACP-Phase V.

# Annexure-1

## HSS PLUS 2023: DATA FORM FOR ANTENATAL CLINIC ATTENDEES (ANC)

[Please fill the site details in the box below/ Paste the sticker with site details/Stamp the site details in the empty box]

| State: _____ District: _____<br>Site/Sub-site Name: _____<br>_____<br>(Site Code) (SSN) (Sample No) (Date DD/MM/YY)<br>☐☐☐☐☐☐☐☐ ☐ ☐☐☐ ☐☐☐☐☐☐ | |
|---|---|

**[Please tick (✓) in the relevant option selected by the respondent in the consent form]**

| | | |
|---|---|---|
| I consent for the survey team to interview | Yes | No |
| I consent for providing the blood samples and testing it for HIV/Syphilis/ Hepatitis B/ Hepatitis C | Yes | No |
| I consent for being contacted for follow up medical services if my samples are reactive for any of the test | Yes | No |
| I consent for publication and dissemination of anonymized and combined data | Yes | No |
| I permit to store the left-over (if any) samples for future testing and public health activities | Yes | No |

### Section 1: Background Characteristic

**1.** How old are you? (record age in completed years) ☐☐

**2.** What is your literacy status?

**1.** Illiterate **2.** Literate and till 5th standard
**3.** 6th to 10th standard **4.** 11th to graduation **5.** Post-Graduation

**3.** What is the order of your current pregnancy?

**1.** First **2.** Second **3.** Third **4.** Fourth or more

**4.** What is the duration of current pregnancy?

**1.** First trimester **2.** Second trimester **3.** Third trimester

**5.** Did you receive antenatal care services from any healthcare facility (including this one) during your current pregnancy before today?

**1.** Yes **2.** No

**6.** What is your current place of residence?

**1.** Urban (Municipal Corporation/Council/Cantonment) **2.** Rural

**7.** What is your current primary occupation?

**1.** Agricultural Labourer **2.** Non-Agricultural Labourer
**3.** Domestic Servant **4.** Skilled/Semi-skilled worker
**5.** Petty business/small shop **6.** Large Business/Self-employed
**7.** Service (Govt/Pvt) **8.** Student **9.** Truck Driver/Helper
**10.** Auto/taxi driver **11.** Hand cart pullers/rickshaw pullers
**12.** Hotel staff **13.** Agricultural cultivator/landholder
**14.** Housewife **15.** Unemployed

**8.** What is your spouse/partner's current primary occupation?

**1.** Agricultural Labourer **2.** Non-Agricultural Labourer
**3.** Domestic Servant **4.** Skilled/Semi-skilled worker
**5.** Petty business/small shop **6.** Large Business/Self-employed
**7.** Service (Govt./Pvt.) **8.** Student
**9.** Truck Driver/Helper **10.** Auto/taxi driver
**11.** Hand cart pullers/rickshaw pullers **12.** Hotel staff
**13.** Agricultural cultivator/landholder **14.** Unemployed **99.** No Response

**9.** Did your spouse/partner reside alone in another place/town away from you for work for a period longer than 6 months in past one year?

**1.** Yes **2.** No **99.** No Response

## Section 2: HIV/AIDS related testing & treatment services uptake

**10.** Have you ever been tested for HIV prior to this ANC visit?

**1.** Yes **2.** No **99.** Don't know/No response

**Note:** If the respondent has reported "Yes" in question number '10', then ask the questions '11-13' as per instructions provided. If the respondent has never been tested for HIV (i.e. option '2' or '99' encircled in question '10'), then skip the questions '11-13' and go to the question '14' please.

**11.** When was the last time you were tested for HIV?

1. Tested during current pregnancy 2. Tested before current pregnancy

**12.** What was the result of your last HIV test?

**1.** Positive **2.** Negative **3.** Did not collect the test result **99.** No Response

**Note:** If the respondent has reported "Positive" in question number '12', then ask the question '13' to the respondent. If, the response in question number '12' is anything else, please skip question numbers '13' and go to the question number '14'.

**13.** You mentioned that your last test result was positive for HIV. Are you currently taking antiretroviral medications/HIV tablets?

**1.** Yes **2.** No

## Section 3: Viral Hepatitis

**Statement:** Hepatitis and HIV co-infection has emerged as a critical challenge for HIV infected people. Many people living with HIV receiving antiretroviral therapy are also suffering from liver disease resulting from untreated viral hepatitis. Knowing about hepatitis will help the national programme to understand the severity of hepatitis disease and plan the resources accordingly. And hence, we will like to ask you certain questions about hepatitis. I would like you to note once again that confidentiality is fully maintained in this surveillance survey, and the same questions are being asked to all the participants.

### Hepatitis in General

**14.** Have you ever had jaundice in the past 1 year?

**1.** Yes **2.** No

**15.** Have you heard of hepatitis?

**1.** Yes **2.** No

**Note:** If the respondent has reported "Yes" in question number '15', then ask the questions '16-26' as per instructions provided. If the answer to above question '15' is "No", please skip question numbers '16' to '26' and go to the end of the interview. Thank the respondents and end the interview

**16.** Are you aware of testing being offered for hepatitis in the government facilities?

**1.** Yes **2.** No

**17.** Are you aware of treatment being offered for hepatitis in the government facilities?

**1.** Yes **2.** No

### Hepatitis B

**Statement:** Thank you very much for your response. It was very useful to understand your awareness about hepatitis. Now I will ask some questions pertaining to Hepatitis B. Will request for your kind patience and response to these questions

**18.** Have you ever received the hepatitis B vaccine?

**1.** Yes **2.** No **99.** Don't know / No response

**19.** Have you ever been tested for hepatitis B?

**1.** Yes **2.** No **99.** Don't know / No response

**Note:** If the respondent has reported "Yes" in question number '19', then ask the questions '20-22' as per instructions provided. If the answer to above question '19' is "No"or 'Dont know/No response", please skip question numbers '20' to '22' and go to the question number '23'.

**20.** You mentioned that you have been tested for Hepatitis B. When was the last time you were tested for Hepatitis B?

1. Less than or equal to 12 months ago
2. More than 12 months and less than three years ago
3. Three years or more ago

**21.** What was the result of your last Hepatitis B test?

**1.** Positive **2.** Negative **3.** Did not collect the test result
**99.** No response

**Note:** If the respondent has reported "Positive" in question number '21', then ask the question '22' to the respondent. If the response is anything else, please skip question numbers '22' and go to the question number '23.

**22.** You mentioned that your last test result was positive for Hepatitis B. Did you take any medicines to treat your Hepatitis B infection?

**1.** Yes **2.** No **99.** Don't know/No Response

**Hepatitis C**

**Statement:** Thanks very much for all your support so far. Now we have reached to the last segment of this interview where I will ask some questions pertaining to Hepatitis C. I would like you to state once again that confidentiality is fully maintained in this surveillance survey, and the same questions are being asked to all the participants of this group.

**23. Have you ever been tested for Hepatitis C?**

**1.** Yes **2.** No **99.** Don't know/No response

**Note:** If the respondent has reported "Yes" in question number '23', then ask the questions '24-26' as per instructions provided. If the answer to above question '23' is "No" or "Don't know / No response", please skip question numbers '24' to '26' and go to the end of the interview. Thank the respondents and End the interview.

**24. You mentioned that you have been tested for Hepatitis C. When was the last time you were tested for Hepatitis C?**

1. Less than or equal to 12 months ago
2. More than 12 months and less than three years ago
3. Three years or more ago

**25.** What was the result of your last Hepatitis C test?

**1.** Positive **2.** Negative

**3.** Did not collect the test result **4.** No Response

**Note:** If the respondent has reported "Positive" in question number '25', then ask the question '26' to the respondent. If, the response is anything else, please skip question number '26' and go to the end of the interview. Thank the respondents and End the interview?

**26.** You mentioned that your last test result was positive for Hepatitis C. Did you take any medicine to treat your Hepatitis C infection?

**1.** Yes **2.** No **99.** Don't know/No Response

**CONFIDENTIAL : ONLY FOR THE USE OF HSS SITE PERSONNEL**

**Note:** Thank the participant for her support and cooperation and reassure her about the anonymity and confidentiality of answers. Take her to the lab technician for blood specimen collection. Ensure that the sample number on data form and blood specimen vial is same.

| | |
|---|---|
| Signature: | Signature : |
| Name: | Name: |
| (Person who filled the form) | (Sentinel Site in-charge) |

# Annexure-2

## List of designated ILC testing laboratories

| | Designated ILC Testing Lab | State/UT |
|---|---|---|
| 1. | All India Institute of Medical Sciences (AIIMS), New Delhi | Chandigarh<br>Himachal Pradesh<br>Punjab |
| 2. | National Institute of Immunohaematology (NIIH), Mumbai | DNH & DD<br>Madhya Pradesh<br>Maharashtra (Mumbai) |
| 3. | National Institute of Communicable Diseases (NICD), New Delhi | Delhi<br>Haryana<br>J&K and Ladakh<br>Rajasthan |
| 4. | National Institute of Biologicals (NIB), Noida | Uttar Pradesh<br>Uttarkhand |
| 5. | National Institute of Translational Virology and AIDS Research (NITVAR), Pune | Goa<br>Gujarat<br>Maharashtra |
| 6. | National Institute of Mental Health and Neuro-Sciences (NIMHANS), Bangalore, Karnataka | Karnataka |
| 7. | School of Tropical Medicine (STM), Kolkata, West Bengal | Bihar<br>Chhattisgarh<br>Sikkim<br>West Bengal |
| 8. | Institute of Preventive Medicine (IPM), Hyderabad, Andhra Pradesh | Andhra Pradesh<br>Telangana |
| 9. | National Institute for Research in Bacterial Infections (NIRBI), Kolkata, West Bengal | A&N Islands<br>Assam<br>Jharkhand<br>Meghalaya<br>Mizoram<br>Odisha |

| | | |
|---|---|---|
| 10. | Regional Institute of Medical Sciences (RIMS), Imphal, Manipur | Arunachal Pradesh<br>Assam<br>Manipur<br>Tripura |
| 11. | Christian Medical College (CMC), Vellore, Tamil Nadu | Kerala |
| 12. | Tamil Nadu Dr. MGR Medical University (TNMGR), Chennai, Tamil Nadu | Puducherry<br>Tamil Nadu |
| 13. | Madras Medical College (MMC), Chennai, Tamil Nadu | Tamil Nadu |

# Annexure-3

## Participants Information Sheet and Informed Consent Form for Ante Natal Clinic (ANC) Attendees Aged 18 Years or above

### Participant Information Sheet for Ante Natal Clinic (ANC) Attendees Aged 18 Years or Above

Warm Greetings! I am a Nurse/Counsellor from _____ ANC site. We are part of National AIDS and STD Control Program.

**Background:** I am having this interaction with you as we are having this survey on behalf of Government of India. We have a document which we will provide to you and through this document, we would like to provide information about the HIV Sentinel Surveillance conducted by Govt. of India. This form explains the purpose and details of this survey and your role and participation in the same. Please read the following information carefully. If you prefer, we can read it out for you so that you may understand all about this survey before you decide to participate. After you have understood this information, we will request you to provide consent and participate in the survey. If you have any questions/ queries, you can ask us before giving the consent.

**Purpose:** Government of India conducts surveys to collect the information on various health conditions; HIV Sentinel Surveillance (HSS) is one of them. HSS is being conducted by National AIDS Control Organization (NACO), Ministry of Health and Family Welfare, Govt. of India, the nodal national agency for control of HIV in India. In this HIV Sentinel Surveillance, we are collecting information on HIV, Syphilis, Hepatitis B and Hepatitis C to understand how many people are having these diseases. This surveillance will be conducted every two years over a period of three months across selected ANC sites in India. 400 pregnant women (ANC attendees) are being included in the survey from an antenatal clinic in a government or private hospital and you are chosen as one among them.

**Procedure**: If you agree to participate in this survey, we will first ask you some questions on background characteristics, HIV related testing and treatment services uptake and viral hepatitis. This may take around 10-15 minutes. After you answer the questions, we will collect 5 ml (one teaspoon) of blood through your vein. This will take about one to two minutes and will be done by our trained lab technician. Our lab technicians will use disposable, clean and completely safe equipment for the collection of samples. Data and sample collection procedure will be carried out maintaining all COVID appropriate safety protocol as per respective State guidelines.

We request you to respond to the questions truthfully, to the best of your knowledge. There is no right or wrong answer to any of the questions. Your participation in this surveillance survey is entirely voluntary. If you wish not to take part, you can freely do so, we respect your rights. You do not have to answer a question that you do not wish to and also may refuse to provide blood sample. Your answers will be collected on a paper based study tool. Your name and address will not be taken in this interview and your data will only be identified by a sample number.

Your blood sample will be tested for HIV, Syphilis, Hepatitis B and Hepatitis C. The blood samples collected will be sent to a HSS testing laboratory in the country where test will be conducted. Test result will take

around 1-2 months. If your sample is reactive to any of the given tests, we will reach out to you in very confidential manner for the further testing and treatment services using the records available with this ANC clinic.

In order to ensure your immediate medical care, we will provide you the PPTCT services as per the National HIV Counseling and testing services guidelines and Hepatitis B and Hepatitis C services through the program for Hepatitis control and prevention.

**Possible Risk and Discomforts:** We do not anticipate any harm to you by your participation in the survey. Your participation is completely voluntary and data collection and storage is completely confidential. Our trained lab technician will collect your blood sample by using a safe and sterile needle in a clean and private environment. Yet, you may feel some discomfort during the process. If you feel any discomfort please let us know immediately. We may wait or stop the procedure if you wish.

**Possible Benefits:** This survey is not intended for any individual benefit to the participant. However, the results of this surveillance will help Government of India to improve and augment appropriate services all across India for HIV, STI and Hepatitis B and Hepatitis C disease for pregnant women. It will be beneficial to the communities who are at risk of getting infected with HIV in your community and region and in India as a whole.

**Confidentiality:** Please note that all the bio-behavioural data collected under this surveillance will be kept completely confidential. The surveillance staffs are trained to maintain confidentiality of data and conversations with you will not be disclosed. The collected data will be entered in a password protected data base. The information collected and the data base will not be shared with the outside the surveillance survey team at national, regional and state and site level. Your name will only be recorded on consent form but not on the data form or on specimen. The anonymized and combined data will be analysed and dissemination in the form of publication.

**Participant's rights and freedom to withdraw:** Your participation in this surveillance is entirely voluntary. It is your choice whether to participate or not. If you wish not to take part, you can freely do so, we respect your rights. You may choose not to answer any of the questions and also may refuse to provide samples. Additionally, you may also stop participating in the survey at any time you choose. Your refusal will not affect your routine care.

**Compensation for participation:**

We will be offering you required services for HIV, STI and Hepatitis infections at this clinic. There is no other compensation for participation in this surveillance.

**Compensation for injury:**

Though we don't anticipate such risk to you due to your participation, we have taken adequate care to ensure that you don't face any trouble. In case you face any trouble due to your participation, you are requested to immediately report the same as per the details given below and adequate and appropriate care will be given to you.

**Possible future use of biological material and data:**

If you agree we may preserve the samples and use it in future for public health activities for the benefit of the community only as per approval of NACO, Govt. of India. We will not allow any commercial use of your samples.

**Contact Details:** If you ever have any question about this survey, or if you face any trouble due to your participation in ANC HSS Plus surveillance -, you are requested to immediately contact Dr. Pradeep Kumar, National Consultant (Surveillance & Epidemiology) Strategic Information, National AIDS Control Organization, New Delhi at Tel. – 011- 43509906 or <Name and contact number of PI and PC>or you may contact 24X7 toll-free helpline number 1097. For queries related to the rights as a study participant, please write to: <Chairperson, Name and contact details of ethics committee>

Do you have any Questions?

If you are willing to participate in this survey, we request you to sign / provide your thumb impression with date in the informed consent form below :

**Informed Consent Form for Ante Natal Clinic (ANC) Attendees Aged 18 Years or Above**

I have read the foregoing information, or it has been explained to me in the language I understand. I have had the opportunity to ask questions and all my questions have been answered satisfactorily. I have fully understood all the information, benefits and risks associated with participation in this survey. I understand that I can withdraw my participation anytime, for any reason. I have understood my role in this survey including the method of data collection and willingly agree to participate and respond to the questions asked. I also know that the information collected from me will be kept anonymous and confidential. I am willing to participate in this survey and give my blood sample for HIV, Syphilis, Hepatitis B and Hepatitis C. I know that the data/sample collected under this survey will be used by the National AIDS Control Programme to improve the HIV services with full confidentiality. I agree that the HSS staff may reach out to me for follow up (counselling and treatment services) if my sample is reactive for any of the tests.

**Kindly put (✓) in the relevant option for consenting:**

| | | |
|---|---|---|
| I consent for the survey team to interview | Yes | No |
| I consent for providing the blood samples and testing it for HIV/Syphilis/ Hepatitis B/ Hepatitis C | Yes | No |
| I consent for being contacted for follow up medical services if my samples are reactive for any of the test | Yes | No |
| I consent for publication and dissemination of anonymized and combined data | Yes | No |
| I permit to store the left-over (if any) samples for future testing and public health activities | Yes | No |

| | | |
|---|---|---|
| Date | Name of the participant | Signature/thumb impression of the participant |

| | | |
|---|---|---|
| Date | Name of the Witness | Signature of the Witness |

[Signature of the witness is required if the respondent is illiterate. Witness should be literate and not related to the research team].

| | | |
|---|---|---|
| Date | Name of the Nurse/Counsellor | Signature of the Nurse/Counsellor |

## Participation Information Sheet and Assent Form for Ante Natal Clinic (ANC) Attendees Aged 15-17 Years

### Participant Information Sheet for Ante Natal Clinic (ANC) Attendees Aged 15 - 17 Years

Warm Greetings! I am a Nurse/Counsellor from _____ ANC site. We are part of National AIDS and STD Control Program.

**Background:** I am having this interaction with you as we are having this survey on behalf of Government of India. We have a document which we will provide to you and through this document, we would like to provide information about the HIV Sentinel Surveillance conducted by Govt. of India. This form explains the purpose and details of this survey and your role and participation in the same. Please read the following information carefully. If you prefer, we can read it out for you so that you may understand all about this survey before you decide to participate. After you have understood this information, we will request you to provide consent and participate in the survey. If you have any questions/ queries, you can ask us before giving the consent.

**Purpose:** Government of India conducts surveys to collect the information on various health conditions; HIV Sentinel Surveillance (HSS) is one of them. HSS is being conducted by National AIDS Control Organization (NACO), Ministry of Health and Family Welfare, Govt. of India, the nodal national agency for control of HIV in India. In this HIV Sentinel Surveillance, we are collecting information on HIV, Syphilis, Hepatitis B and Hepatitis C to understand how many people are having these diseases. This surveillance will be conducted every two years over a period of three months across selected ANC sites in India. 400 pregnant women (ANC attendees) are being included in the survey from an antenatal clinic in a government or private hospital and you are chosen as one among them.

**Procedure**: If you agree to participate in this survey, we will first ask you some questions on background characteristics, HIV related testing and treatment services uptake and viral hepatitis. This may take around 10-15 minutes. After you answer the questions, we will collect 5 ml (one teaspoon) of blood through your vein. This will take about one to two minutes and will be done by our trained lab technician. Our lab technicians will use disposable, clean and completely safe equipment for the collection of samples. Data and sample collection procedure will be carried out maintaining all COVID appropriate safety protocol as per respective State guidelines.

We request you to respond to the questions truthfully, to the best of your knowledge. There is no right or wrong answer to any of the questions. Your participation in this surveillance survey is entirely voluntary. If you wish not to take part, you can freely do so, we respect your rights. You do not have to answer a question that you do not wish to and also may refuse to provide blood sample. Your answers will be collected on a paper based study tool. Your name and address will not be taken in this interview and your data will only be identified by a sample number.

Your blood sample will be tested for HIV, Syphilis, Hepatitis B and Hepatitis C. The blood samples collected will be sent to a HSS testing laboratory in the country where test will be conducted. Test result will take around 1-2 months. If your sample is reactive to any of the given tests, we will reach out to you in very

confidential manner for the further testing and treatment services using the records available with this ANC clinic.

In order to ensure your immediate medical care, we will provide you the PPTCT services as per the National HIV Counseling and testing services guidelines and Hepatitis B and Hepatitis C services through the program for Hepatitis control and prevention.

**Possible Risk and Discomforts:** We do not anticipate any harm to you by your participation in the survey. Your participation is completely voluntary and data collection and storage is completely confidential. Our trained lab technician will collect your blood sample by using a safe and sterile needle in a clean and private environment. Yet, you may feel some discomfort during the process. If you feel any discomfort, please let us know immediately. We may wait or stop the procedure if you wish.

**Possible Benefits:** This survey is not intended for any individual benefit to the participant. However, the results of this surveillance will help Government of India to improve and augment appropriate services all across India for HIV, STI and Hepatitis B and Hepatitis C disease for pregnant women. It will be beneficial to the communities who are at risk of getting infected with HIV in your community and region and in India as a whole.

**Confidentiality:** Please note that all the bio-behavioural data collected under this surveillance will be kept completely confidential. The surveillance staffs are trained to maintain confidentiality of data and conversations with you will not be disclosed. The collected data will be entered in a password protected data base. The information collected and the data base will not be shared with the outside the surveillance survey team at national, regional and state and site level. Your name will only be recorded on consent form but not on the data form or on specimen. The anonymized and combined data will be analysed and dissemination in the form of publication.

**Participant's rights and freedom to withdraw:** Your participation in this surveillance is entirely voluntary. It is your choice whether to participate or not. If you wish not to take part, you can freely do so, we respect your rights. You may choose not to answer any of the questions and also may refuse to provide samples. Additionally, you may also stop participating in the survey at any time you choose. Your refusal will not affect your routine care.

**Compensation for participation:**

We will be offering you required services for HIV, STI and Hepatitis infections at this clinic. There is no other compensation for participation in this surveillance.

**Compensation for injury:**

Though we don't anticipate such risk to you due to your participation, we have taken adequate care to ensure that you don't face any trouble. In case you face any trouble due to your participation, you are requested to immediately report the same as per the details given below and adequate and appropriate care will be given to you.

**Possible future use of biological material and data:**

If you agree we may preserve the samples and use it in future for public health activities for the benefit of the community only as per approval of NACO, Govt. of India. We will not allow any commercial use of your samples.

**Contact Details:** If you ever have any question about this survey, or if you face any trouble due to your participation in ANC HSS Plus surveillance -, you are requested to immediately contact Dr. Pradeep Kumar, National Consultant (Surveillance & Epidemiology) Strategic Information, National AIDS Control Organization, New Delhi at Tel. – 011- 43509906 or <Name and contact number of PI and PC>or you may contact 24X7 toll-free helpline number 1097. For queries related to the rights as a study participant, please write to: <Chairperson, Name and contact details of ethics committee>

Do you have any Questions?

If you are willing to participate in this survey, we request you to sign / provide your thumb impression with date in the informed consent form below :

**Assent Form for Ante Natal Clinic (ANC) Attendees Aged 15-17 Years**

I have read the foregoing information, or it has been explained to me in the language I understand. I have had the opportunity to ask questions and all my questions have been answered satisfactorily. I have fully understood all the information, benefits and risks associated with participation in this survey. I understand that I can withdraw my participation anytime, for any reason. I have understood my role in this survey including the method of data collection and willingly agree to participate and respond to the questions asked. I also know that the information collected from me will be kept anonymous and confidential. I am willing to participate in this survey and give my blood sample for HIV, Syphilis, Hepatitis B and Hepatitis C. I know that the data/sample collected under this survey will be used by the National AIDS Control Programme to improve the HIV services with full confidentiality. I agree that the HSS staff may reach out to me for follow up (counselling and treatment services) if my sample is reactive for any of the tests.

**Kindly put (✓) in the relevant option for consenting:**

| | | |
|---|---|---|
| I consent for the survey team to interview | Yes | No |
| I consent for providing the blood samples and testing it for HIV/Syphilis/ Hepatitis B/ Hepatitis C | Yes | No |
| I consent for being contacted for follow up medical services if my samples are reactive for any of the test | Yes | No |
| I consent for publication and dissemination of anonymized and combined data | Yes | No |
| I permit to store the left-over (if any) samples for future testing and public health activities | Yes | No |

| Date | Name of the participant | Signature/thumb impression of the participant |
|---|---|---|

| Date | Name of the Witness | Signature of the Witness |
|---|---|---|

[Signature of the witness is required if the respondent is illiterate. Witness should be literate and not related to the research team].

| Date | Name of the Nurse/Counsellor | Signature of the Nurse/Counsellor |
|---|---|---|

# Annexure-4

## LIST OF CONTRIBUTORS ENGAGED IN HSS 2023 IMPLEMENTATION

**National AIDS Control Organization**

Dr. Chinmoyee Das, Head-Strategic Information
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65. Dr. Rahul Biswas, DD-CST, West Bengal SACS
66 Mr. Saibal Maity,AD-PPTCT & In-charge AD-SI, West Bengal SACS

## NOTES

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