Technical Report

India HIV Estimates 2021

National AIDS Control Organisation
&
Indian Council of Medical Research – National Institute of Medical Statistics (ICMR-NIMS)
Ministry of Health & Family Welfare, Government of India

© NACO, MoHFW, GoI, 2022

All rights reserved

You may copy, redistribute, and adapt the publication for non-commercial purposes, provided the publication is appropriately cited. In any use of this publication, there should be no suggestion that NACO endorses any specific organization, products, or services. The use of the NACO logo is not permitted. If you adapt the publication, then you must license your work allowing copy, redistribute and adapt the work for non-commercial purposes. If you create a translation of this publication, you should add the following disclaimer: "This translation was not created by the NACO. NACO is not responsible for the content or accuracy of this translation. The original English edition shall be the binding and authentic edition".

General disclaimers

NACO has made every effort to ensure the accuracy of data and verify the information contained in this publication. However, errors and omissions excepted. The publication is being distributed without warranty of any kind, either expressed or implied.

Maps, if any used in this publication, are only to provide visual impressions on the given indicator. These are not for scale and must not be construed or used as a "Legal Description "of any State/UT/district.

Suggested citation

National AIDS Control Organisation & ICMR-National Institute of Medical Statistics (2022). India HIV Estimates 2021: Technical Report. New Delhi: NACO, Ministry of Health & Family Welfare, Government of India.

For additional information on the India HIV Estimates 2021: Technical Report, please contact:

Surveillance & Epidemiology: Strategic Information Division
National AIDS Control Organisation (NACO)
Ministry of Health & Family Welfare, Government of India
6th and 9th Floor
Chanderlok, 36, Janpath, New Delhi, 110001

Technical Report

India HIV Estimates 2021

National AIDS Control Organisation
&
Indian Council of Medical Research – National Institute of Medical Statistics (ICMR-NIMS)
Ministry of Health & Family Welfare, Government of India

GoI/NACO/Surveillance Epidemiology/ India HIV Estimates 2021: Technical Report/27102022

वी. हेकाली झिमोमी, भा.प्र.से.
अपर सचिव एवं महानिदेशक

V. Hekali Zhimomi, IAS
Additional Secretary & Director General

राष्ट्रीय एड्स नियंत्रण संगठन
स्वास्थ्य और परिवार कल्याण मंत्रालय
भारत सरकार

National AIDS Control Organisation
Ministry of Health & Family Welfare
Government of India

Foreword

Disease burden estimation is essential for decision makings and setting priorities for informed public health response. It provides information on the level and trend of people infected and affected with a disease for policy formulation and resource allocations. Given the context, periodic HIV burden estimation is an integral component of the HIV/AIDS programmes globally.

In India, efforts for estimating HIV disease burden were initiated in the early years of the National AIDS and STD Control Programme (NACP). Existing data were analysed in 1994 to provide a working estimate. HIV burden estimations became integral to the Surveillance and Epidemiology (S&E) under NACP with the launch of HIV Sentinel Surveillance in 1998. The findings were used to implement the first round of burden estimation by using a simple arithmetic approach. Since then, sixteen rounds of HIV burden estimations have been completed under NACP.

HIV Estimation 2021 is the latest round in the series updating the epidemiological evidence in the country. It was implemented using UNAIDS's recommended 'Spectrum' model and included the most recent population projections, fertility estimates, and epidemiological and programmatic data in the process. In current report, the findings on the key indicators of prevalence, incidence, mortality, and elimination of vertical transmission have been provided by State/UT.

NACP aspires to attain zero new infections, zero vertical transmission, zero AIDS-related deaths and zero HIV/AIDS-related stigma & discrimination. HIV Estimations 2021 underlines the need to intensify and expand the interventions for the prevention of new infections and the elimination of vertical transmission of HIV. I am confident that all stakeholders including policymakers, programme managers, partners, civil societies, community, and academicians will use the report to formulate suitable actions for fast-tracking the national AIDS and STI response.

(V. Hekali Zhimomi)

6th Floor, Chandralok Building, 36 Janpath, New Delhi-110001 Tel.: 011-23325331 Fax : 011-23351700
E-mail : dgoffice@naco.gov.in

अपनी एचआईवी अवस्था जानें, निकटतम सरकारी अस्पताल में मुफ्त सलाह व जांच पाएं
Know your HIV status, go to the nearest Government Hospital for free Voluntary Counselling and Testing

निधि केसरवानी, भ्रा.प्र.से.
निदेशक
Nidhi Kesarwani, I.A.S.
Director

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

Preface

The Government of India is currently implementing NACP Phase-V as a fully funded central Sector Scheme for the period of 1st April 2021 to 31st March 2026 with an outlay of Rs. 15471.94 crore. The NACP Phase-V will anchor the national AIDS and STD response till 2025-26 towards the attainment of the United Nations' Sustainable Development Goals 3.3 of ending the HIV/AIDS epidemic as a public health threat through a comprehensive package of prevention, detection, and treatment services

The NACP Phase-V aims to reduce annual new HIV infections and AIDS-related mortalities by 80% by 2025-26 from the baseline value of 2010. The NACP Phase-V also aims to attain dual elimination of vertical transmission, and elimination of HIV/AIDS-related stigma while promoting universal access to quality STI/RTI services to at-risk and vulnerable populations.

HIV Estimations 2021: Technical Report, providing the latest epidemiological evidence by States/UT in India, is a timely publication in the first year of NACP Phase-V. The technical report provides the context, method, results (national and by State/UT) and implications for the programme in five chapters. The report highlights the disproportionately high epidemic in many States of north-eastern India calling for a focus on granular level planning tailored to local epidemic and community contexts.

HIV Surveillance and Epidemiology under NACP is done through a robust institutional arrangement. Anchored by NACO's SI-Surveillance & Epidemiology division, currently nine institutes (AIIMS-New Delhi, AIIMS-Bhubaneswar, VMMC and SH-New Delhi, ICMR-NIMS-New Delhi, ICMR-NARI-Pune, ICMR-NIE-Chennai, ICMR-NICED-Kolkata, PGIMER-Chandigarh and RIMS-Imphal) are engaged by NACO under Integrated and Enhanced Surveillance and Epidemiology Framework of NACP Phase-V. This technical report is one of the products emanating through robust institutional arrangements. We acknowledge the role of each of the institutes in bringing out this report. We are confident that the epidemiological insights on the magnitude and direction of the epidemic provided in this report will not only update the stakeholders on the status of the epidemic but will also encourage them to ponder to refine the responses towards the attainment of the 2030 end goal.

Nidhi Kesarwani

9th Floor, Chandralok Building, 36 Janpath, New Delhi-110001 Tel.: 011-23325343 Fax: 011-23325335
E-mail : dir@naco.gov.in

अपनी एचआईवी अवस्था जानें, निकटतम सरकारी अस्पताल में मुफ्त सलाह व जाँच पाएँ
Know your HIV status, go to the nearest Government Hospital for free Voluntary Counselling and Testing

आईसीएमआर – राष्ट्रीय आयुर्विज्ञान सांख्यिकी संस्थान
(भारतीय आयुर्विज्ञान अनुसंधान परिषद)
स्वास्थ्य अनुसंधान विभाग, स्वास्थ्य
एवं परिवार कल्याण मंत्रालय, भारत सरकार
अंसारी नगर, नई दिल्ली – 110029

डॉ. एम. विष्णु वर्धना राव
एमएससी (स्टेटिस्टिक्स), एमटेक (आईटी),
पीएचडी (स्टेटिस्टिक्स)
निदेशक

ICMR - NATIONAL INSTITUTE OF MEDICAL STATISTICS
(INDIAN COUNCIL OF MEDICAL RESEARCH)
Department of Health Research, Ministry of Health
and Family Welfare, Government of India
Ansari Nagar, New Delhi - 110029

Dr. M. Vishnu Vardhana Rao
M.Sc (Stat), M.Tech (IT), PhD (Stat)
Director

Phone : 91-11-26588803
Telefax : 91-11-26589635
Email : nims.director@icmr.gov.in
: dr_vishnurao@yahoo.com

Preface

HIV estimations are undertaken periodically in India to provide up-to-date information on the HIV epidemic by key indicators to inform decision making and programme planning including resource allocations to where and who matter the most. The 2021 HIV estimates at national, and State/Union Territory is latest in the series on key epidemiological indicators of adult HIV prevalence (number of people living with HIV), HIV incidence per 1,000 uninfected population (number of annual new HIV infections), AIDS related mortality per 100,000 population (number of annual AIDS related deaths) and need for services to prevent mother to child transmission of HIV.

HIV estimates have been generated by the Sub-group on HIV Burden Estimations (SGE) which is co-chaired by the National AIDS Control Organisation (NACO)/Ministry of Health and Family Welfare and the Indian Council of Medical Research-National Institute of Medical Statistics (ICMR-NIMS) – which is the apex technical body for HIV estimations in the country. Members of the SGE include epidemiologists, social scientists, demographers, statisticians, and clinicians from ICMR Regional institutes and Medical Colleges, Monitoring & Evaluation officers/epidemiologists from State AIDS Control Societies, and independent national experts. The Technical Working Group on HIV Surveillance and Epidemiology (TWG) and Technical Resource Group on HIV Surveillance and Estimations (TRG) are the oversight bodies who reviewed and validated the scientific methods used and results under 2021 HIV estimates round. Experts from UNAIDS, along with WHO and CDC are also part of the bodies.

It is important to highlight that the 2021 round of HIV estimates have been generated using the latest Spectrum tool version 6.18 which has latest assumptions that are nationalised as much as possible considering local data. A significant update made in this round of estimations is that the demographic projections from 2021-2036 are informed by the latest 2020 technical report of the National Commission on Population, Ministry of Health, and Family Welfare. Other major data updates made include latest data on HIV treatment, key population size estimates, HIV Sentinel Surveillance (HSS) and HIV positivity data among Ante-natal clinic attendees at Clinics under the National AIDS and STD Control Programme. Curve-fitting was done using "R Hybrid model" in States which have many HSS data points as per the recommended model requirements, and "EPP Classic model" used in States/Union Territories with relatively lesser number of HSS data points. Therefore, the 2021 HIV estimates cannot be compared directly with estimates published previously as it is generated using latest tools, methods, and data.

The 2021 HIV estimates highlight that while the epidemic in India continues to decline, the level and trend of the epidemic is heterogenous and dynamic in nature at the State/Union Territory level and among populations and age groups. I am sure that this technical report which presents the key findings will be very useful for all stakeholders engaged in HIV/AIDS response.

I would like to congratulate all those who have been part of this modelling exercise and worked tirelessly to bring out this critical information for the National AIDS and STD Control Programme in India. In particular, from ICMR-NIMS, I would like to recognise Dr. Damodar Sahu Scientist F and Focal Person-HIV Estimations led the estimations work implementation along with other team members: Dr. Anil Kumar, Scientist F, Dr. Saritha Nair, Scientist E, Dr. Jiten Kumar Singh, Scientist E, Dr. Varsha Ranjan, Research Officer, Dr. Hasibur Zaman Haque, Junior Consultant (Epidemiology) and Mr. Pravesh Kushwaha, Data Programmer.

Dr. Vishnu Vardhana Rao
Director, ICMR-NIMS
Co-chair, National Sub-group on HIV Estimations

UNAIDS

Message

India's AIDS response is exemplary in how data driven it is – which is critical considering the size of the country and how diverse and heterogenous the HIV epidemic is at the sub-national levels and among different population groups. More insights to this diversity of the epidemic have been possible through the all the efforts for data generation, analysis, dissemination, and use over the last three decades to comprehensively guide the National AIDS Control Programme (NACP) and continuing.

Two of the flagship and most critical epidemiological data generation initiatives are the HIV Sentinel Surveillance (HSS) and the HIV estimates both undertaken under the leadership of the National AIDS Control Organisation (NACO) for a comprehensive understanding of the status and response to the HIV epidemic and to guide future decisions and actions to end AIDS as a public health threat in India by 2030.

On behalf of UNAIDS, I would like to congratulate NACO, as well as all the Regional Institutes, State AIDS Control Societies and Senior members of the Technical Working Group (TWG) and Technical Resource Group on HIV Surveillance and Estimations (TRG) who have been engaged in and led the process.

The 2021 HIV estimates are generated by NACO with the Indian Council of Medical Research-National Institute of Medical Statistics (ICMR-NIMS) which is the nodal technical agency for HIV estimations. These estimates are generated using the latest UNAIDS globally recommended version of the Spectrum software, with latest national data inputs including 2021 HSS data, and adherence to robust processes and methods.

The latest 2021 HIV estimates highlight the overall progress in AIDS response at the national level, especially the improvement in declining mortality levels. With around 42 thousand AIDS related deaths estimated in 2021, the reduction has been by 76% from 2010 to 2021. This can be particularly attributed to the treatment scale-up efforts under 'test and treat' policy and multi-month dispensation of medicines introduced to cushion the impact of the COVID-19 pandemic. However, to reduce deaths even further, lessons learned should be reinforced and improved to achieve the 95-95-95 target set under NACP V by 2025, against current levels of 77-84-85, and as planned under NACP V with greater community engagement to support treatment access and continuity.

Annual new HIV infections are estimated at 63 thousand in 2021 which marks a 47% decline since 2010 thereby highlighting the noteworthy progress made in HIV prevention but equally signalling the need to do more to achieve the goal of 80% decline from 2010-25 as outlined in the NACP V. Many initiatives are being implemented under NACP to enable this, including one stop shop approach, 'Sampoorna Suraksha', comprehensive combination prevention, and district integrated strategy for HIV/AIDS (DISHA) based on the diverse epidemics and local needs.

UNAIDS remains committed to support national efforts led by NACO to achieve the 2025 NACP V goals towards the 2030 Sustainable Development Goals with partners WHO and CDC and the civil society.

David Bridger
UNAIDS Country Director for India

Dr. CHINMOYEE DAS
Public Health Specialist, Grade I
Tel. : +91-11-23736851
Fax : +91-11-23731746
E-mail : c.das@gov.in
drchinmoyee.naco@gmail.com

भारत सरकार
स्वास्थ्य एवं परिवार कल्यान मंत्रालय
राष्ट्रीय एड्स नियंत्रण विभाग
6वां तल, चन्द्रलोक बिल्डिंग,
36 जनपथ, नई दिल्ली–110001

Government of India
Ministry of Health & Family Welfare
National AIDS Control Organisation
6th Floor, Chandralok Building,
36, Janpath, New Delhi, 110001

Acknowledgement

Periodic HIV Estimations is a key component of spectrum of Surveillance and Epidemiology (S&E) activities under-the National AIDS and STD Control Programme (NACP). Being implemented since 1998, HIV Estimations 2021 is the latest in the series updating the epidemiological evidence nationally and by States/UT. India's topmost epidemiologists, demographers, biostatisticians, community representatives with State and national programme managers have actively contributed to the successful completion of HIV Estimations 2021.

The Technical Resource Group (TRG) for HIV Surveillance and Epidemiology, under the chairpersonship of Shri Alok Saxena (the then Additional Secretary & DG, NACO, MoHFW, GoI) and co-chairpersonship of Dr. Sanjay Mehendale (Former Additional Director General, Indian Council of Medical Research, New Delhi) recommended the process, methods, and report for HIV Estimations 2021. We place on record our sincere thanks to the leadership for providing vision, insights, and support towards HIV Estimations 2021.

Technical Working Group (TWG) (Surveillance & Epidemiology), under the Chairpersonship of Dr. DCS Reddy (Former HoD, Department of Community Medicine, Institute of Medical Sciences, Banaras Hindu University, Varanasi, Uttar Pradesh, India), and Technical Sub-Group (HIV Burden Estimation) under the Chairpersonship of Prof Arvind Pandey (National Chair, Medical Statistics, ICMR and Former Director, ICMR-NIMS, New Delhi) was instrumental in reviewing and recommending the method and findings of the HIV Estimations 2021 for TRG perusal. Dr. M Vishnu Vardhana Rao (Director, ICMR-NIMS, New Delhi) led the implementation of HIV Estimations 2021 at Indian Council of Medical Research-National Institute of Medical Statistics (ICMR-NIMS). Dr. Shashi Kant (AIIMS New Delhi), Dr. Bilali Camara (Senior Medical Epidemiologist), Dr. Raman Gangakhedkar (Former Head, Division of Epidemiology & Communicable Diseases, ICMR-New Delhi), Dr. John Stover (Avenir Health), Mr. Taoufik Bakkali (UNAIDS Asia-Pacific), Dr. Shri Kant Singh (IIPS), Dr. Sheela Godbole (ICMR-NARI, Pune), Dr. A. Elangovan (ICMR-NIE, Chennai), Dr. Shanta Dutta (ICMR-NICED, Kolkata), Dr. Sanjay Rai (AIIMS, New Delhi), Dr. P.V.M. Lakshmi (PGIMER, Chandigarh), Dr. H. Sanayaima Devi (RIMS, Imphal), Dr. David Bridger (UNAIDS India), Dr. Melissa Nyendak (CDC India), Mx Abhina Aher (Community Expert) and Dr. Rajatshruva Adhikary (WHO India) strengthened the exercise as TRG and TWG members/invitees. We thank the experts for critical technical guidance at all stages of HIV Estimations 2021.

The leadership and guidance of Ms. V. Hekali Zhimomi (Addl. Secretary & DG, NACO) in publication & release of this document is duly acknowledged. Programmatic context for the exercise was provided by Ms. Nidhi Kesarwani (Director, NACO), Dr. Anoop Kumar Puri (DDG, NACO), Dr. Uday Bhanu Das (DDG, NACO), Dr. Shobini Rajan (DDG, NACO), Dr. Bhawani Singh (DD, NACO), Dr. Sai Prasad Bhavsar (DD, NACO), and Dr. Bhawna Rao (DD, NACO). We place on record our sincere thanks to NACO'S programme divisions for providing insights, and support towards HIV Estimations 2021.

Dr. Pradeep Kumar (NACO) and Dr. Damodar Sahu (ICMR-NIMS) anchored the implementation of HIV Estimations 2021 which included drafting and finalization of the Technical Brief. Dr. Arvind Kumar (Former Associate Consultant, Surveillance & Epidemiology, NACO), Dr. Varsha Ranjan (ICMR-NIMS) and Ms. Nalini Chandra (UNAIDS India) actively supported the exercises of Estimations at all steps. UNAIDS India supported the publication of HIV Estimations 2021 report. We acknowledge the contribution of each of them towards successful completion of HIV Estimations 2021.

HIV Estimations 2021 is being published at a critical juncture, establishing the progress made so far and highlighting the priority areas towards achieving the 2030 goal of ending AIDS epidemic as a public health threat. We are confident that all stakeholders will use the latest evidence presented here to fine-tune their responses to further benefit the national AIDS response in the country.

(Dr. Chinmoyee Das)

Contents

Acronyms xv

Executive Summary 1

Process 1

Method 1

Results 2

Chapter 1: Introduction 4

Overview 4

HIV Estimations 2021 4

Objectives 5

Process 5

Chapter 2: Methodology and Data Inputs 7

Tool 7

Method 8

Step 1: Updating the projection period in Spectrum manager 9

Step 2: Updating the demographic projections in DemProj 9

Step 3: Updating the input data in AIM module 11

Step 4: Curve-fitting 13

Step 5: Calibration 14

Step 6: Results Generation, Validation and Uncertainty Analysis 14

Chapter 3: National Level Results 15

Adult HIV prevalence (15–49 years) 16

Number of People Living with HIV 16

Number of People Living with HIV per million population 16

HIV incidence per 1,000 uninfected population 17

Number of annual new HIV infections 18

AIDS related deaths per 100,000 population 18

Number of annual AIDS related deaths 18

Need for Prevention of Mother to Child Transmission of HIV (PMTCT) services 20

Chapter 4: State/Union Territory Level Results 21

Adult HIV prevalence (15–49 years) 21

Number of People Living with HIV 23

Number of People Living with HIV per million population 25

HIV incidence per 1,000 uninfected population 25

Number of annual new HIV infections 27

HIV incidence (15–49 years) among HRG Population 28

AIDS related mortality per 100,000 population....30

Number of annual AIDS related deaths....32

Need for Prevention of Mother to Child Transmission of HIV (PMTCT) services....34

Chapter 5: Discussion....35

Annexures....37

Annexure 1: Composition of NACO's Sub-group (HIV Burden Estimations)....37

Annexure 2: Institutional Arrangement for Surveillance and Epidemiology under NACP....39

Annexure 3: Composition of NACO's Technical Working Group (Surveillance & Epidemiology)....40

Annexure 4: Composition of NACO's Technical Resource Group (Surveillance & Epidemiology)....43

Annexure 5: HIV Estimates for Key Indicators, 2021, India HIV Estimates 2021....46

Annexure 6: State and UT-wise Adult HIV Prevalence (15–49 Years), 2015–2021, India HIV Estimates 2021....47

Annexure 7: State & UT-wise HIV Incidence (Per 1000 Uninfected Population), 2015–2021, India HIV Estimates 2021....48

Annexure 8: State & UT-wise AIDS-Related Mortality (Per 100,000 Population), 2015–2021, India HIV Estimates 2021....49

Acronyms

AIDS	Acquired Immuno Deficiency Syndrome
AIM	AIDS Impact Module
ANI	Annual New HIV Infections
ARD	AIDS-Related Deaths
ART	Anti-Retroviral Therapy
ASFR	Age-specific Fertility Rate
CBR	Crude Birth Rate
CDR	Crude Death Rate
DemProj	Demographic Projection Module
EPP	Estimation and Projection Package
FSW	Female Sex Worker
HIV	Human Immunodeficiency Virus
HRG	High Risk Group
HSS	HIV Sentinel Surveillance
H/TG	Hijra/Transgender people
ICMR	Indian Council of Medical Research
ICTC	Integrated Counselling and Testing Centers
IDU	Injecting Drug User
IESE	Integrated and Enhanced Surveillance and Epidemiology
MoHFW	Ministry of Health and Family Welfare
MSM	Men who have Sex with Men
NACO	National AIDS Control Organisation
NACP	National AIDS and STD Control Programme
NHM	National Health Mission
NI	National Institute
NIMS	National Institute of Medical Statistics

PLHIV	People Living with HIV
PMTCT	Prevention of Mother to Child Transmission of HIV
RI	Regional Institute
SACS	State AIDS Control Society
SIMS	Strategic Information Management System
SRS	Sample Registration System
TFR	Total Fertility Rate
TWG	Technical Working Group
TRG	Technical Resource Group
UNAIDS	Joint United Nations Programme on HIV and AIDS
UT	Union Territory
WHO	World Health Organisation

Executive Summary

The National AIDS Control Organisation, Ministry of Health and Family Welfare (NACO, MoHFW), undertakes model-based HIV estimates exercise periodically to provide the updated evidence on status of HIV/AIDS epidemic in India. In this effort, HIV burden estimations in India is done using the latest version of the UNAIDS-supported Spectrum tool. HIV Estimations 2021 is the latest round in the series of HIV burden estimations under the National AIDS and STD Control Programme (NACP) in India. Spectrum is a suite of easy-to-use models to support analysis, planning, and advocacy for various public health programmes. The HIV/AIDS component of the Spectrum is periodically updated under the technical guidance of UNAIDS Reference Group on Estimates, Modelling and Projections. NACO's Technical Sub-group (HIV Burden Estimation) employed Spectrum v. 6.18 (7 March 2022) and used the latest evidence of demographics, programme coverage, and epidemiology for the 2021 round. The methods and results were reviewed and approved by the multi-disciplinary Technical Resource Group (Surveillance & Epidemiology), and Technical Working Group (Surveillance & Epidemiology) under NACP. The technical report presents the method and results (by State/UT and nationally) on key epidemiological parameters of prevalence, incidence, mortality, and associated programmatic needs.

Process

2021 round of HIV estimates for national and State/UT level is an outcome of concerted efforts spanning nearly nine months. The process was initiated in August 2021 when NACO and ICMR-NIMS presented the plan for implementation and methodology for the 2021 HIV estimates round using Spectrum software to the group of experts and stakeholders participating in the global consultation titled "Consolidating the Evidence, Building the Future: Consultation meeting on Integrated and Enhanced Epidemiology Under the National AIDS and STD Control Programme in India" scheduled during 27–29 August 2021. Thereafter, a time-bound work plan for the HIV estimates work was implemented. As part of the review and iterative process of HIV estimations in India, series of meetings were held. These include execution of one population expert group meeting on 17 December 2021 to review and finalize the method for updating the demographic data inputs considering the projections by the Technical Group on population projections, National Commission on Population, MoHFW. Three meetings of the sub-group were held on 24 January, 18–19 April, and 26–27 April 2022 respectively to review all the data inputs, methods and validate the results; followed by a review meeting by the TWG on 4 May and TRG on 11 May 2022. Based on inputs received during each of these meetings, the State/UT Spectrum models were updated before approval by the high level TRG body.

Method

The key update made under the 2021 estimation round included updating the demographics in DemProj module and the future projection period till 2036. The last time such a major update was made was during the 2015 round when the demographic projections were extended from 1981 to 2026. The main reasons for this are two-fold. First, considering the Sustainable Development Goal of "ending of the AIDS

epidemic as a public health threat" which has an endline target year of 2030. Second, availability of latest population projections from 2011 to 2036 as published by the Technical Group, National Commission on Population, MOHFW.

The population size for 34 States/UTs have been updated in Spectrum DemProj considering the population projections made by the National Commission on Population expert group and ensuring consistency with it for the years 2011 to 2036. The indicators of Total Fertility Rate (TFR), Age-specific Fertility Rate (ASFR), sex ratio at birth, life expectancy at birth by sex, and net migration by age and sex have been updated for the period 2011 to 2036 considering these projections by the Technical Group.

Other key updates made to the AIM module of Spectrum included the annual data on number of adults and children alive and on ART (2019, 2020 & 2021) and number of pregnant women receiving Prevention of Mother to Child Transmission of HIV is updated for the years 2020 and 2021. The epidemic configuration is updated for few States to include additional High Risk Group Population (HRG) considering available data. Hijra/Transgender population (H/TG) population group is added in an additional 15 States, Injecting Drug Use (IDU) population added in an additional six States, Men having Sex with Men (MSM) population added in an additional five States, and Female Sex Workers (FSW) population added in an additional one State. The same HRG population size estimate used in the earlier estimation round has been used. Surveillance data is also updated with the latest 2021 round of HIV Sentinel Surveillance (HSS) implemented among Ante-natal Clinic Attendees (ANC) — considered as proxy for the general population — and HRG groups. Another data input is the addition of routine testing data from Stand Alone ICTC of the pregnant women included for the year 2020. Data from Targeted Interventions (TI) for HRG groups is also added for the last three-years. HSS site data available from at least 1 HSS site for the last three or more years or from 2 HSS sites for two-years is a requirement to inform the HIV prevalence trend.

In addition, as recommended by the UNAIDS reference group, R-Hybrid is adopted for curve-fitting in 2021 HIV estimation in States where there is a good number of HSS data points for general population against the old and simple EPP Classic model which is based on four parameters (that is, time of epidemic start, proportion in the at-risk population, transmission rate for untreated adults which is kept constant, and behaviour change parameter) – mainly suggested for an epidemic structure in sparse data situations. Curve fitting in EPP Classic model is fast because of the few parameters but its weaknesses was that it was a less flexible model. It assumed a fixed epidemiological model which may not reflect complex realities. In fact, R-Hybrid is a more flexible model providing a better fit to the data in the recent period with scaled-up prevention and treatment. The sub-group thus used R-Hybrid for curve-fitting for the general population for States where there was a lot of HSS data (10 or more sites) and EPP Classic for the remainder. The prevalence curves thus generated were calibrated considering NFHS-3 and NFHS-4 data for general population and IBBS 2014–15 data for HRGs — as per previous rounds.

Results

2021 HIV estimates thus, provide latest and updated information on the HIV epidemic. They updated the previous rounds' findings in terms of characteristic of HIV in India. The epidemic continues to remain heterogenous and dynamic at the State/UT level. Though there have been success in reversing the trends of the HIV epidemic and reducing the number of new HIV infections and AIDS related deaths during the period 2010–2021; but more needs to be done to achieve the NACP phase-V goals of achieving an 80% decline in annual new HIV infections

and AIDS related deaths from 2010 to 2026 and advancement towards the Sustainable Development Goal of 'ending the AIDS epidemic as a public health threat by 2030.' The evidence made available through the estimates can further inform programme planning and prioritization at the State/UT level going forward. A summary of the key findings from the 2021 HIV estimates round are as follows:

At the national level, estimated adult HIV prevalence (15–49 years) has declined since the epidemic's peak in 2000 where prevalence was estimated at 0.55% in 2000 to 0.32% in 2010, and 0.21% in 2021. The north-east region states have the highest adult HIV prevalence (2.70% in Mizoram, 1.36% in Nagaland, and 1.05% in Manipur), followed by southern States (0.67% in Andhra Pradesh, 0.47% in Telangana, and 0.46% in Karnataka). The number of People Living with HIV (PLHIV) are estimated at around 24.01 lakh. Maharashtra, Andhra Pradesh, and Karnataka are the top three states with the largest number of PLHIV.

Annual New Infection (ANI) are estimated at 62.9 thousand in 2021 in India. There is a 46.3% decline in ANI at national level from 2010–2021. A declining trend is noted in most States with most rapid decline in Himachal Pradesh (with around 73% decline from 2010–2021), Tamil Nadu (around 72% decline), Telangana (nearly 71% decline). An increasing trend is estimated in the northeast States of Tripura, Meghalaya, Arunachal Pradesh, Assam, Sikkim, Mizoram, and the Union Territory of DNH&DD.

AIDS Related Deaths (ARD) are estimated at 41.9 thousand in 2021 in India. A 76.5% decline in ARD has been estimated at national level from 2010–2021. A declining trend is noted in all States/UTs excluding Puducherry, Arunachal Pradesh, Meghalaya, and Tripura. The highest decline in ARD is estimated in Chandigarh, Telangana, and West Bengal.

PMTCT need are estimated at 20,612 in 2021 in India. Top 3 states accounting for the highest need are Maharashtra (12.9%), Bihar (11.9%), and Uttar Pradesh (10.6%).

Latest 2021 HIV estimates provide critical evidence to help inform further geographic and population prioritization of HIV prevention, testing, treatment efforts [ART and PMTCT] under the NACP, as national efforts are in the 'last mile' towards the AIDS 'End-Game.' As the HIV estimates have shown that the epidemic is not evenly spread between States/UTs, more granular population and location planning and programming would be needed to guide actions.

Chapter 1

Introduction

Overview

Robust surveillance and epidemiology are essential for effective public health response. Having recognized such importance, the World Health Organization (WHO) and The Joint United Nations Programme on HIV/AIDS (UNAIDS) have advocated for and issued periodic guidelines on surveillance systems and epidemiology as a key component to inform comprehensive HIV/AIDS response. Model-based HIV burden estimation is its integral part globally to inform public health policy formulation, resource allocation and implementation design as it is almost impossible to count the exact number of those who are infected/affected by a public health problem and associated mortality.

In India, HIV surveillance is the first activity under the national AIDS response. Initiated as early as in 1985 in the form of sero-surveillance by the Indian Council of Medical Research (ICMR), the system discovered the first HIV case in India in April 1986. Since then, the HIV surveillance system under the National AIDS and STD Control Programme (NACP) has evolved significantly as integrated and enhanced surveillance and epidemiology (IESE) system for HIV, STIs and related co-morbidities covering four biomarkers and eight population groups.

Each round of surveillance culminates into the model-based HIV disease burden to provide latest evidence on the status of the HIV/AIDS epidemic by State/UTs. The process, which was first undertaken in 1998 using indigenous spreadsheet method, started to employ UNAIDS-supported and globally used Estimation and Project Package (EPP) along with Spectrum software in 2006. In 2012, EPP was integrated into Spectrum to enhance ease of use and ensure consistent data and assumptions for the curve fitting and indicator estimations. Accordingly, the HIV Estimations under NACP from 2012 onwards is being done using Spectrum package only. As a part of the evolution, district-level HIV burden was estimated for five high prevalence States in India during the 2017 round and then scaled-up for all the States/UT in 2019 providing epidemiological evidence for 735 districts across the country.

HIV Estimations 2021

HIV burden estimations is a periodic exercise under the robust surveillance and epidemiology system of NACP in India. NACO has designated Indian Council of Medical Research, National Institute of Medical Statistics (ICMR-NIMS)-Delhi as the nodal institute to anchor the HIV burden estimation under the guidance of the NACO's Sub-group (HIV burden estimation), Technical Working Group (Surveillance and Epidemiology) (TWG-S&E) and Technical Resource Group (Surveillance and Epidemiology) (TRG-S&E). The members under these NACO's institutional members are sourced from multi-disciplinary subject matter experts and representatives from National Institutes, Regional Institutes, State AIDS Control Societies (SACS), International Institute of Population Science (IIPS), independent experts, other key national partners part of the national surveillance and estimations

system, UNAIDS, WHO, and PEPFAR. The 2021 round is latest in the series of HIV estimation rounds implemented in India.

2021 HIV estimates provide the updated and most comprehensive information on the HIV epidemic, where HIV estimates on the following key indicators have been generated for national level and 34 States/Union Territories (UT)[1] by age, sex, and population group: adult HIV prevalence (number of People Living with HIV [PLHIV]), HIV incidence (number of annual new HIV infections), mortality (number of annual AIDS related deaths), and need for Prevention of Mother to Child Transmission of HIV (PMTCT) services.

In terms of the report structure, there are four chapters. This introductory chapter will describe the objectives and process of generating the HIV estimates for national and State/UT level. The second chapter describes the tools and methods used. The results by various HIV indicators for India and States/UTs are presented in the third chapter. The fourth chapter presents a discussion on the key findings. The report also includes eight annexures. The members of the NACO's sub-group (HIV burden estimations) are presented under annexure 1. Annexure 2 highlights the institutional arrangements for surveillance and epidemiology. The members of NACO's TWG and TRG are presented under annexures 3 and 4 respectively. Annexures 5–8 present estimates on key indicators for national and State/UT level.

Objectives

The overarching objective of the 2021 HIV estimation round is generating HIV estimates using latest demographic, programme, and epidemiological data inputs, updated tools and methods, and following a rigorous scientific process.

The objectives of 2021 HIV estimations are as follows:

1. To generate HIV estimates for the key indicators of adult HIV prevalence (number of PLHIV), HIV incidence (number of annual new HIV infections), mortality (number of annual AIDS related deaths), and need for PMTCT services — using the latest globally recommended Spectrum modelling tool (version 6.18), data inputs, and following a scientifically rigorous iterative process.
2. To analyze the epidemic patterns at various geographic levels, understand key trends, and measure progress towards the following national targets listed in the NACP V (2021–2026): progress towards achieving an 80% decline in annual new HIV infections from 2010–2026, 80% decline in annual AIDS related deaths from 2010–2026, and elimination of mother to child transmission of HIV by 2026.

This report focuses on the method, results, and key findings from the 2021 HIV estimation exercise which has been implemented for national and State/UT level.

Process

The process of HIV estimations undertaken by the sub-group (HIV burden estimation), Technical Working Group (Surveillance and Epidemiology) and Technical Resource Group (Surveillance and Epidemiology) is rigorous and iterative. HIV estimations were included as a key activity under the NACO's Integrated and Enhanced Surveillance and Epidemiology Framework (IESE) for NACP V (2021–2026). Presentation on the method for 2021 HIV estimates using Spectrum modelling tool was made by NACO and ICMR-NIMS at the global

[1] For the UT of Jammu & Kashmir and Ladakh, combined estimates are provided. HIV estimates have not been generated for Lakshadweep as there is no HIV Sentinel Surveillance (HSS) site in this Union Territory.

consultation titled "Consolidating the Evidence, Building the Future: Consultation meeting on Integrated and Enhanced Epidemiology Under the National AIDS and STD Control Programme in India" scheduled during 27 to 29 August 2021.

Following have been some of the key steps in the process of implementation.

Further details on the tools and method used for 2021 HIV estimations are presented in the subsequent chapter.

Table 1: Key aspects in the 2021 HIV Estimations

Sl. No.	Activity	Timeline
1	Constitution of the NACO's sub-group (HIV burden estimation) by NACO for implementation of HIV estimates work under oversight of the TWG and TRG	December 2021
2	Experts and Stakeholders meeting on Demographics under HIV Estimations 2021	December 17, 2021
3	Meeting on Spectrum modelling tool updates made considering latest evidence by UNAIDS	January 17, 2022
4	Updating the demographic data inputs to the Spectrum State/UT models	December 2021 & January 2022
5	Consolidating the programme and epidemiological data inputs	December 2021 & January 2022
6	Three meetings of the National Sub Group (HIV Burden Estimation) to review the data inputs, methods, and State/UT Spectrum models 1st Sub Group Meeting 2nd Sub Group Meeting 3rd Sub Group Meeting	January 24, 2022 April 18–19, 2022 April 26–27, 2022
7	Presentation of the method and results by the sub-group to the TWG and feedback	May 4, 2022
8	Final review and recommendation of method and results by TRG (S&E)	May 11, 2022

Chapter 2

Methodology and Data Inputs

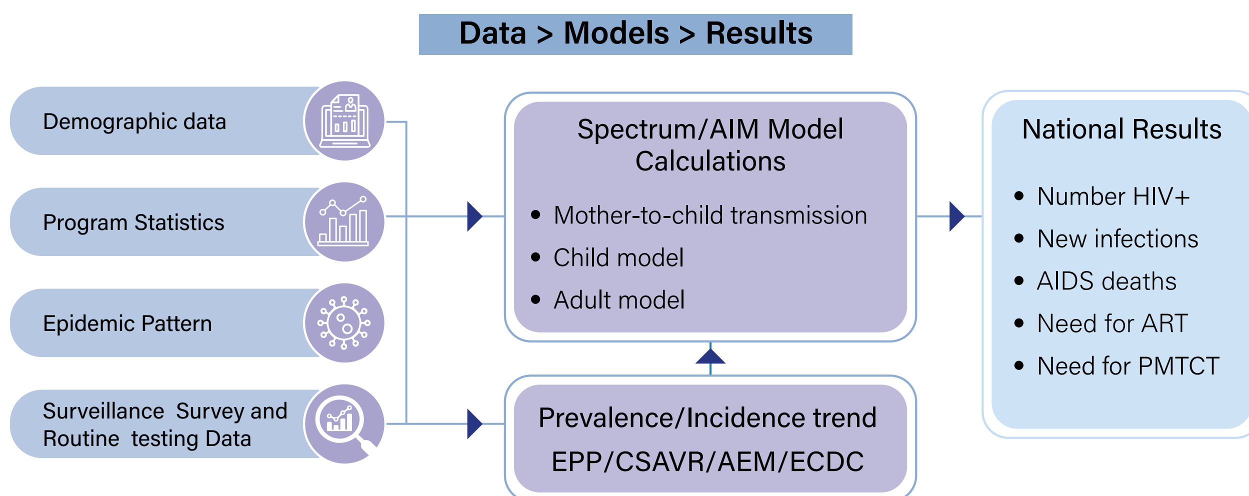
2021 HIV estimates have been generated using Spectrum modelling tool version 6.18 and following scientific methods validated by the National Technical Resource Group (TRG) on HIV Surveillance and Epidemiology. This chapter provides an overview to the tools and method used to generate the 2021 HIV estimates for national level and 34 States/UTs.

Tool

The UNAIDS supported Spectrum software has been used for HIV estimations in India since 2006 in conjunction with the Estimation and Projection Package (EPP). In 2011, EPP got integrated to the Spectrum AIM (AIDS Impact Module) and has been used ever since. Two modules used for HIV estimation are DemProj for demographic projections and AIM for modelling the consequences of the epidemic and generating estimates on key indicators of interest for programme planning such as prevalence, incidence, mortality. The conceptual framework of Spectrum (AIDS Impact Module) is given in figure 1.

As part of the effort to consistently improve the accuracy of estimates, every year, the Spectrum software is updated based on evidence generated from latest global studies recommended for its inclusion by a consortium of multi-disciplinary experts from various countries who are part of the UNAIDS Global Reference Group on HIV Estimates, Projections, and Modelling.[2] For

Figure 1: Conceptual framework of Spectrum 'AIDS Impact Module'



[2] Further details please visit UNAIDS Reference Group on Estimates, Modelling and Projections https://www.epidem.org/

2021 HIV estimates, the globally recommended Spectrum 6.18 version has been used. As compared with the Spectrum 6.06 version which was used during the last 2020 round, there have been few updates made. Some of the key updates made to the Spectrum model for concentrated epidemics are summarized in the box given below. Further details may be referred to elsewhere.[3]

- An option has been made available in the Spectrum model to add COVID-19 related deaths to background mortality. This option has not been utilized given that the number would not impact the overall demographics considering the large population size.
- For concentrated epidemics, an option was added for fitting incidence ratios to ART by age, by 5-year age group, or broader age groups used for Global AIDS Monitoring. In consideration of the data availability, annual ART data continued to be used in this round also, and in epidemic configuration the option for concentrated epidemics continued to be used.
- AIDS Incidence Model has been aligned to EPP for incidence & prevalence. This is a key update made to the model leading to slight impact on the results.
- Other options were made available in the model to input data on paediatric Nosocomial infections by age, HIV positive migrants by age if available.
- Other updates which have no relevance to the India estimation modelling have not been listed here.

Method

The NACO's sub-group (HIV burden estimation) develops 34 individual State/UT Spectrum models for generating State/UT specific results on key epidemic indicators. National level results are generated by aggregating the State/UT models using the aggregate feature of the Spectrum modelling tool.

Therefore, the first step is to develop the 34 State/UT models before national estimates can be obtained. Akin to previous rounds, the approach used was to refer to the earlier estimates rounds' final Spectrum files and open and update them in the latest version of the Spectrum software by adding on latest data inputs.

In the 2021 round, significant data input updates have been made considering availability of the key data sets. These data updates are as follows: the projection period for the models extended from 1981 to 2036, demographic data updated for the period from 2011 to 2036 considering National Commission on Population expert group population projections (2020) for this period, NACP programme data on number of adults and children alive on ART and pregnant women receiving PMTCT services added on for the years 2020 and 2021, data from the latest 2021 round of HIV Sentinel Surveillance (HSS) conducted among antenatal clinic and key population groups added, and HIV positivity data from the programme for the last two years also included. Prevalence curve fitting was implemented using 'R Hybrid' model for the general population in States having multiple surveillance data points i.e., 10 or more than 10 HSS sites, and 'EPP Classic' for the remaining States and UTs. The prevalence curves were calibrated using NFHS III and NFHS IV prevalence (95% CI) for general population and IBBS 2014–15 as per previous

[3] Please visit UNAIDS www.unaids.org; Avenir Health https://www.avenirhealth.org/software-spectrum.php;

rounds before results were generated. Below are further details on the method steps.

Step 1: Updating the projection period in Spectrum manager

The projection period refers to the first-year population and the final-year population of the model. As the population projection needs to start somewhere considering the first HIV/AIDS case diagnosis in 1986, for India, the start year is set at 1981 as per previous rounds. Under 2021 estimations, the final year is set at 2036 considering the evolving programme needs and the endline year of the SDG 3 (target 3.3). The demographic projections have been updated accordingly.

The last time such a significant update to the projection period was made was during the 2012 estimations round when the final year was set at 2017 and during the 2015 round when this was extended till 2026 considering the programme needs.

Step 2: Updating the demographic projections in DemProj

DemProj requires the following data to be inputted for the demographic projections from the base year to the final year of the projection period (1981–2036) for each State/UT: base year population by age and sex, total fertility rate (TFR), age-specific fertility rate (ASFR), sex ratio at birth, life expectancy at birth by sex and age-specific mortality. The key data sets of reference for demographic projections in DemProj module of Spectrum are Census of India and Sample Registration System. The 2020 National Commission on Population technical group on population projection for the period 2011 to 2036 was another key reference by the sub-group.

In the last 2020 estimates round, the State/UT specific demographic data were already available. It was the starting point of review by the sub-group. Further updates were incorporated by the sub-group, especially for the extended projection period up to 2036 and considering the 2020 National Report by the National Commission on Population expert group on population projection from 2011 to 2036.

- **Base year and census years:** The sub-group noted that already steps had been taken during earlier estimations round to ensure complete matching of population by sex and age group between the output of the DemProj system and the various Census years: 1981, 1991, 2001 and 2011 using a smoothening statistical technique. This smoothening was done because the population size by age and sex for the base year as available from the Census for each State/UT could not be incorporated directly due to existence of several problems including age not reporting, under-reporting, age misreporting in raw Census data. Hence, the base year population was adjusted by equal distribution of "age-not stated population" for all age-groups. After considering age-not stated population, the base year population was smoothened using Strong-method (which was used by the National Commission on Population expert group of population projection 2006). This exercise of smoothing was done for 1981, 1991, 2001, 2011 Census years. After this smoothening and normalisation of the population, it had been inputted to DemProj.

- **Update for population projections for the period 2011 to 2036:** The sub-group introduced key updates for the projection period from 2011 onwards. The sub-group compared the DemProj population projections being used during the earlier estimations rounds with the National Commission on Population expert group on population projection for the period 2011 to 2036. It was observed that there were slight differences. The year 2021 was selected as the reference year for this comparison. The difference was noted by less than 2% in the States of Uttar Pradesh, Haryana, Kerala, Andhra Pradesh, Punjab, Madhya Pradesh,

Himachal Pradesh, Rajasthan, Uttarakhand, West Bengal, Karnataka, Tamil Nadu, and Odisha. The difference was, however, greater than 2% but less than 8.5% in Delhi, Gujarat, Jharkhand, Chhattisgarh, Bihar, Jammu & Kashmir, Maharashtra, and Telangana. In the eight north-east States, the difference was less than 1% in all States excluding Manipur where it was at around 4.3%. The population difference was much greater in the Union Territories of Andaman & Nicobar Islands, Chandigarh, Dadra & Nagar Haveli and Daman & Diu, Puducherry, and Goa where the difference in population size was in the range of 14% to 27.5%.

Therefore, the sub-group decided to update the population size for the projection period 2011 to 2036 in DemProj and keep it consistent with the projection made by the Government of India National Commission on Population technical group on population projection. The indicators of TFR, ASFR, sex ratio at birth, life expectancy at birth by sex, and net migration by age and sex have been updated for the period 2011 to 2036 considering the projections by the national technical group.

- **TFR and ASFR:** Regarding the TFR and ASFR, the reports of the SRS had been referred to for updating these values for the period 1981 to 2018 in DemProj during the last estimations round. The TFR and ASFR for the period 2011 to 2036 has been updated. Projections were made using the Gompertz model as suggested by the National Commission on Population expert group for population projection.
- **Sex ratio at birth:** The same method for estimating sex ratio at birth as used in earlier estimation rounds has been retained for the period 1981 to 2011. Sex ratio at birth was estimated by the sub-group using Reverse Survival Ratio method based on the 1981, 1991, 2001, 2011 Census data. The estimates were validated with SRS data up to the latest available year. The SRS estimated sex ratio at birth has been used for all States wherever the data was available. For the rest of the States where SRS data was not available, the reverse survival ratio method estimate has been used as per the National Commission on Population expert group for population projection. More details about the reverse survival method and its application are available elsewhere. For the period 2011 to 2036, the projections were updated following the method by the National Commission on Population expert group on population projection.
- **Level and Age-Sex Pattern of Mortality:** Data on life expectancy by sex was available from the SRS reports for every five-year period beginning from 1981: 1981–85, 1986–90, 1991–95, 1996–2000, 2001–05, 2002–07 which was utilized. For the period 2008–2036, the life expectancy was extrapolated following the method by the National Commission on Population expert group on population projection. For each estimate of IMR, the corresponding value was obtained by using the model life tables. For age-sex pattern of mortality, the Coale-Demeny West model life table was considered for all the States except Meghalaya, where UN South-Asia model life table was considered in view of the high infant mortality rate.
- **Net-Migration:** Inputs on net-migration were derived by applying different methods based on available Census volume and age-sex distribution of migration data for various Census years starting from 1981, 1991 and 2001 and CBR, CDR data from SRS. Both direct and indirect methods were used to arrive at the required inputs. Direct method involved information on place of residence and duration (0–9 years) and place of enumeration for the period 1981–91, 1991–2001. Estimated age and sex distribution of migrants (place of residence and duration (0–9 years)) and place of enumeration was the direct method used for the period 1991–2001. For 2001–2011, indirect residual method was followed using vital statistics (birth rate, death rate)). From

2011 to 2036, the same approach as used the National Commission on Population expert group on population projection was followed.

Net migrants = (Population 2011 – Population 2001) – (Births – Deaths)

Step 3: Updating the input data in AIM module

- Treatment eligibility criteria: The treatment eligibility criteria for adults and children were inputted to AIM considering the national policy for the projection period. Already, under the previous estimations round and for the period 1981 to 2026, the treatment eligibility (CD4) had been inputted for adults as follows: 200 cells/µl until 2008; 250 cells/µl for 2009–2011, 350 cells/µl for 2012–2015 and 500 cells/µl in 2016. In 2017 the Treat All Policy was introduced (reflected as 999 cells/µl in Spectrum) which was inputted from 2017 to 2026 — and now extended to 2036. Similarly, the treatment eligibility criteria for children were also updated considering the evolving national policy — the latest being 'Treat All' in 2017.

- Programme treatment statistics: Programme data needed to be inputted on number of mothers receiving treatment for PMTCT, number of adult males and females alive and on ART, and number of children alive and on ART. Year wise data needed to be inputted for the full projection period. Data had already been included for the years 2003–2004 onwards — when free ART was made available under NACP — up to 2020 in the last estimation round. For the 2021 estimation round, data available for the year 2021 also needed to be inputted. For this, reference was made to NACO Strategic Information Management System (SIMS) programme data. Accordingly, 2021 programme treatment data was inputted to AIM. This was after thorough review, analysis and reconciliation considering private sector data and domicile information of people seeking treatment from across State/UT borders at the big medical hubs of Delhi, Chandigarh, Mumbai/Maharashtra, Tamil Nadu, West Bengal, and Telangana.

  For projecting the treatment coverage for the period 2022 to 2036, the earlier method used by the sub-group was retained, which was to apply the rate of scale-up observed over the last few years (pre-COVID and during COVID) to the future years and flatlining it at 95% coverage once reached.

- Updating the epidemic configuration: The type of epidemic in India is concentrated and accordingly set in Spectrum State/UT models already. The sub-group reviewed the population group representation in the epidemic configuration of States/UTs models. The general population group had been included to the epidemic configuration for all 34 States/UTs since 2008. With regard the HRG population, it was observed that as of the last 2020 estimates round, the FSW, MSM, H/TG people, and IDU were represented in 31 States/UTs, 23 States/UTs, 2 States, and 24 States/UT epidemics respectively. The determinants for including a population group to the epidemic configuration was (i) population size availability and (ii) HIV prevalence data availability from at least 1 HSS site with 3-year data points, or 2 HSS sites with 2-year data points — which was the minimum requirement needed to generate a curve.

  As done in the past, the data availability was reviewed once again by the sub-group to assess whether the population group representation in States/UTs could be increased — as the aim was to ensure maximum representation for the benefit of informing the NACP. Accordingly, the H/TG population group were added in additional 15 States/UT, IDU population group added in additional six States/UT, MSM population

Table 2: Population Sub-Groups Represented in States/UTs, HIV Estimations 2021

S No	State/UT	GP	MSM	FSW	IDU	TG/H
1	Andaman and Nicobar Islands	✓				
2	Andhra Pradesh	✓	✓	✓	✓	✓
3	Arunachal Pradesh	✓		✓	✓	
4	Assam	✓	✓	✓	✓	✓
5	Bihar	✓	✓	✓	✓	
6	Chhattisgarh	✓	✓	✓	✓	✓
7	Chandigarh	✓	✓	✓	✓	
8	Delhi	✓	✓	✓	✓	✓
9	DNH&DD	✓				
10	Gujarat	✓	✓	✓	✓	✓
11	Goa	✓	✓	✓	✓	
12	Himachal Pradesh	✓	✓	✓	✓	
13	Haryana	✓	✓	✓	✓	
14	Jharkhand	✓	✓	✓	✓	✓
15	Jammu & Kashmir and Ladakh	✓		✓	✓	
16	Karnataka	✓	✓	✓	✓	✓
17	Kerala	✓	✓	✓	✓	✓
18	Meghalaya	✓	✓	✓	✓	
19	Maharashtra	✓	✓	✓	✓	✓
20	Manipur	✓	✓	✓	✓	
21	Madhya Pradesh	✓	✓	✓	✓	✓
22	Mizoram	✓	✓	✓	✓	
23	Nagaland	✓	✓	✓	✓	
24	Odisha	✓	✓	✓	✓	✓
25	Punjab	✓	✓	✓	✓	✓
26	Puducherry	✓	✓	✓		
27	Rajasthan	✓	✓	✓	✓	✓
28	Sikkim	✓		✓	✓	
29	Telangana	✓	✓	✓	✓	✓
30	Tamil Nadu	✓	✓	✓	✓	✓
31	Tripura	✓		✓	✓	
32	Uttarakhand	✓	✓	✓		
33	Uttar Pradesh	✓	✓	✓	✓	✓
34	West Bengal	✓	✓	✓	✓	✓

Highlighted Cells: Population sub-Groups included in 2021 round of HIV Estimations

group added in additional five States/UT, and FSW population group added in additional one State/UT. In case there was not sufficient data from HSS meeting the criteria mentioned in the above paragraph, routine testing data from targeted interventions were added for the last 3-years.

Once the epidemic configuration was updated for these States/UT, the population size available under NACP was entered following the same method as used previously. The percent male population was defined, and key population turn-over was also entered keeping consistency with the earlier estimation rounds.

Surveillance data: A key data input for modelling HIV prevalence and incidence by population group is HSS data. India is globally recognized to have a large and robust HSS system under NACP. Starting with a network of 176 sites in 1998, growing to now around 1460 sites— the network has enabled greater geographic and population representativeness with plans for further strengthening it by design in the coming years under the 'Integrated and Enhanced Surveillance and Epidemiology Framework under NACP' phase V.

Latest data from the 2021 round of HSS is available. The 2021 HSS round was implemented under the NACO's Surveillance system covering the population groups on ANC attendees (used as proxy for the general population) and HRG population of FSW, MSM, H/TG persons, IDU. These data were carefully reviewed by NACO, ICMR-NIMS, NI-AIIMS and Regional Institutes to remove outliers, and allocate data to the correct sites in case of name change before they were inputted to the Spectrum model. Data from earlier rounds of HSS inputted to the model were reviewed once again to check for any inconsistencies and clean the same.

HRG population specific positivity data from NACO's targeted interventions was also inputted wherever HSS data was not sufficient (that is, there were less than three-year data points for one HSS site, or two-year data points for two HSS sites).

ANC Census data: Once the surveillance data was inputted, the sub-group also inputted the ANC positivity data available from NACO Stand-alone ICTCs for the latest years 2020 under ANC Census for general population. No changes were made to the data entered for 2010–2019 in earlier estimation rounds.

Survey data: HIV Estimations 2021, as in previous rounds, has used the data from population-based surveys to inform the epidemic curve fittings and calibrations in EPP. For the general population group, data from NFHS-3 and NFHS-4 was used. For HRG, prevalence data from Integrated Biological and Behavioral Surveillance Survey (IBBS) 2014-15 was used. For the States/UT, where data from both NFHS-3 and NFHS-4 was available, the population-based prevalence was used to inform both curve fittings and calibrations. For the States/UTs, where data from only NFHS-4 was available, it was used for calibration. Data from IBBS 2014-15 was used for calibration as per availability.

Step 4: Curve-fitting

A key update is the curve-fitting model adopted under the 2021 estimation round. Till the previous round, 'EPP Classic' model was used for curve fitting for all population groups for all States/UTs. EPP Classic is the oldest and simplest of the models which is based on four parameters: time of epidemic start, proportion in the at-risk population, transmission rate for untreated adults which is kept constant, and behaviour change parameter. Its strengths are that it imposes an epidemic structure in sparse data situations, and curve fitting is fast because of the few parameters. However, its weaknesses are that it is not a very flexible model. It assumes a fixed epidemiological model which may not reflect complex realities. Therefore, as recommended by UNAIDS, 'R-Hybrid' model was adopted for curve-fitting wherever there was a lot of HSS data points for general population in specific

States. R-Hybrid was considered a more flexible model providing a better fit to the data in the recent period with scaled-up prevention and treatment. The sub-group thus used R-Hybrid for curve-fitting for the general population for States where there was multi-year data from more than 10 ANC HSS sites. EPP Classic model was used curve fitting of the general population curve for the remainder States/UTs which had less than 10 ANC HSS sites. As per the previous rounds, EPP Classic was used for curve fitting of all key population groups.

Step 5: Calibration

The second-last step in the process of HIV estimation modelling was calibration of the HIV prevalence curve considering data from large scale population representative survey. As per the method used in previous rounds, NFHS 4, 2015-16 data (95% CI) was used to calibrate the State/UT general population prevalence curves. The IBBS 2014–15 data was used to calibrate the HRG population prevalence curves. No changes were made to the method under this estimation round.

Step 6: Results Generation, Validation and Uncertainty Analysis

The final step was to review the results generated for the key indicators for each of the States/UTs and validate the same considering data from multiple sources including NFHS, programme monitoring data, and local intelligence on the HIV epidemic. Uncertainty analysis was then run to define the 'uncertainty bounds.'

Chapter 3

National Level Results

This chapter presents an overview to the HIV epidemic at the national level. Estimates on the following key indicators will be presented: adult HIV prevalence (15–49 years), total number of People living with HIV (PLHIV), HIV incidence, number of annual new HIV infections, AIDS related mortality, and need for Prevention of Mother to Child Transmission of HIV (PMTCT) services. Age and sex breakup are included. The table below provides a summary of the same.

Table 3: National Summary of the HIV/AIDS Epidemic in 2021

Indicator	Category	Value
Adult (15–49 years) Prevalence	**Total**	0.21% [0.17–0.25]
	Male	0.22% [0.18–0.28]
	Female	0.19% [0.15–0.23]
Number of people living with HIV	**Total**	24,01,284[19,92,058–29,06,772]
	Adult (15+ years)	23,31,476 [19,37,759–28,18,674
	Women (15+ years)	10,50,251 [8,72,579–12,68,579]
	Children (<15 years)	69,808[54,266–89,260]
	Young people (15–24)	1,70,403[1,30,096–2,26,182]
PLHIV per Million Population	**Total**	1762[1462–2133]
HIV incidence per 1000 uninfected population	**Total**	0.05[0.03–0.08]
	Male	0.05[0.03–0.09]
	Female	0.04[0.02–0.07]
New HIV Infections	**Total**	62,967 [36,715–1,04,058]
	Adults (15+ years)	57,969 [33,488–96,528]
	Women (15+ years)	24,550 [14,268–40,694]
	Young people (15–24)	15,078[8,597–25,172]
Change in new HIV infections since 2010 (%)	**Total**	-46.25
	Adults (15+ years)	-44.48
	Female (15+ years)	-43.75
	Children (<15 years)	-60.82
AIDS-related deaths	**Total**	41,968 [26,499–67,451]
	Adults (15+ years)	39,462 [25,141–63,261]
	Women (15+ years)	11,258[5,789–20,460]
	Children (<15 years)	2506[1125–4389]
	Young people (15–24)	1118[644–1954]

(contd.)

(contd.)

Indicator	Category	Value
AIDS- related Deaths per 100,000 Population	**Total**	3.08[1.94–4.95]
	Male	4.21[2.77–6.41]
	Female	1.88[0.97–3.40]
Change in AIDS related deaths since 2010 (%)	**Total**	-76.54
	Adults (15+ years)	-76.44
	Female (15+ years)	-82.74
	Children (<15 years)	-77.92
PMTCT need	**Total**	20,612 [16,379–26,359]
Final MTCT Rate of HIV (%)	**Total**	24.25[18.50–29.50]

Adult HIV prevalence (15–49 years)

Overall, the estimated adult HIV prevalence (15–49-years) had been declining in India since the epidemic's peak in 2000 when it was estimated at 0.55%, decreasing through to 0.32% in 2010, and further reducing to an estimated 0.21% in 2021. In 2021, HIV prevalence among adult male population was estimated at 0.22% while among the adult female population it was 0.19%.

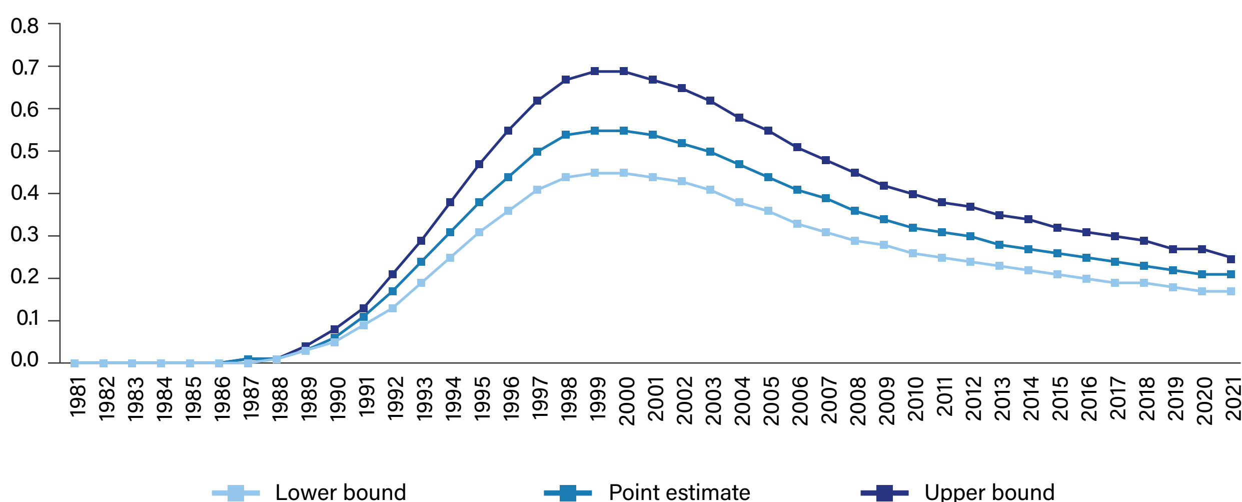
Number of People Living with HIV

The number of People Living with HIV (PLHIV) was estimated at 24.01 lakh in 2021. Adults (15+ years) were estimated to account for 97% (23.31 lakh) of the total infections, while children (0–14 years) were estimated to account for 3% (0.69 lakh) of the same. Young people (15–24 years) were estimated to account for 7% (1.70 lakh) of the total PLHIV cases. In terms of sex disaggregation, adult male and female population accounted for 55% and 45% of the total estimated infections respectively.

Number of People Living with HIV per million population

The number of People Living with HIV (PLHIV) per million population has also been declining since the epidemic's peak. The number of PLHIV per million population was estimated at 1,762 in 2021.

Figure 1: Estimated Adult HIV Prevalence (%) in India 1981-2021



HIV incidence per 1,000 uninfected population

Prevention of new HIV infections is a key focus of the National AIDS and STD Control Programme. HIV incidence per 1,000 uninfected population is a key indicator to measure progress and impact of the various prevention efforts. HIV incidence per 1,000 uninfected population declined from 0.60 in 1996, to 0.10 in 2010, and reducing further to an estimated to 0.05 in 2019. This level was maintained from 2019 to 2021 during the COVID-19 pandemic. HIV incidence among the male population was estimated at 0.05 while among the female population it was estimated at 0.04 in 2021.

Figure 2: Estimated number of PLHIV in India 1981–2021

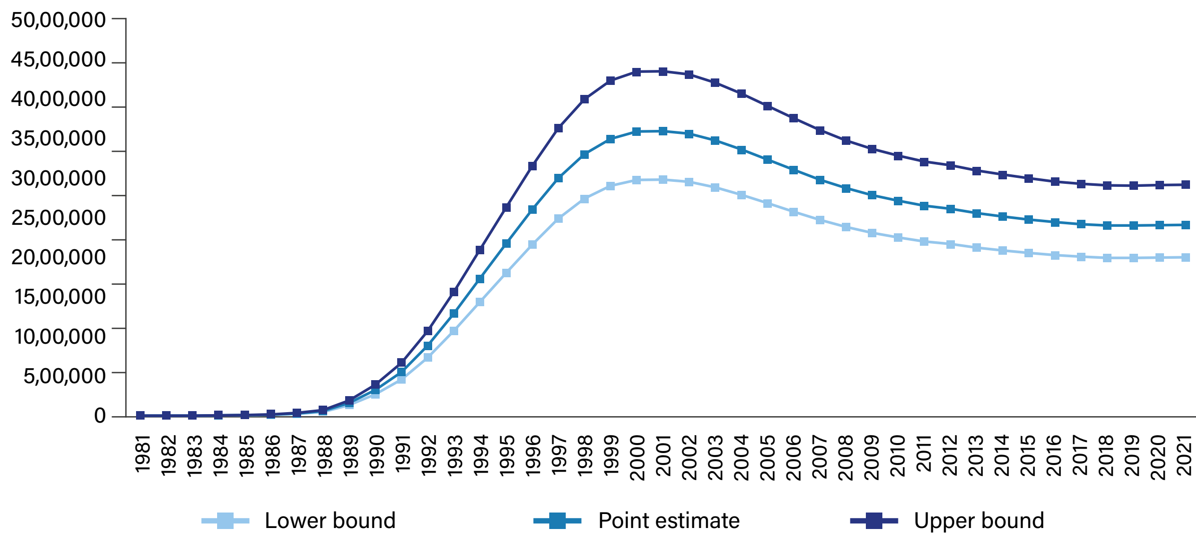
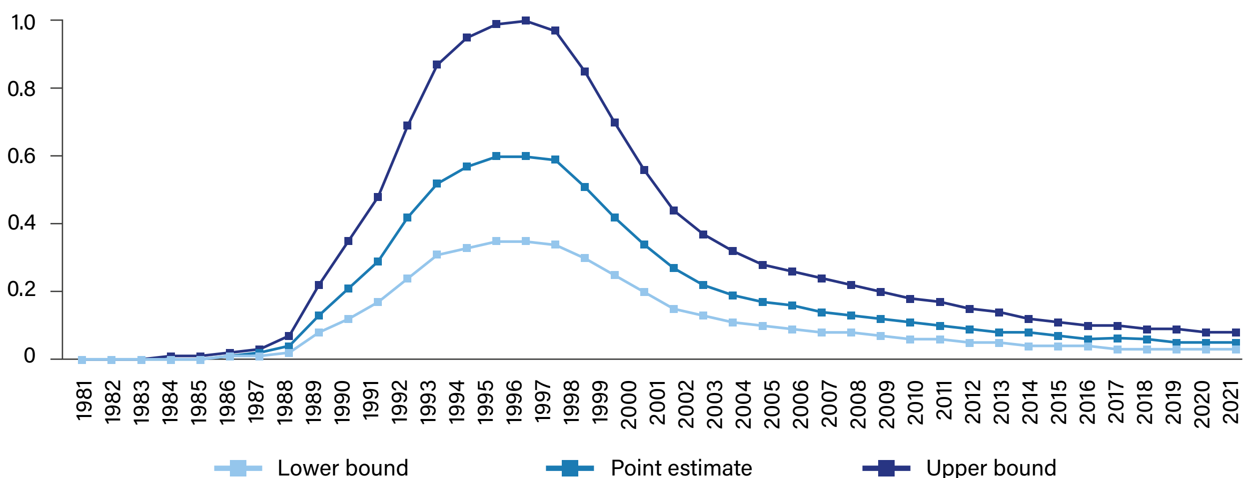


Figure 3: HIV incidence per 1,000 uninfected population, India, 1981 to 2021



Number of annual new HIV infections

Estimated annual new HIV infections have been declining with the scale-up of HIV prevention interventions under the various phases of the National AIDS and STD Control Programme. From 1997 to 2010, annual new HIV infections declined rapidly by around 78%. From 2010 to 2021, the total decline was by an estimated around 46% — while among the adult female population (15+ years) specifically, the decline was estimated at around 44% and among children (0–14 years) it was by an estimated around 61%.

As of 2021, the estimated number of annual new HIV infections was 63 thousand. Adults (15+ years) accounted for 92% (58 thousand) of the total new infections while children (0–14 years) accounted for 8% (5 thousand) of the total. The number of new HIV infections among young people (15–24 years) was estimated at around 15 thousand in 2021. In terms of sex disaggregation, the female population accounted for around 43% of the total number of annual new HIV infections while the male population accounted for around 57% of the total.

AIDS related deaths per 100,000 population

Saturation of early HIV treatment among PLHIV under the "Test and Treat" policy has been a key objective of the National AIDS and STD Control Programme given the positive effect of early treatment on saving lives and preventing onward transmission of HIV as part of the 'treatment as prevention' and 'Undetectable=Untransmissible' strategy. With the scale in treatment coverage, AIDS related deaths per 100,000 population was estimated to have declined from 25.77 in 2004, to 15.04 in 2010, and reducing further to an estimated to 3.08 in 2021. AIDS related deaths per 100,000 population among the male population was estimated at 4.21 while among females it was estimated at 1.88 in 2021.

Number of annual AIDS related deaths

Ever since free-ART became available under the NACP, AIDS related deaths have declined rapidly in India from 2004 (276.55 thousand) to 2021 (41.97 thousand) by as much as 84.82%.

During the last 11 years, from 2010 to 2021, the total AIDS related deaths declined by 76.54%. Among the adult population (15+ years), the rate of decline was at similar levels (76.44%), while among the adult female population, deaths were estimated to have reduced more rapidly by around 82%. Among children, the decline was by nearly 78% from 2010 to 2021.

In 2021, the total number of annual AIDS related deaths in India was estimated at 41.97 thousand. Annual AIDS related deaths among the adult female (15+ year) population was estimated at 11.26 thousand — and among young people (15–24 years) and children (0–14 years) it was estimated at 1.12 thousand and 2.51 thousand in 2021 respectively.

Figure 4: Annual New Infections in India, 1981–2021

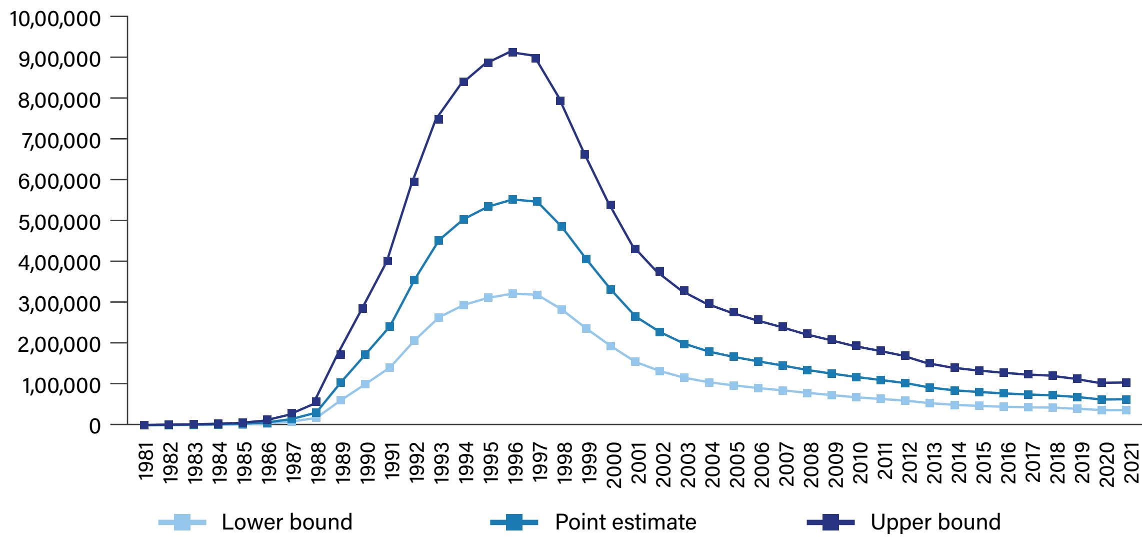


Figure 5: AIDS related deaths per 100,000 population in India, 1981–2021

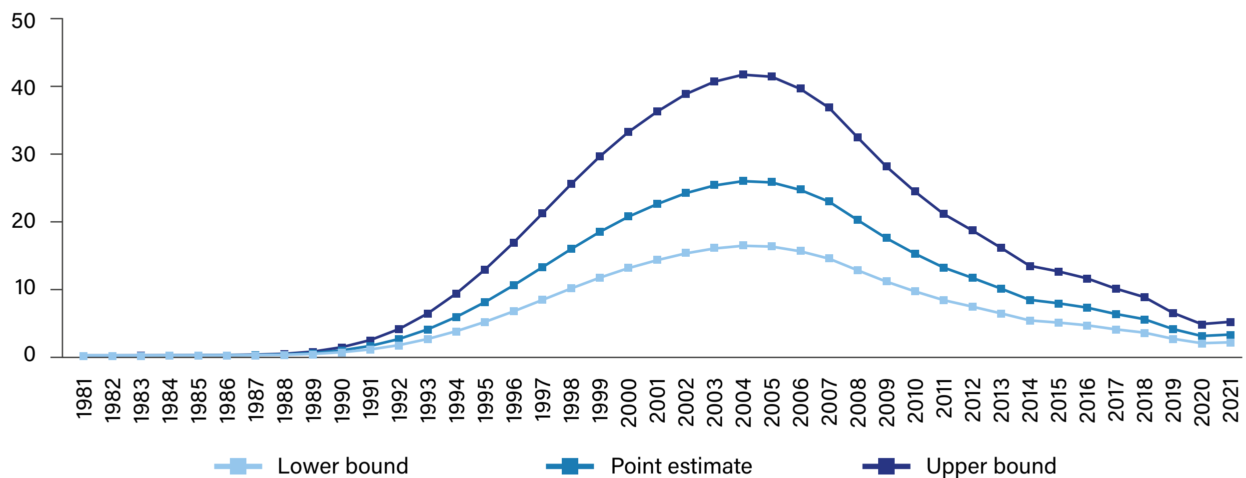
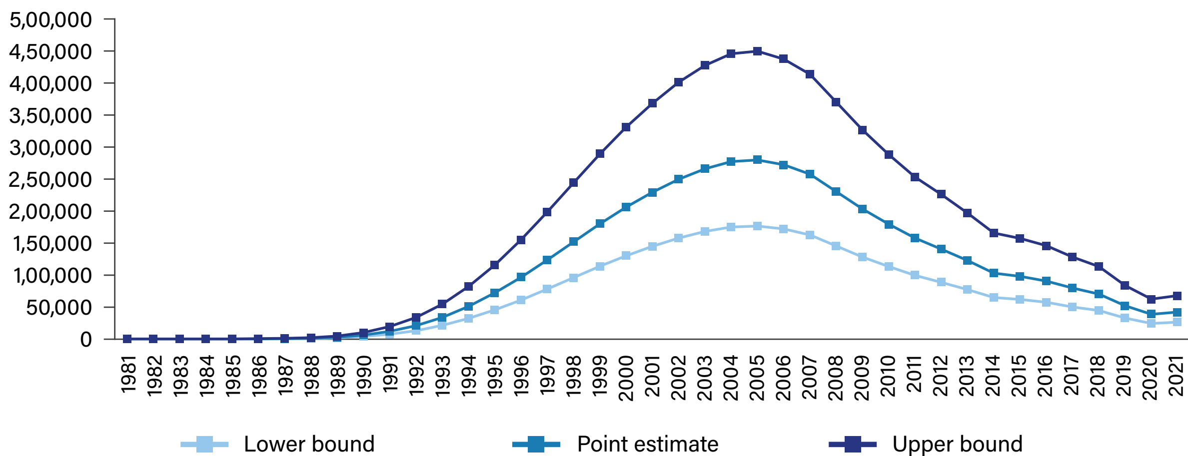


Figure 6: Annual AIDS related Deaths in India, 1981–2021

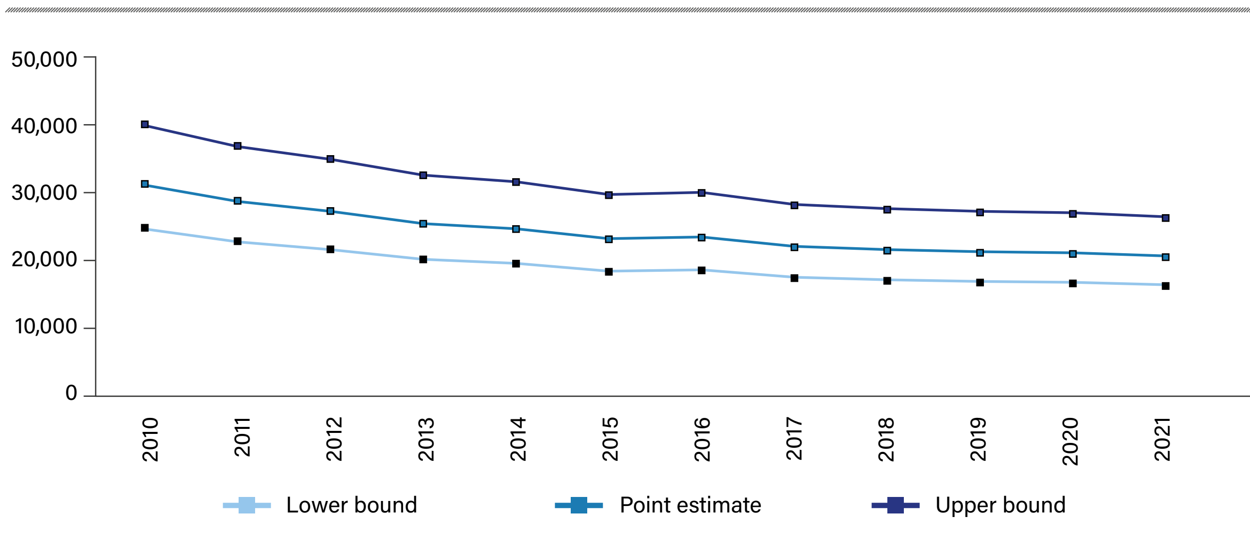


Need for Prevention of Mother to Child Transmission of HIV (PMTCT) services

India is committed to achieving the goal of Elimination of Mother to Child Transmission (EMTCT) of HIV by 2025 under the NACP. For this, differentiated HIV testing services among pregnant women are being saturated under NACP and NHM — as are treatment services for Prevention of Mother to Child Transmission of HIV (PMTCT).

As of 2021, the estimated number of pregnant mothers needing PMTCT services was 20,612. One of the key impact indicators for measuring progress towards EMTCT is Mother to Child Transmission (MTCT) rate. As per the 2021 HIV estimates, the final MTCT rate in India was 24.25% in 2021.

Figure 7: PMTCT service need in India, 2010 to 2021



Chapter 4

State/Union Territory Level Results

The 2021 HIV estimates round provides latest evidence on the state of the HIV epidemic at the sub-national level. The following sections of this chapter will present estimates for adult HIV prevalence (15– 49 years), total number of PLHIV, HIV incidence, number of annual new HIV infections, AIDS related mortality, number of annual AIDS related deaths, and need for PMTCT services at the State/UT level.

Adult HIV prevalence (15–49 years)

State/UT adult (15–49 years) HIV prevalence is a key indicator to determine the level and spread of the HIV epidemic among the population across different parts of the country. 2021 HIV estimates highlights the diversity of the HIV epidemic across geographies within India.

In 2021, the top three States with the highest adult HIV prevalence are Mizoram (2.70%), Nagaland (1.36%), and Manipur (1.05%) in the north-east region. Other States with HIV prevalence higher than the national average (0.21%) are Andhra Pradesh (0.67%), Telangana (0.47%), Karnataka (0.46%) in the southern region, Meghalaya (0.42%) in the north-east region and Maharashtra (0.33%) in the western region. Delhi, Goa, and Puducherry have adult HIV prevalence estimated at 0.31% each followed by Punjab at 0.28% and Haryana and Tamil Nadu at 0.22% each. The States/UTs of Gujarat, Chandigarh, DNH&DD, Chhattisgarh, Bihar, Odisha, Andaman and Nicobar Islands, Tripura, Uttarakhand, Himachal Pradesh, Rajasthan, and Uttar Pradesh have an adult HIV prevalence in

Figure 8: State/UT wide Adult HIV Prevalence (%), 2021

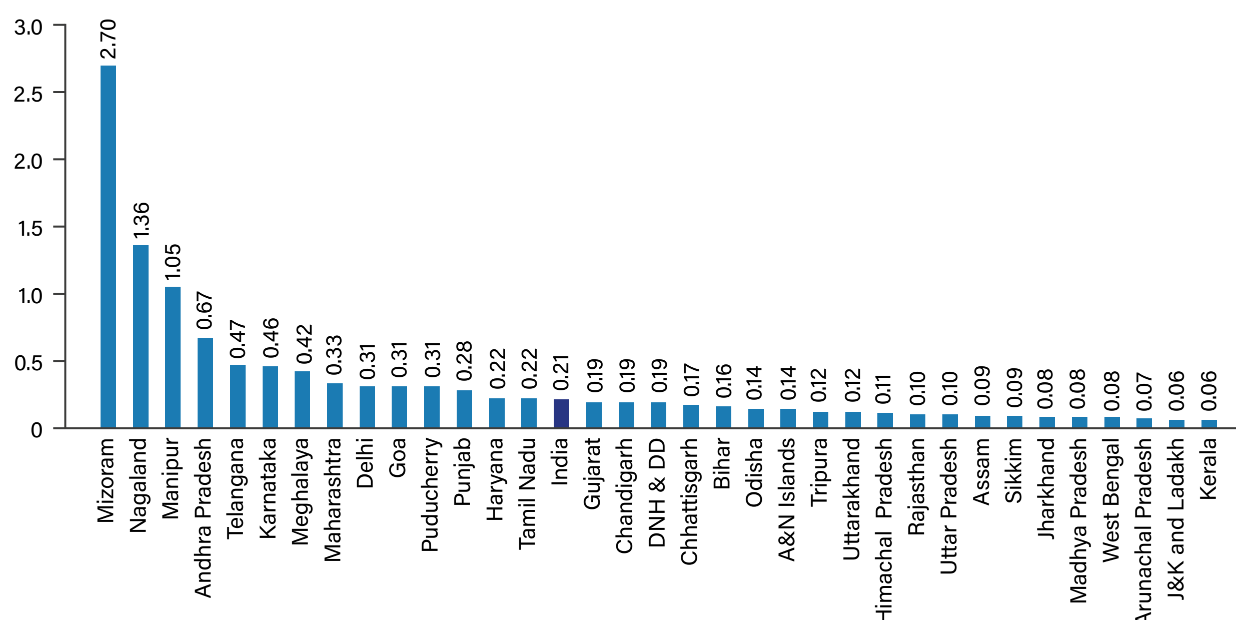


Figure 9: Trend of Adult HIV Prevalence (%) in States/UTs, 1981–2021

the range of 0.10%-0.20%. Rest of the States/UTs have <0.10% estimated adult HIV prevalence.

The trend of adult HIV prevalence in States/UTs is diverse. In Mizoram, the estimated adult HIV prevalence is rising sharply over previous years, while in Arunachal Pradesh, Meghalaya, and Tripura the rise is at lower levels, and appears stable in Nagaland, Assam, and Sikkim. The trend for adult HIV prevalence is one of decline in West Bengal, Chhattisgarh, Madhya Pradesh, Maharashtra, Goa, Andhra Pradesh, Telangana, Tamil Nadu, and Kerala since the epidemic's peak.

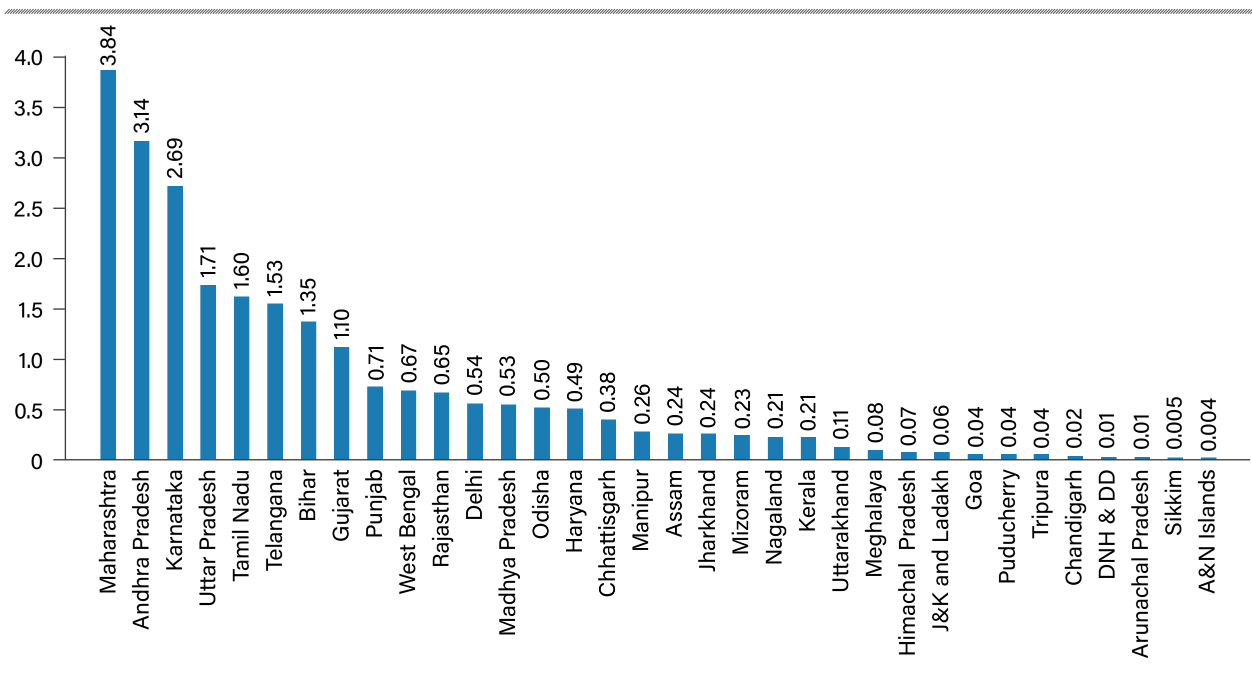
Number of People Living with HIV

The estimated number of People Living with HIV (PLHIV) at the State/UT level provide critical information to assess the burden of the disease, the future need for treatment, and to plan testing programmes in specific geographical areas.

States/UTs estimated to have the highest number of PLHIV at more than 1 lakh each are in Maharashtra (3.94 lakh), Andhra Pradesh (3.21 lakh), Karnataka (2.76 lakh), Uttar Pradesh (1.78 lakh), Tamil Nadu (1.63 lakh), Telangana (1.56 lakh), Bihar (1.43 lakh), and Gujarat (1.14 lakh). These eight States account for around 73% of the PLHIV burden. States with PLHIV estimates in the range of 0.40 lakh to 1 lakh are Punjab (0.73 lakh), West Bengal (0.69 lakh), Rajasthan (0.67%), Delhi (0.56 lakh), Madhya Pradesh (0.55 lakh), Odisha (0.52 lakh), Haryana (0.50 lakh), Chhattisgarh (0.40 lakh). These eight States account for around 19% of the PLHIV burden. The remaining 18 States/UTs have PLHIV estimates at less than 0.25 lakh each and together account for 8% of the PLHIV burden.

In terms of the PLHIV estimate disaggregated by age, over 3 lakh HIV infections are estimated among the adult population (15+years) in Maharashtra (3.84 lakh), and Andhra Pradesh (3.14 lakh), while it is estimated at 2.69 lakh in Karnataka, and between 1 and 2 lakh in Uttar Pradesh, Tamil Nadu, Telangana, Bihar, and Gujarat. The estimated number of adult PLHIV is less than 1 lakh but more than 0.5 lakh in Punjab, West Bengal, Rajasthan, Delhi, Madhya Pradesh, and Odisha.

Figure 10: State UT-Wide PLHIV (in Lakh) in 15+ Population, 2021



In terms of the HIV burden among young people (15–24 years), States estimated to have over a higher number of Young People Living with HIV (YPLHIV) at over 15 thousand are Maharashtra (24.25 thousand), Andhra Pradesh (20.03 thousand), Karnataka (19.32 thousand), Uttar Pradesh (16.54 thousand), and Bihar (15.12 thousand). In Telangana, Tamil Nadu, and Gujarat, this estimate is in the range of 5 to 10 thousand; while in Rajasthan, West Bengal, Madhya Pradesh, Haryana, Odisha, Punjab, Chhattisgarh, Delhi, Manipur, Mizoram, Assam, Nagaland, Jharkhand, and Meghalaya the burden of infection among this age group is between 1 and 5 thousand. In remaining States/UTs, it is less than 1 thousand.

Figure 11: State UT-Wide PLHIV (in Lakh), 2021

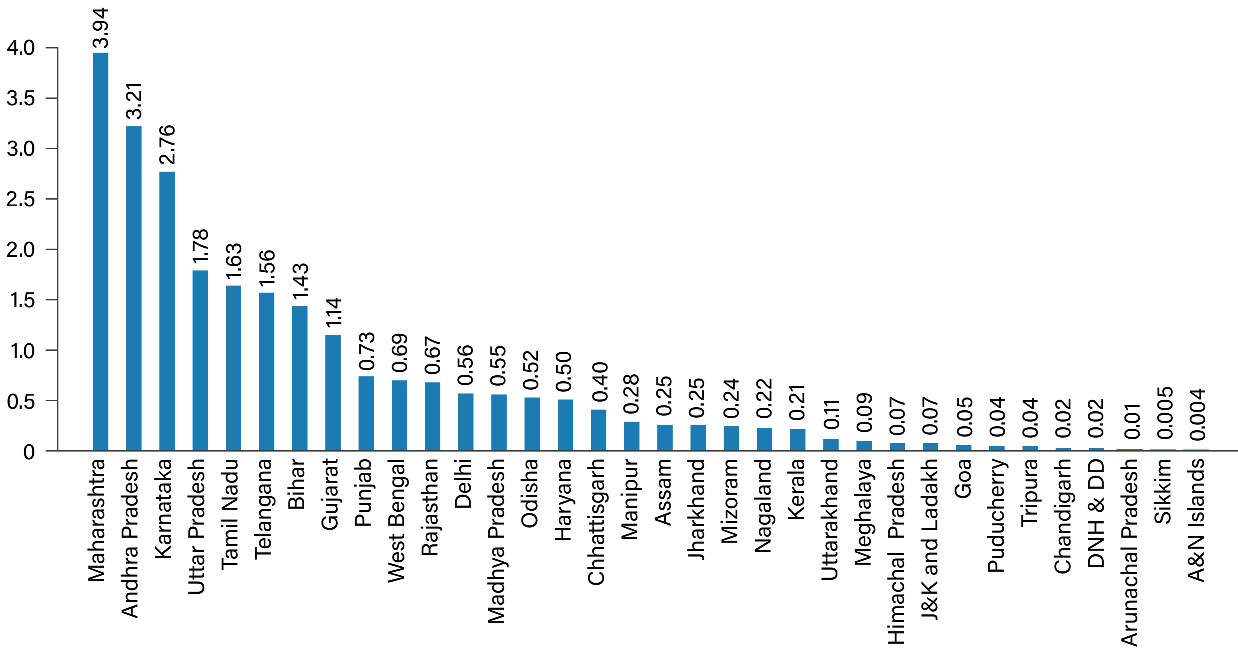
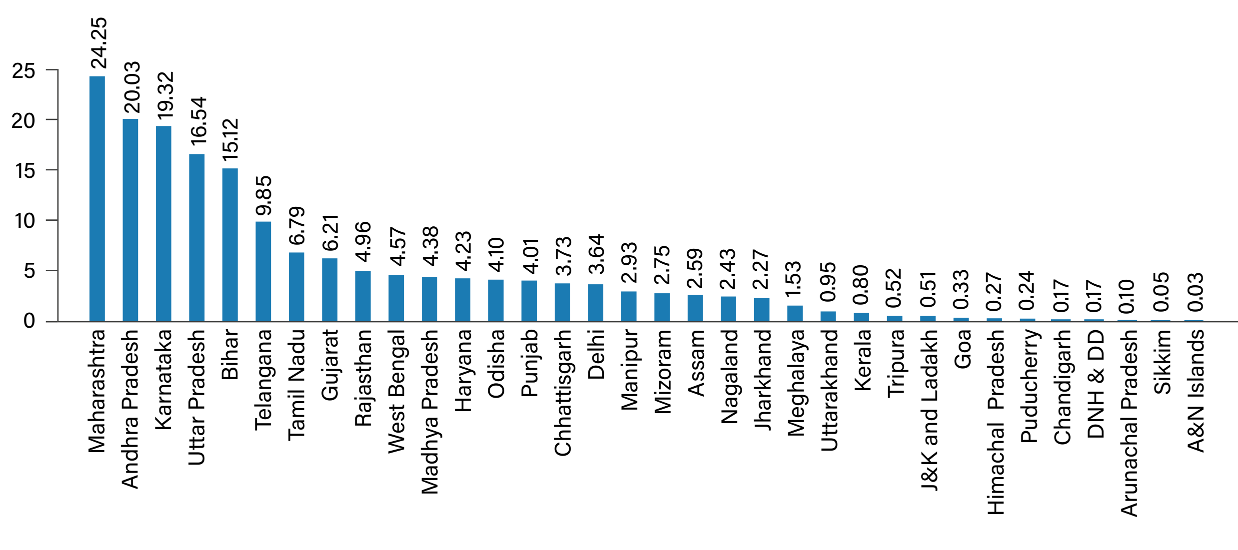


Figure 12: State UT-Wide PLHIV in 15- 24 Age Group Population (in thousand), 2021



Number of People Living with HIV per million population

The indicator on estimated Number of People Living with HIV (PLHIV) per million population gives insight the PLHIV burden relative to the total population size. States with the highest PLHIV number per million population are the three north-east States of Mizoram, Nagaland, and Manipur. This is followed by Andhra Pradesh, Telangana, Karnataka, Maharashtra, Goa, Delhi, Meghalaya, Puducherry, Punjab, and Tamil Nadu. All these States have PLHIV per million population higher than the national average (which is 1,762 PLHIV per million population). Haryana, Gujarat, Chandigarh, DNH&DD, Chhattisgarh, Bihar, and Odisha are estimated to have between 1 and 2 thousand PLHIV per million population — while the rest of the States/UTs have less than 1 thousand PLHIV per million population.

HIV incidence per 1,000 uninfected population

HIV incidence rate at the sub-national level gives insight to the epidemic trend, and the dynamics between the population across the country, to inform combination HIV prevention services under NACP.

2021 HIV estimates highlight the top five States with the highest incidence per 1,000 uninfected population which are Mizoram (1.31 per 1,000 uninfected population), Nagaland (0.51), Meghalaya (0.37), Manipur (0.32), and Delhi (0.14) in 2021. Following this are the States/UTs of Tripura (0.13), Puducherry (0.12), Andhra Pradesh (0.08), DNH&DD (0.08), Bihar (0.07), Goa (0.07), Haryana (0.07), Assam (0.06), Chhattisgarh (0.06), Karnataka (0.06), Chandigarh (0.06), Arunachal Pradesh (0.05), Odisha (0.05), Punjab, (0.05), Sikkim (0.05), and Telangana (0.05) — who are estimated to have HIV incidence above or equal to the national average (0.05). In the rest of the States/UTS, the estimate is less than 0.05 per 1,000 uninfected population.

In terms of the overall trend, incidence per 1,000 uninfected population is estimated to be declining in nearly all States/UTs excluding few States in the north-east region.

Figure 13: State/UT wide Estimated PLHIV per Million Population, 2021

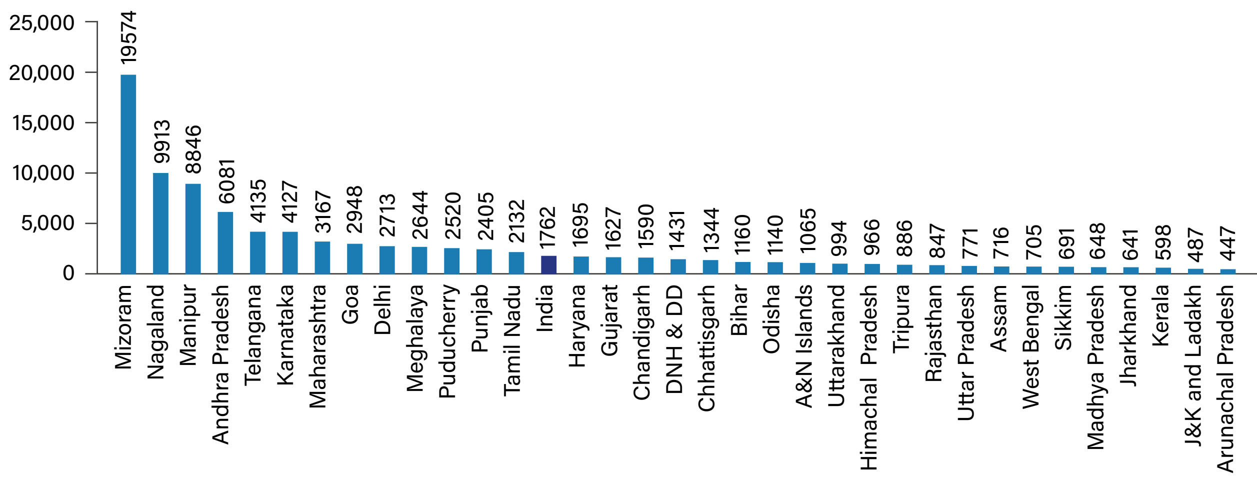


Figure 14: State/UT wide HIV Incidence per 1000 Uninfected Populations, 2021

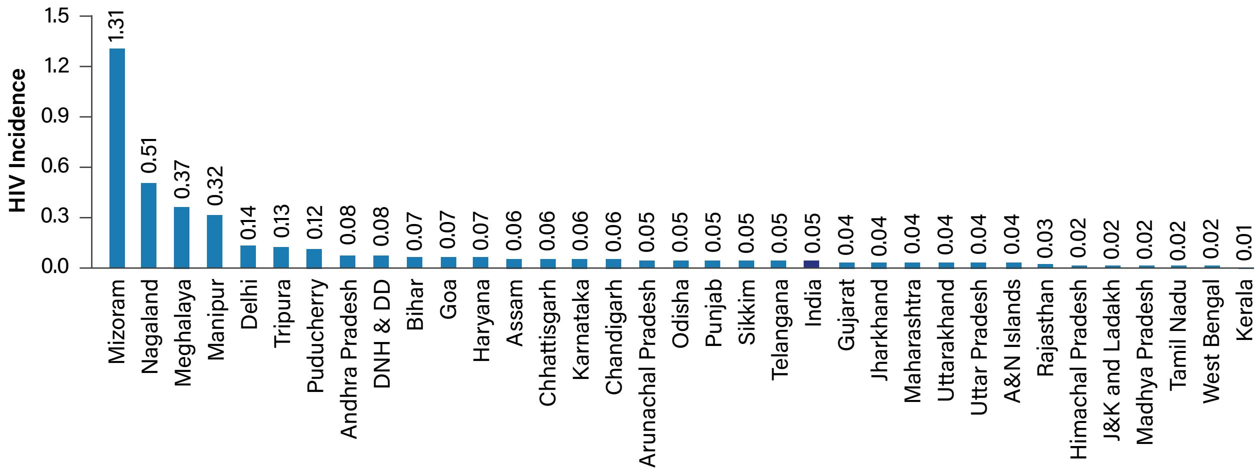


Figure 15: Trend of Adult HIV Prevalence (%) in States/UTs, 1981–2021

MN MZ NG

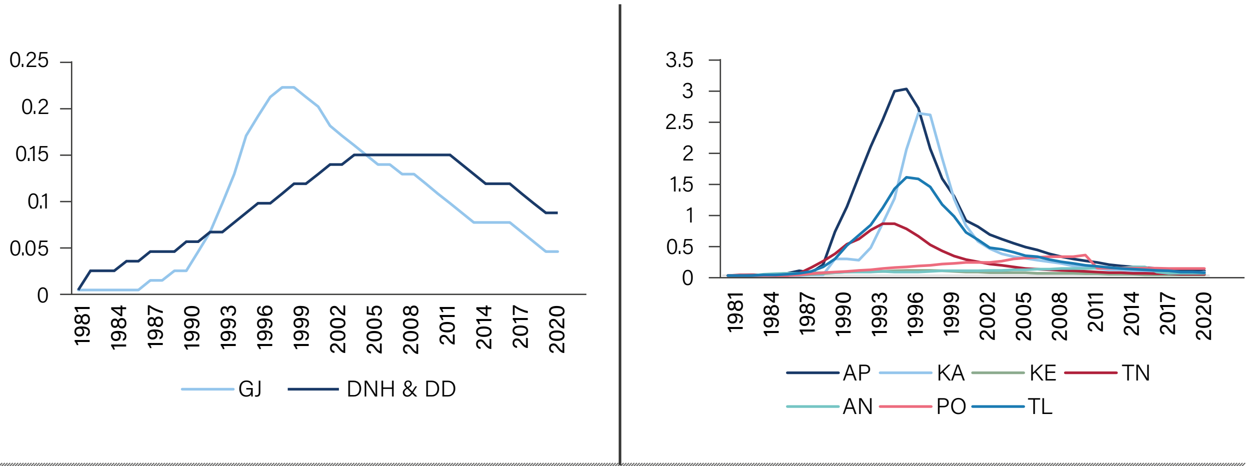
AR AS MG SK TR

BH JH OD WB

CG MP UP

HP HR J&K PJ RJ UK DL CH

GO MH

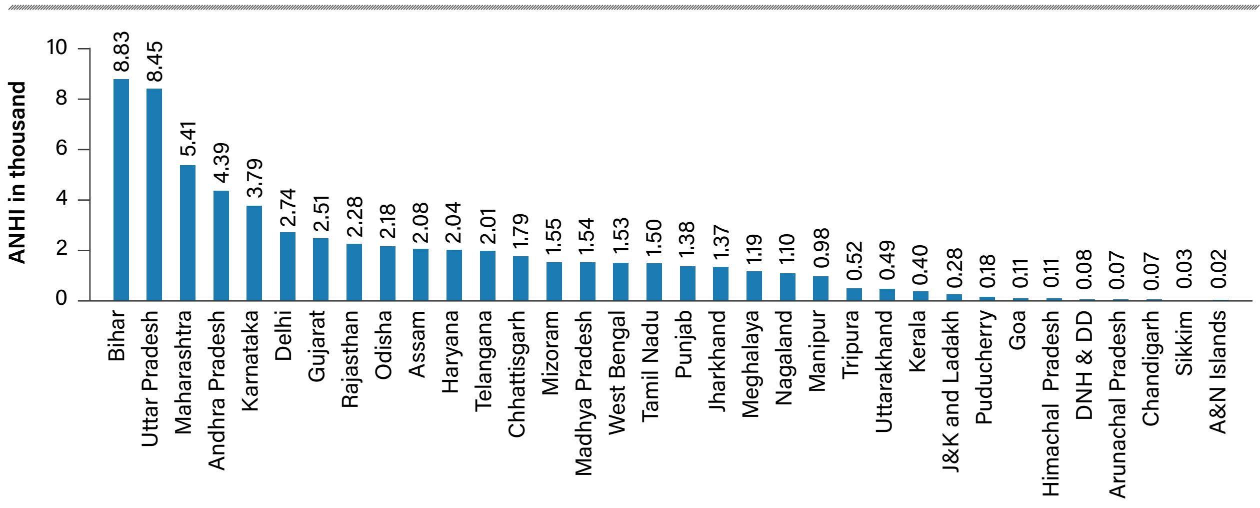


Number of annual new HIV infections

At the sub-national level, top five States which are estimated to have the highest number of annual new HIV infections in 2021, at more than 3 thousand each, are Bihar (8.83 thousand), Uttar Pradesh (8.45 thousand), Maharashtra (5.41 thousand), Andhra Pradesh (4.39 thousand), and Karnataka (3.79 thousand) — and they together account for 49% of total new HIV infection burden in the country. This is followed by States which are estimated to have annual new HIV infections in the range of 2 to 3 thousand to together account for 25% of the total burden. These States are: Delhi, Gujarat, Rajasthan, Odisha, Assam, Haryana, and Telangana. The rest of the 22 States/UTs account for 26% of the total annual new HIV infections in 2021.

Annual new HIV infections is declining in nearly all States/UTs from 2010 to 2021. The decline is the most rapid at more than 70% in Himachal Pradesh (73.3%) from 2010 to 2021, followed by Tamil Nadu (72.5%), Telangana (71.0%), Punjab (70.5%). Other States/UTs where annual new HIV infections have declined between 50% and 70% are Andhra Pradesh (68.2%), Kerala (66.8%), Andaman & Nicobar Islands (66.7%), Karnataka (62.9%), Gujarat (59.7%), Madhya Pradesh (59.5%), West Bengal (57.5%), Maharashtra (55.8%), and Puducherry (54.3%). In Odisha, Chandigarh, Haryana, Rajasthan, Uttarakhand, Chhattisgarh, J&K and Ladakh,

Figure 16: State/UT wide Annual New Infections (in thousand), 2021



Manipur, Nagaland, Uttar Pradesh, Jharkhand, Goa, and Delhi the decline is in the range of 10% and 50%, while in Bihar the decline is by less than 10% during 2010 to 2021. Few States/UTs where annual new HIV infections is increasing are Tripura, Meghalaya, Arunachal Pradesh, Assam, Sikkim, DNH&DD, and Mizoram.

In terms of age disaggregation, annual new HIV infections among the adult (15+ years) population in 2021 is estimated at 7.87 thousand in Bihar, 7.83 thousand in Uttar Pradesh, 4.81 thousand in Maharashtra, 3.99 thousand in Andhra Pradesh, 3.47 thousand in Karnataka, 2.62 thousand in Delhi, 2.36 thousand in Gujarat, and 2.17 thousand in Rajasthan. In the rest of the States/UTs it is less than 2 thousand each.

HIV incidence (15–49 years) among HRG Population

There is diversity in the HIV incidence rate among various population groups. In Mizoram, HIV incidence among FSW is estimated at 1.0%, among IDU at 4.0% and among MSM at 0.41%. In Nagaland, HIV incidence among the FSW and MSM is estimated at 0.02%, and 0.05% respectively. In Meghalaya, HIV incidence among the FSW, IDU and MSM is estimated at 4.0%, 1.0%, and 0.6% respectively.

Figure 17: Percentage change in Annual New Infections by State/UT, 2010–2021

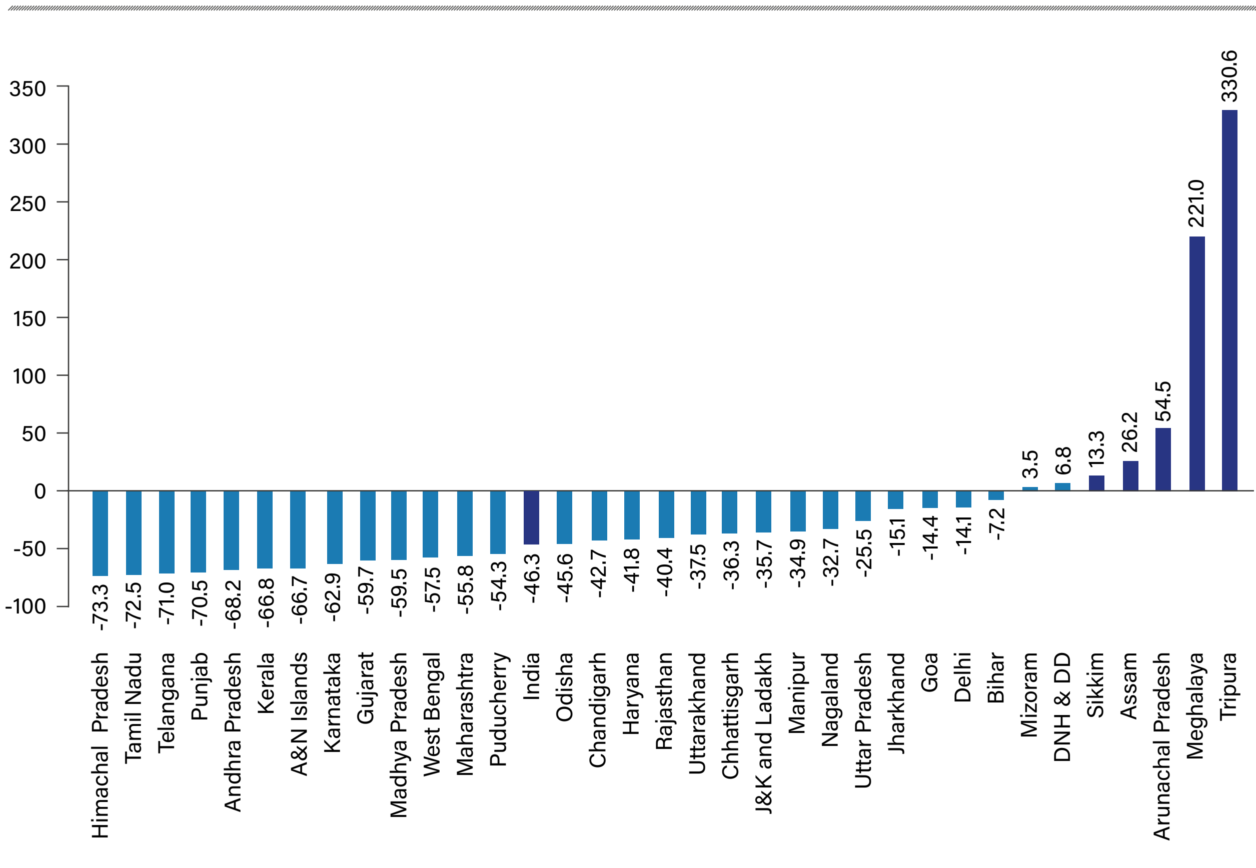


Figure 18: State/UT wide Annual New Infections (in thousands) in 15+ population, 2021

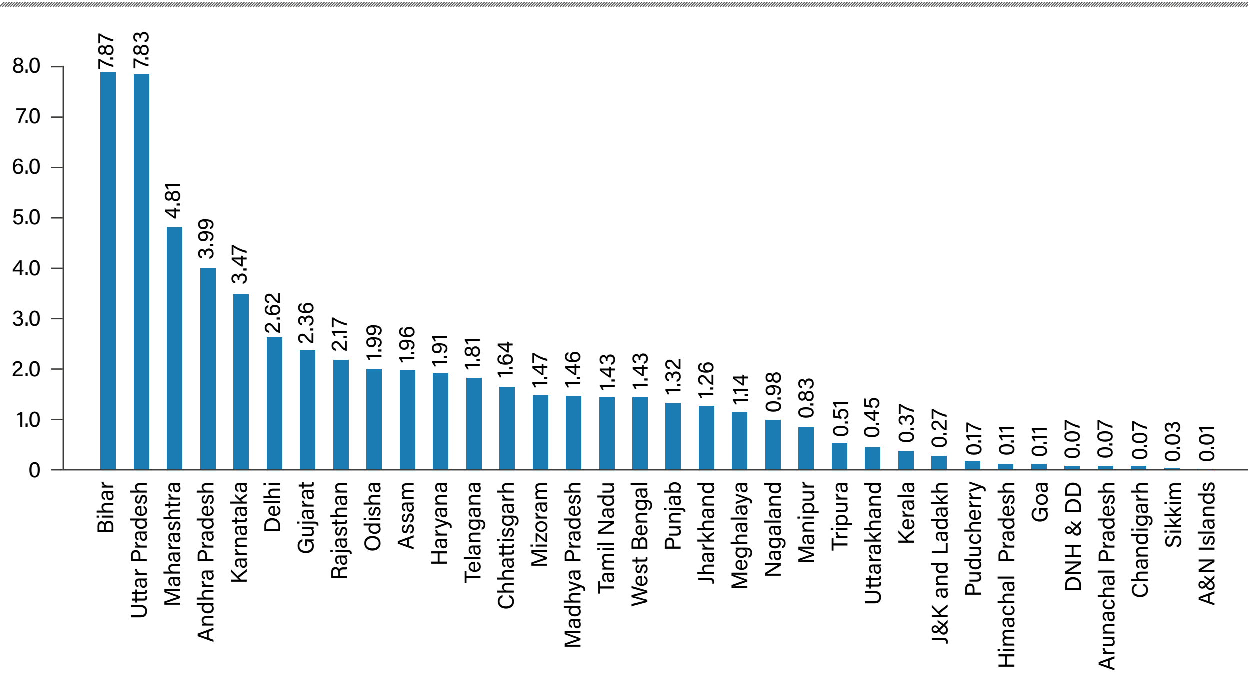


Figure 19 a: HIV incidence (15-49 years) among HRG (FSW)

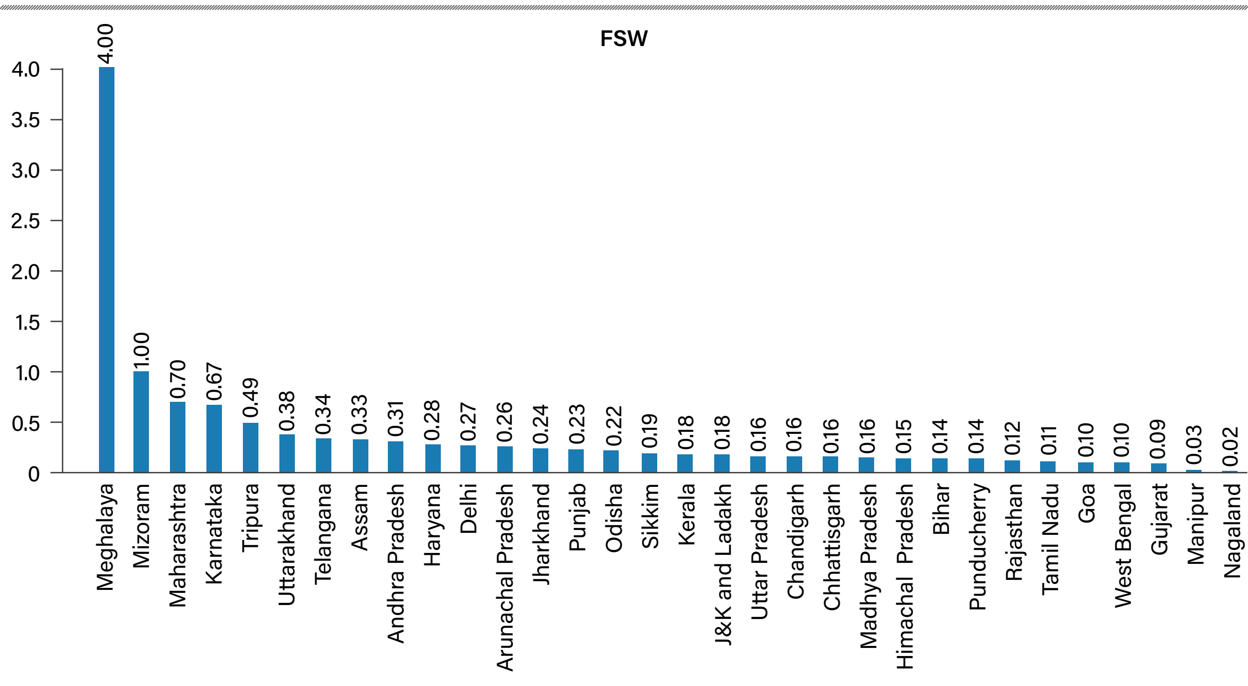


Figure 19 b: HIV incidence (15–49 years) among HRG (IDU)

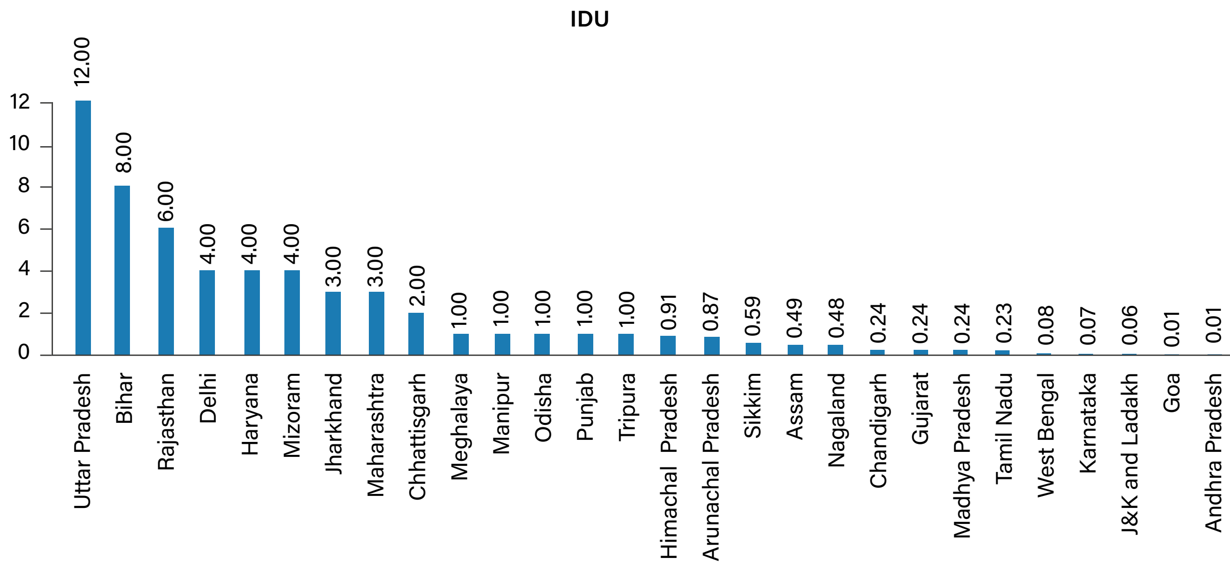
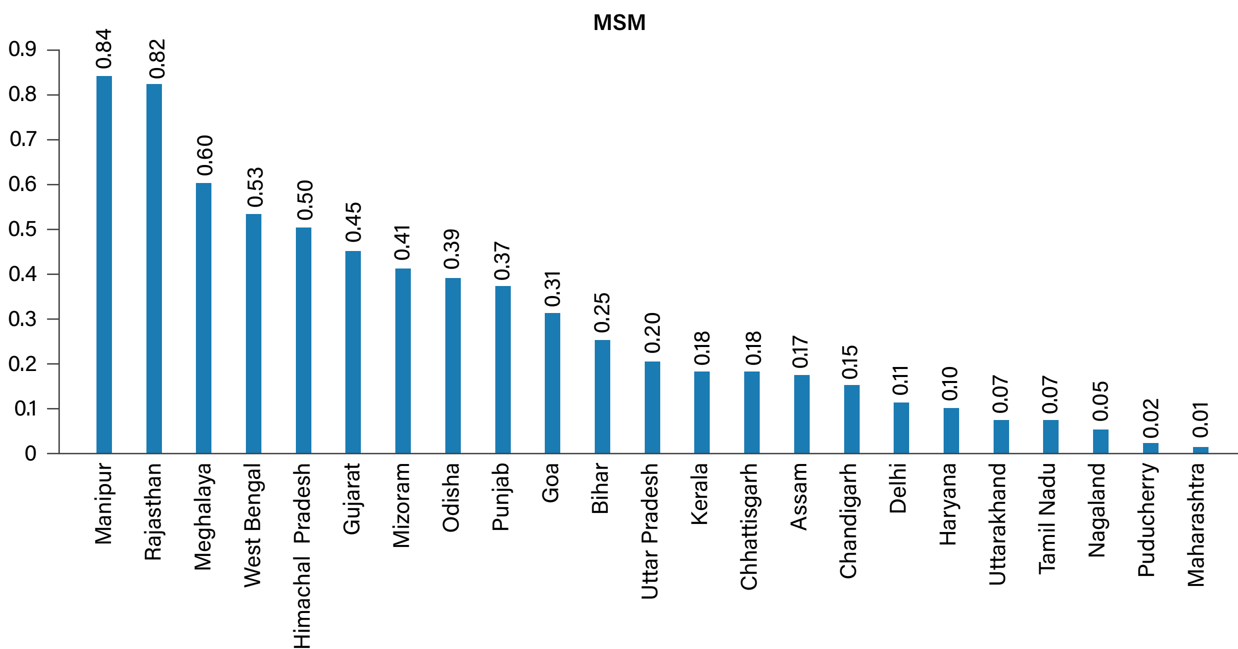


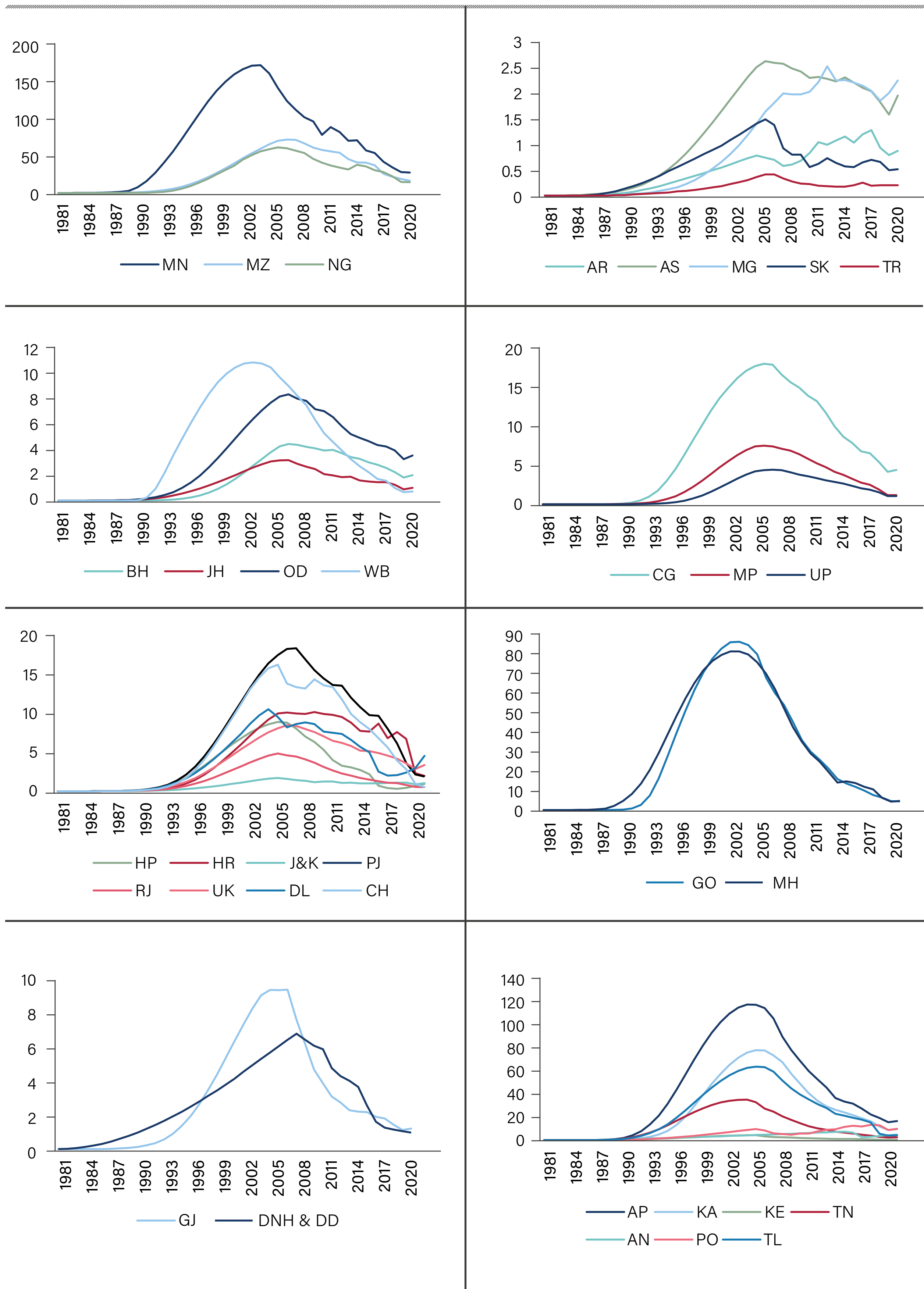
Figure 19 c: HIV incidence (15–49 years) among HRG (MSM)



AIDS related mortality per 100,000 population

A key goal of NACP is to prevent AIDS related mortality across the country by saturating coverage of PLHIV receiving lifesaving ART medicines. The 2021 HIV estimates highlight the continual decline in AIDS related mortality across States/UTs with the advent of free ART under NACP in 2003–04. The rate of decline is, however, varying between States/UTs relative to the ART coverage among PLHIV. In few States, there is a slightly increase in AIDS related mortality in the last two-three years due to the acknowledged grave impact of the COVID-19 pandemic causing temporary disruption in service access during country-wide lockdowns.

Figure 20: Trend of AIDS Mortality in India, States/UTs, 1981 to 2021 (per 100,000 population)



Number of annual AIDS related deaths

Estimates of number of annual AIDS related deaths provides insight to the efficacy of the treatment programme and indicates geographic areas where services are to be continually strengthened. At the sub-national level, three States with the highest number of annual AIDS related deaths are Andhra Pradesh (9.19 thousand), Karnataka (6.74 thousand), and Maharashtra (5.83 thousand) in 2021. These three States account for 52% of total annual number of deaths during the year. This is followed by the States of Bihar, Uttar Pradesh, Tamil Nadu, Telangana, Odisha, and Chhattisgarh who have between 1 and 2.5 thousand annual AIDS related deaths estimated and together account for 28% of total cases. The rest of the 25 States/UTs account for around 20% of the total cases.

In terms of age disaggregation, annual AIDS related deaths among the adult (15+ years) population in 2021 is estimated at 8.93 thousand in Andhra Pradesh, 6.54 thousand in Karnataka, 5.66 thousand in Maharashtra. This is followed by the States of Uttar Pradesh, Tamil Nadu, Bihar, Telangana, Odisha, and Chhattisgarh where the estimate is between 1 and 2 thousand annual AIDS related deaths among this age group. In the rest of the States/UTs it is less than 1 thousand each.

In terms of the trend, AIDS related deaths have continually been declining on annual basis in nearly all States/UT. An over 80% decline has been estimated in Chandigarh, Telangana, West Bengal, Goa, Punjab, Maharashtra, Kerala, Tamil Nadu, Rajasthan, and Himachal Pradesh from 2010 to 2021. During this same period, the decline has been by 50% to 80% in Karnataka, Madhya Pradesh, Haryana, Andhra Pradesh, DNH&DD, Mizoram, Gujarat, Uttar Pradesh, Chhattisgarh, Nagaland, Manipur, and Jharkhand — while in Odisha, Uttarakhand, Bihar, Sikkim, Delhi, Andaman & Nicobar Islands, J&K and Ladakh and Assam, the decline has been by less than 40%, but more than 7%. An increasing trend has been estimated in Puducherry, Arunachal Pradesh, Meghalaya, while in Tripura, there is no change from 2010 to 2021.

Figure 21: State/UT wide Estimated Annual AIDS related Deaths (in thousand), 2021

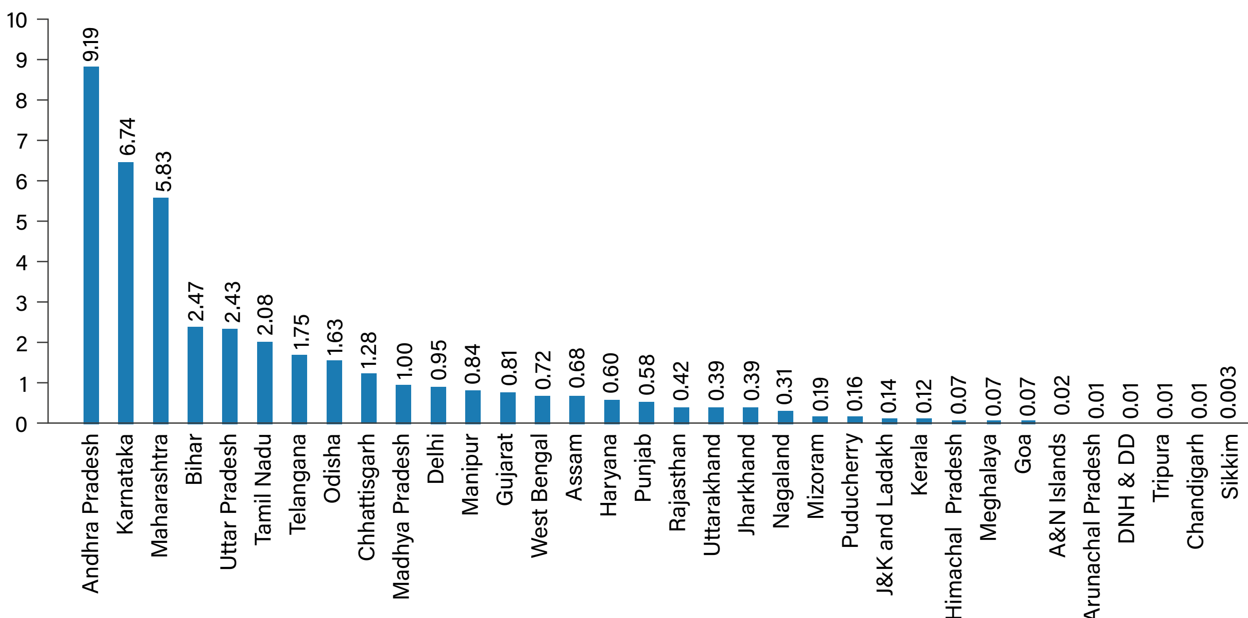


Figure 22: State/UT wide Estimated Annual AIDS related Deaths (in thousands) in 15+ Population, 2021

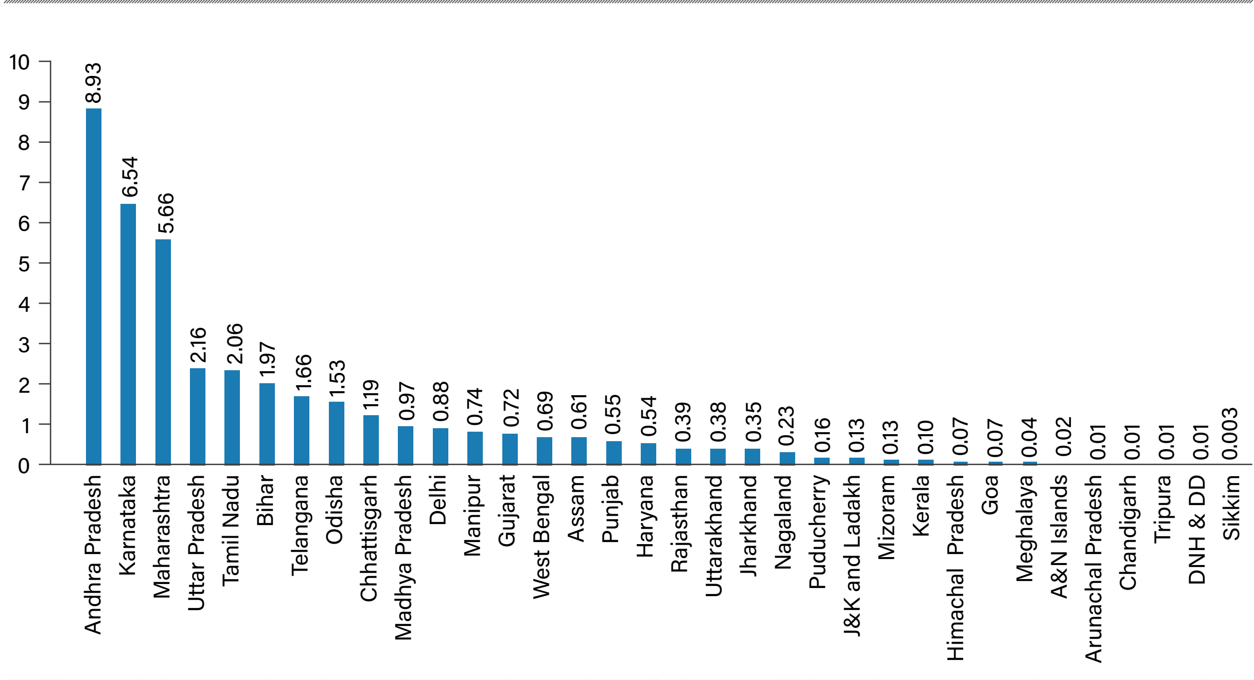
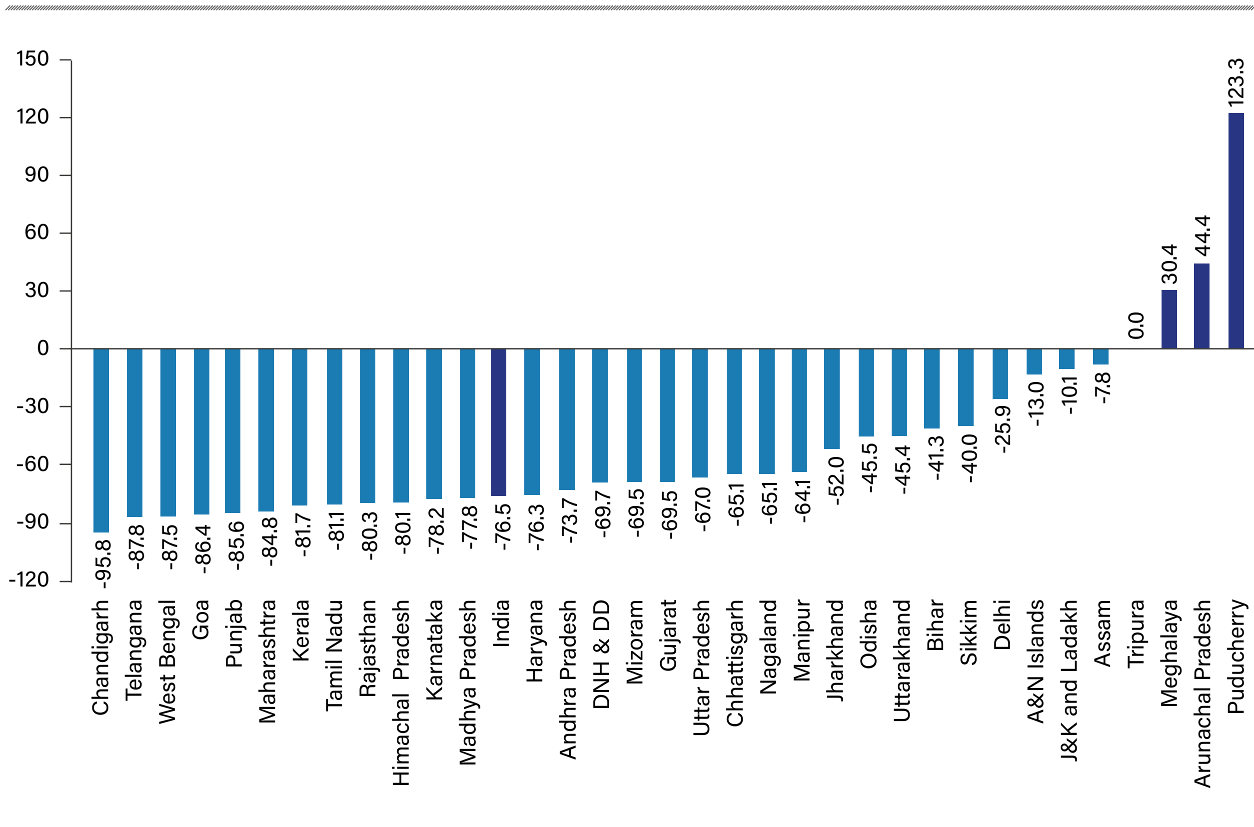


Figure 23: Percentage change in Annual AIDS related Deaths by State/UT, 2010–2021

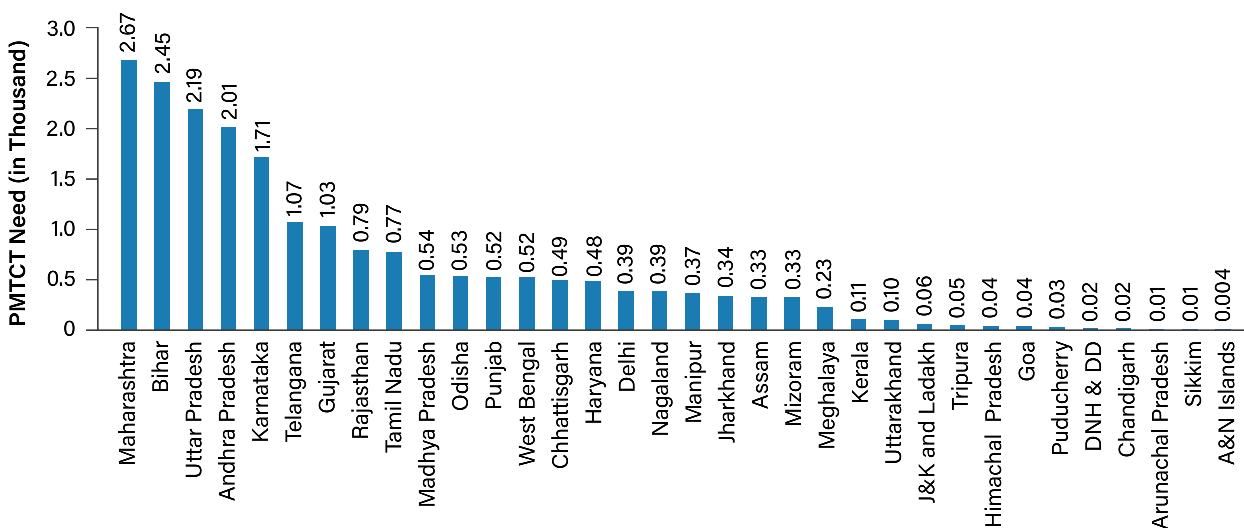


Need for Prevention of Mother to Child Transmission of HIV (PMTCT) services

India is committed to achieving the target of elimination of mother to child transmission of HIV by 2025 and is taking concerted effort to increase HIV testing and expand coverage of Prevention of Mother to Child Transmission of HIV (PMTCT) services among those who are in need. The estimated need for PMTCT services is a key indicator to inform treatment coverage and highlight areas needing focus across the country.

States accounting for the highest PMTCT need, between 1 and 3 thousand, are Maharashtra (2.67 thousand), Bihar (2.45 thousand), Uttar Pradesh (2.19 thousand), Andhra Pradesh (2.01 thousand), Karnataka (1.71 thousand), Telangana (1.07 thousand), Gujarat (1.03 thousand) — and these seven States together account for 64% of the PMTCT need in the country. This is followed by Rajasthan (0.79 thousand), Tamil Nadu (0.77 thousand), Madhya Pradesh (0.54 thousand), Odisha (0.53 thousand), Punjab (0.52 thousand), West Bengal (0.52 thousand) — and these six States together account for 18% of the PMTCT need. The rest of the 21 States/UTs account for 18 of the PMTCT need in the country in 2021.

Figure 24: State/UT wide PMTCT Need (in Thousand), 2021



Chapter 5

Discussion

The Government of India is committed to achieving the Sustainable Development Goal of 'ending the AIDS epidemic as a public health threat by 2030.' The National AIDS and STD Control Programme (NACP) phase V (2021–26) lays down the clear pathway for achieving these goals, by building on the gains achieved during earlier programme phases, advancing best practices, and adopting innovations tailored to respond to the diverse local needs across the country, in an evidence informed manner. The NACP V outlines the clear endline goal of achieving an 80% decline in annual new HIV infections and 80% in AIDS related deaths from 2010 to 2025–26.

The HIV estimates work implemented by NACO and ICMR-NIMS, with the sub-group (HIV burden estimation), and under oversight of the TWG and TRG, provide critical evidence on the state of the HIV epidemic for impact planning under NACP V. The 2021 HIV estimates, latest in the series of estimations work in India, provide critical baseline information for NACP Phase V. The 2021 HIV estimates have been generated using the latest globally recommended modelling tool Spectrum version 6.18, with latest demographic, epidemiological and programme data inputted. Multiple rounds of reviews and iterations have been conducted by the sub-group, TWG and TRG to ensure the quality of the HIV estimates. The 2021 HIV estimates on key indicators are considered more robust than estimates generated in earlier rounds and should not be compared considering the updated method and data inputs.

HIV epidemic in India remains heterogenous and dynamic in nature. Overall, the epidemic has continued to decline since its peak in 2000 and stabilizing in recent years. Adult HIV prevalence is estimated at 0.21% in 2021. Three States with the highest adult HIV prevalence are Mizoram, Nagaland, and Manipur at more than 1%. Other States/UTs have diverse prevalence levels. In terms of absolute numbers, there are 24.01 lakh people estimated to be living with HIV in the country as of 2021. States/UTs estimated to have the highest number of PLHIV at more than 1 lakh each are Maharashtra, Andhra Pradesh, Karnataka, Uttar Pradesh, Tamil Nadu, Telangana, Bihar, and Gujarat. These eight States account for around 73% of the PLHIV burden.

States with the highest incidence per 1,000 uninfected population are Mizoram (1.31 per 1,000 uninfected population), Nagaland (0.51), Meghalaya (0.37), Manipur (0.32). The north-east region States require continued focused attention under the NACP. There is diversity in the HIV incidence rate among various population groups in these States.

From 2010 to 2021, the total decline in annual new HIV infections is by an estimated 46.25%. Annual new HIV infections is declining in nearly all States/UTs from 2010 to 2021 at varying rates, however it is estimated to be rising in Tripura, Meghalaya, Arunachal Pradesh, Assam, Sikkim, DNH&DD, and Mizoram. Reinforcement of HIV prevention interventions are being planned under NACP V via multiple strategies which is expected to have a positive impact in reducing infections even further in coming years towards the targets.

AIDS related deaths has declined rapidly in India by as much as 76.54% from 2010 to 2021

because of the efficacy of the ART programme under NACP. In terms of the trend, AIDS related deaths have continually been declining on annual basis in nearly all States/UT at varying levels. An increasing trend has been estimated in Puducherry, Arunachal Pradesh, Meghalaya, while in Tripura, there is no change from 2010 to 2021. All these geographic areas continue to be of focus under NACP.

India is committed to achieving the goal of Elimination of Mother to Child Transmission (EMTCT) of HIV by 2025 under the NACP. Of the estimated number of pregnant mothers needing PMTCT services (20,612), nearly 64% are receiving services. As there is a felt need to do more, differentiated HIV testing and treatment services among pregnant women are being saturated under NACP and NHM so that comprehensive services are made available.

The 2021 HIV estimates clearly highlight the need for NACP phase V to focus on granular level planning considering local epidemics, responses, and contexts. The district integrated strategy for HIV/AIDS (DISHA) — among other strategies and initiatives being planned under NACP V — for State and District geographic focus is welcome.

Annexures

Annexure 1: Composition of NACO's Sub-group (HIV Burden Estimations)

T/11020/1/2021/Surveillance & Epidemiology
Government of India
Ministry of Health and Family Welfare
National AIDS Control Organization

6th & 9th Floor, Chanderlok Building,
36, Janpath, New Delhi, 110001
Dated 15.12.2021

OFFICE ORDER

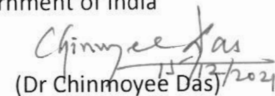
Subject: Sub-Group (HIV Burden Estimation) of NACO's Technical Working Group (Surveillance & Epidemiology) under National AIDS Control Programme

1. NACO's Surveillance & Epidemiology (S&E) functions have evolved significantly into an ambitious framework for Integrated and Enhanced Surveillance & Epidemiology (IESE) of HIV, STIs and related co-morbidities under the National AIDS Control Programme to anchor the national AIDS response towards the attainment of 2030 SDG 3.3 of ending AIDS as a public health threat. The IESE framework is guided through a robust institutional mechanism under the guidance of NACO's Technical Resource Group (TRG) and Technical Working Group (TWG) (Surveillance and Epidemiology).
2. Consequent to framing up of IESE framework, it has been decided to constitute Sub-Group (HIV Burden Estimation) of NACO's Technical Working Group (Surveillance & Epidemiology) under National AIDS Control Programme. The composition and ToR of the Sub-Group on HIV Burden Estimation are as below:

Particulars	Details
Chair	Dr Arvind Pandey, National Chair (Medical Statistics), ICMR and Former Director, ICMR-NIMS, New Delhi
Co-Chairs	1. Director, ICMR-NIMS, New Delhi 2. HoD, Strategic Information (S&E), NACO
Member Secretary	Senior-most consultant NACO's Strategic Information (S&E) division
Ex-officio institutional member	1. All focal persons of National and Regional institutes (Surveillance & Epidemiology) under NACP 2. All DDs/ADGs, NACO
Technical Experts	1. Dr Shashi Kant, Professor and Head, Centre for Community Medicine, AIIMS, New Delhi 2. Dr S K Singh, Professor, Department of Mathematical Demography & Statistics, IIPS, Mumbai 3. Dr D K Shukla, Former Director I/C, National Institute of Medical Statistics, New Delhi 4. Dr Bilali Camara, Medical Epidemiologist 5. Mr Taoufik Bakkali, HIV Disease Burden Expert
Special Invitees	1. Subject Experts/ UNAIDS/WHO/ Community Experts/ State AIDS Control Societies/Other Partner Agencies (As per the approval of the Chair): Up to 6 per meeting
ToR	1. The Sub-Group of TWG will meet at least once a year. 2. The Sub-Group will a. Review and recommend the method, results, and policy implications

Particulars	Details
	of the HIV burden estimation activities under NACO's IESE framework, b. Any other work on HIV burden estimations as per the approval of competent authority. 3. The quorum for the meeting of the Sub-Group shall be complete when a. The meeting is presided by either the Chair or one of the Co-Chairs as per approval of the Chair, and b. The meeting is attended by at-least one third of its total nominated member (Ex-officio institutional member/ Technical Experts). 4. The expenditure for the functioning of the Sub-Group will be regulated in accordance with the instructions issued from time to time. The coordination of the functioning will be done by the senior most consultant (S&E) in NACO. 5. The recommendations of the sub-group will be presented/circulated to the NACO's TWG Surveillance and Epidemiology for their review and recommendation for the next steps. 6. NACO will duly acknowledge the Sub-Group of TWG in all publications (operational manuals, technical/policy briefs, reports, scientific papers) emanating from the activities carried out under the guidance of the Sub-Group concerned. 7. The members/special invitees may acquire knowledge and information during Sub-Group meetings which is not available within the public domain otherwise. All such knowledge and information which may be acquired being member of Sub-Group shall be regarded as strictly confidential and shall not be directly and indirectly disclosed to any person until and unless the knowledge appears in the public domain through NACO's authorized publications/dissemination/releases. 8. The Sub-Group of TWG will be re-constituted periodically as per the approval of the competent authority.

This issues with the approval of the Additional Secretary & Director General (NACO), Government of India



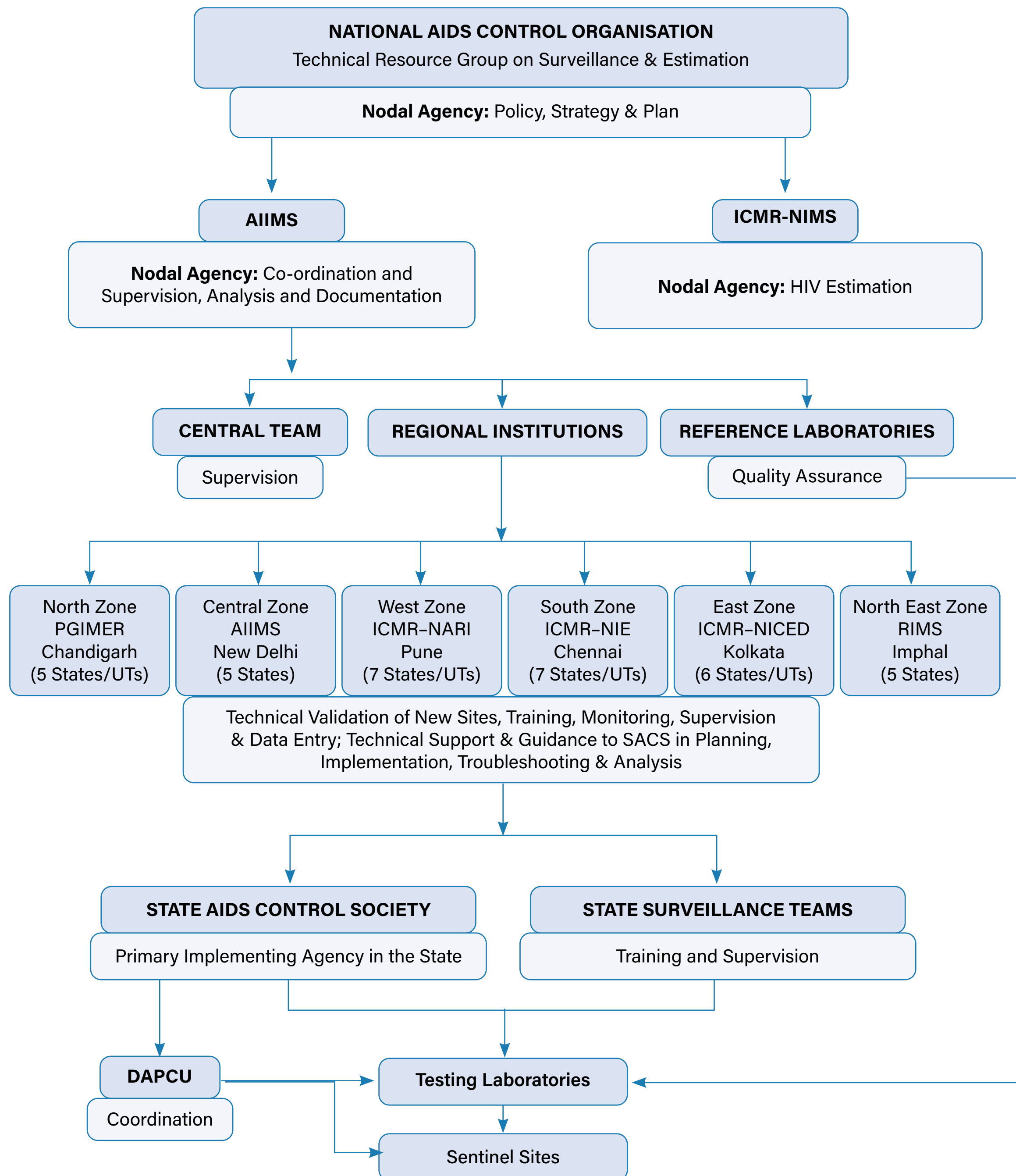
(Dr Chinmoyee Das)

Assistant Director General-Strategic Information

To
1. Dr Arvind Pandey, National Chair (Medical Statistics), ICMR
2. Dr M. Vishnu Vardhana Rao, ICMR-NIMS
3. All members of HIV Burden Estimation Sub-Group as per list enclosed
4. Dr Pradeep Kumar, PO (Surveillance & Epidemiology), NACO

Copy To
1. Sr. PPS to Addl. Secretary & DG (NACO)
2. PPS to Director (NACO)
3. Dr Sanjay Mehendale, Chair, NACO's TRG (S&E) under National AIDS Control Programme
4. Dr DCS Reddy, Chair, NACO's Technical Working Group (S&E) under National AIDS Control Programme
5. Dr Shobini Rajan, Co-Chair, NACO's TWG (S&E) under National AIDS Control Programme
6. All HoDs & DDs, NACO

Annexure 2: Institutional Arrangement for Surveillance and Epidemiology under NACP



Annexure 3: Composition of NACO's Technical Working Group (Surveillance & Epidemiology)

File Number: T-11020/01/2021-NACO (Surveillance & Epidemiology)
National AIDS Control Organization
Ministry of Health & Family Welfare
Govt of India

6th and 9th Floor, Chanderlok Building,
36, Janpath, New Delhi, 110001
Dated 26th July 2021

OFFICE ORDER

Subject: Technical Working Group (TWG) on Surveillance & Epidemiology (S&E) under NACP

***

I. NACO's S&E functions have evolved significantly into an ambitious framework for integrated and enhanced Surveillance & Epidemiology of HIV, STIs and related co-morbidities under the National AIDS Control Programme to anchor the national AIDS response towards the attainment of 2030 SDG 3.3 of ending AIDS as a public health threat.

II. Consequent to the evolution of NACO's S&E functions necessitating the need to include new experts, it has been decided to reconstitute the TWG. The composition and ToR of the reconstituted TWG are as below:

Particulars	Details
Chair	Dr DCS Reddy (Former HoD, Department of Community Medicine, Institute of Medical Sciences, Banaras Hindu University, Varanasi, Uttar Pradesh)
Co-Chair	Dr Shobini Rajan, CMO-SAG, NACO, GoI
Member Secretary	Senior-most consultant in SI (Surveillance and Epidemiology) division: Ex-officio member secretary
Ex-officio institutional member	1. Director, ICMR-NIMS New Delhi & All focal persons of national and regional institutes of Surveillance & Epidemiology 2. Nominee of Director (NCDC) engaged with viral hepatitis surveillance 3. Micro-biology lab in-charge, Apex Regional STI Centre, VMMC & Safdarjung Hospital, New Delhi/representatives 4. HoD, Dept of Community Medicine, Zoram Medical College, Govt of Mizoram/representatives 5. All Deputy Directors, NACO

Chinmoyee Das

Experts	1. Prof. Arvind Pandey, National Chair (Medical Statistics), ICMR and Former Director: ICMR - National Institute of Medical Statistics, New Delhi 2. Dr Shashi Kant, Professor and Head, Centre for Community Medicine, AIIMS, New Delhi 3. Dr S K Singh, Professor, Department of Mathematical Demography & Statistics, IIPS, Mumbai 4. Dr Aarti Tewari, Microbiologist, NCDC, New Delhi 5. Dr JVDS Prasad, Prof. of STD/DVL, Osmania Medical College, Hyderabad 6. Dr Venkateshan Chakrapani, Community Expert 7. Ms Shruta Rawat, Community Expert 8. Dr Brogen Singh Akoijam, Professor, Community Medicine RIMS-Imphal & Expert (Epidemiology) 9. Dr Vezokholu Theyo, Public Health Specialist, Nagaland
Special Invitees	Technical Experts/ UN/bilateral organizations/ Community Experts/ State AIDS Control Societies/Others: As per the approval of the Chair and Co-Chair (Up to 6 per meeting)

Terms of Reference (ToR)

1. Review and recommend the detailed design, operational manuals, tools, results, and policy implications of the activities of integrated and enhanced Surveillance and Epidemiology of HIV, STIs and related co-morbidities under the National AIDS Control Programme in view of the evolving programme needs and the global recommendations. This will include, but not limited to, following areas:
    a. The existing activities of various bio-behavioural surveillance survey, epidemiological investigations into the level, trend and drivers of the HIV/AIDS epidemic and related risk behaviours, in-depth analysis of epidemiological data, HRG size estimations, epidemic profile, district prioritization/categorization etc,
    b. HIV, STI and related Co-morbidities burden estimations (2020 and onward rounds)
    c. Newer activities of programme data-based surveillance & epidemiology, surveillance blood specimen repository, national/state/district level HIV burden estimations (programme-data based or any other suitable modelling techniques), stigma surveillance, mortality surveillance, incidence, and viral load surveillance etc.
2. Any other areas pertaining to the Surveillance & Epidemiology under NACP
3. Periodic review and recommendation on the action plans of national and regional institutes under SI-Surveillance & Epidemiology division of NACO including the project team structures, TA/DA norms, training norms, financial norms etc.
4. The working group will meet at least once in six months. The expenditure for the functioning of this Technical Working Group will be regulated in accordance with the instructions issued from time to time.
5. The recommendations of this working group will be presented/circulated to the TRG (Surveillance and Epidemiology) for their ratification/approval.

Experts	1. Prof. Arvind Pandey, National Chair (Medical Statistics), ICMR and Former Director: ICMR - National Institute of Medical Statistics, New Delhi 2. Dr Shashi Kant, Professor and Head, Centre for Community Medicine, AIIMS, New Delhi 3. Dr S K Singh, Professor, Department of Mathematical Demography & Statistics, IIPS, Mumbai 4. Dr Aarti Tewari, Microbiologist, NCDC, New Delhi 5. Dr JVDS Prasad, Prof. of STD/DVL, Osmania Medical College, Hyderabad 6. Dr Venkateshan Chakrapani, Community Expert 7. Ms Shruta Rawat, Community Expert 8. Dr Brogen Singh Akoijam, Professor, Community Medicine RIMS-Imphal & Expert (Epidemiology) 9. Dr Vezokholu Theyo, Public Health Specialist, Nagaland
Special Invitees	Technical Experts/ UN/bilateral organizations/ Community Experts/ State AIDS Control Societies/Others: As per the approval of the Chair and Co-Chair (Up to 6 per meeting)

Terms of Reference (ToR)

1. Review and recommend the detailed design, operational manuals, tools, results, and policy implications of the activities of integrated and enhanced Surveillance and Epidemiology of HIV, STIs and related co-morbidities under the National AIDS Control Programme in view of the evolving programme needs and the global recommendations. This will include, but not limited to, following areas:
    a. The existing activities of various bio-behavioural surveillance survey, epidemiological investigations into the level, trend and drivers of the HIV/AIDS epidemic and related risk behaviours, in-depth analysis of epidemiological data, HRG size estimations, epidemic profile, district prioritization/categorization etc,
    b. HIV, STI and related Co-morbidities burden estimations (2020 and onward rounds)
    c. Newer activities of programme data-based surveillance & epidemiology, surveillance blood specimen repository, national/state/district level HIV burden estimations (programme-data based or any other suitable modelling techniques), stigma surveillance, mortality surveillance, incidence, and viral load surveillance etc.
2. Any other areas pertaining to the Surveillance & Epidemiology under NACP
3. Periodic review and recommendation on the action plans of national and regional institutes under SI-Surveillance & Epidemiology division of NACO including the project team structures, TA/DA norms, training norms, financial norms etc.
4. The working group will meet at least once in six months. The expenditure for the functioning of this Technical Working Group will be regulated in accordance with the instructions issued from time to time.
5. The recommendations of this working group will be presented/circulated to the TRG (Surveillance and Epidemiology) for their ratification/approval.

Chinmoyee Das

Annexure 4: Composition of NACO's Technical Resource Group (Surveillance & Epidemiology)

T-11020/02/2015-NACO (Surveillance)/Part-2
National AIDS Control Organization
Ministry of Health & Family Welfare
Govt of India

6th and 9th Floor, Chanderlok Building,
36, Janpath, New Delhi, 110001
Dated 4th April 2022

OFFICE ORDER

Subject: Technical Resource Group (TRG) on Surveillance & Epidemiology (S&E) under NACP
***

1. NACO's S&E functions have evolved significantly into an ambitious framework for integrated and enhanced Surveillance & Epidemiology of HIV, STIs and related co-morbidities under the National AIDS Control Programme to anchor the national AIDS response towards the attainment of 2030 SDG 3.3 of ending AIDS as a public health threat.
2. Consequent to the evolution of NACO's S&E functions, changes in positions and non-availability of some members and the need to include members from other related institutions, it has been decided to reconstitute the TRG. The composition and ToR of the reconstituted TRG is as below:

Particulars	Details
Chair	Additional Secretary and Director General, NACO
Co-Chair	Dr Sanjay Mehendale (Former Additional Director General, ICMR and Director, Research, PD Hinduja Hospital and Medical Research Centre, Mumbai, India)
Member Secretary	HoD-Surveillance & Epidemiology (SI)
Ex-officio institutional member	1. Joint Secretary (JS), NACO as Ex-officio institutional member. In case the position of JS (NACO) is vacant, then officer at the level of Director/Deputy Secretary as nominated by AS&DG (NACO) till the position of JS (NACO) is filled up. 2. Nominee of DGHS I. From Directorate II. From Hospital (Central Government) 3. Nominee of Director, NCDC engaged with viral hepatitis 4. Country Director, WHO India/Representatives 5. Dr Peter Ghys, Director, Strategic Information and Evaluation, UNAIDS, Geneva/ Representatives 6. Country Director, UNAIDS India /Representatives 7. Head-Division of Epidemiology & Communicable Diseases, ICMR/Representatives 8. Focal Person, Apex Regional STI Centre, VMMC & Safdarjung Hospital, New Delhi 9. Focal Person, National Institutes (S&E, NACO) (AIIMS-New Delhi and ICMR-NIMS-New Delhi) 10. Focal Person-Apex Lab (Surveillance & Epidemiology), ICMR-NARI-Pune 11. Director, IIPS, Mumbai/Representatives 12. Programme Director, CoE, Maulana Azad Medical College, New Delhi 13. Programme Director, pCoE, Kalawati Saran Children's Hospital & Lady Hardinge Medical College, Delhi 14. All Heads of NACO's Programme divisions

Technical Experts	1. Dr DCS Reddy, Former HoD, Dept of Community Medicine, Banaras Hindu University, Lucknow and Ex-NPO, WHO 2. Prof. Arvind Pandey, National Chair (Medical Statistics), ICMR and Former Director: ICMR - National Institute of Medical Statistics, New Delhi 3. Dr Shashi Kant, Professor and Head, Centre for Community Medicine, AIIMS, New Delhi 4. Dr Rajesh Kumar, Ex-Head, School of Public Health, PGIMER, Chandigarh 5. Dr Raman Gangakhedkar, Former Head-Division of Epidemiology & Communicable Diseases, ICMR 6. Dr Bilali Camara, Senior Medical Epidemiologist 7. Dr Sanjay Dixit, Dept of Community Medicine, MGM Medical College, Indore 8. Dr D K Shukla, Former Director I/C, National Institute of Medical Statistics, New Delhi 9. Dr Sheela V Godbole, Scientist F and HoD-Epidemiology, ICMR-NARI-Pune 10. Dr PVM Lakshmi, Community Medicine and School of Public Health, PGIMER-Chandigarh 11. Mr Taoufik Bakkali, Former SI Advisor, UNAIDS India 12. Dr John Stover, Vice President, Avenir Health, and member, UNAIDS HIV Estimation Reference group 13. Mr Ashok R Kavi, Community expert 14. Mx Abhina Aher, Community expert 15. Shri Manoj Pardesi, Community expert 16. Dr Seema Sood, Professor, Dept. of Microbiology, AIIMS-New Delhi 17. Dr R S Gupta, Public Health expert & Former DDG, NACO 18. Dr Kuldeep Singh Sachdeva, HIV-TB expert & Former DDG, NACO 19. Dr Nandini K. Kumar, Bioethics expert
Special Invitees	Technical Experts/ UN/bilateral organizations/ Community Experts/ State AIDS Control Societies/Others (As per the approval of the Member Secretary): Up to 6 per meeting

Terms of Reference

1. The TRG will meet at least once a year.
2. The quorum for the meeting of the TRG shall be complete when
   a. The meeting is presided by either the Chair or the Co-Chair, and
   b. The meeting is attended by at-least one third of its total nominated member
3. The TRG will
   a. Provide strategic guidance to the integrated and enhanced Surveillance and Epidemiology of HIV, STIs and related co-morbidities under National AIDS Control Programme, and
   b. Review and recommend the design and results of the activities of Surveillance and Epidemiology (including estimations) as recommended by Technical Working Group-Surveillance & Epidemiology through presentation/circulation.
   c. Any other work as per the guidance of competent authority.
4. The expenditure for the functioning of the TRG will be regulated in accordance with the instructions issued from time to time. The coordination of the functioning will be done by the senior most consultant (S&E) in NACO.
5. NACO will duly acknowledge the Technical Resource Group in all publications (operational manuals, technical/policy briefs, reports, scientific papers) emanating from the activities carried out under the guidance of the TRG.

6. The members/special invitees may acquire knowledge and information during TRG meetings which is not available within the public domain otherwise. All such knowledge and information which may be acquired being TRG members shall be regarded as strictly confidential and shall not be directly and indirectly disclosed to any person until and unless the knowledge appears in the public domain through NACO's authorized publications/dissemination/releases.

3. The TRG will be reconstituted periodically as per the approval of the competent authority.

This issues with the approval of Addl. Secretary & DG, NACO, Government of India.

Chinmoyee Das 04/4/22
(Dr Chinmoyee Das)
HoD-Strategic Information

To

1. Dr Sanjay Mehendale (Former Additional Director General, ICMR and Director, Research, PD Hinduja Hospital and Medical Research Centre, Mumbai, India
2. All members of TRG (Surveillance & Epidemiology)

Copy to

1. Sr. PPS to Additional secretary & Director General, NACO
2. PPS to Director (NK), NACO
3. All HoDs, NACO

Annexure 5: HIV Estimates for Key Indicators, 2021, India HIV Estimates 2021

S No.	State/ UT	Percentage of adult HIV prevalence (15–49 yrs), 2021			Total number of PLHIV, 2021 (in thousand)			HIV incidence per 1000 uninfected population, 2021			Total number of annual new HIV infections, 2021(in thousand)			Percentage change in annual new HIV Infections, 2010–2021	AIDS related mortality per 100.000 population, 2021			Total number of AIDS related deaths, 2021(in thousand)			Percentage change in annual AIDS related deaths, 2020–2021	PMTCT need, 2021		
		LB	Estimate	UB	LB	Estimate	UB	LB	Estimate	UB	LB	Estimate	UB		LB	Estimate	UB	LB	Estimate	UB		LB	Estimate	UB
1	An P	0.56	0.67	0.79	277.88	321.03	371.72	0.06	0.08	0.12	2.90	4.39	6.41	-68.19	11.82	17.40	25.50	6.24	9.19	13.46	-73.75	1700	2014	2421
2	Ar P	0.04	0.07	0.10	0.45	0.69	1.00	0.02	0.05	0.09	0.03	0.07	0.13	54.55	0.34	0.86	1.59	0.01	0.01	0.02	44.44	6	9	13
3	Assam	0.08	0.09	0.11	22.14	25.07	28.77	0.05	0.06	0.08	1.56	2.08	2.81	26.23	1.44	1.93	2.55	0.51	0.68	0.89	-7.77	284	334	399
4	Bihar	0.11	0.16	0.22	95.81	142.79	197.04	0.03	0.07	0.13	3.95	8.83	15.70	-7.21	0.86	2.01	4.00	1.06	2.47	4.93	-41.25	1682	2446	3474
5	Chhattisgarh	0.14	0.17	0.22	33.11	39.63	49.18	0.04	0.06	0.10	1.15	1.79	2.79	-36.30	2.71	4.34	6.27	0.80	1.28	1.85	-65.10	384	487	641
6	Delhi	0.25	0.31	0.39	45.53	55.80	68.59	0.08	0.14	0.22	1.68	2.74	4.40	-14.12	2.39	4.61	8.56	0.49	0.95	1.76	-25.94	313	394	500
7	Goa	0.24	0.31	0.41	3.84	4.60	5.66	0.03	0.07	0.12	0.05	0.11	0.19	-14.39	2.93	4.48	7.57	0.05	0.07	0.12	-86.41	26	35	44
8	Gujarat	0.16	0.19	0.23	93.72	113.53	138.48	0.02	0.04	0.07	1.49	2.51	4.87	-59.68	0.72	1.16	1.94	0.50	0.81	1.35	-69.49	811	1030	1333
9	HP	0.08	0.11	0.13	5.58	7.14	8.65	0.01	0.02	0.02	0.08	0.11	0.17	-73.33	0.43	0.98	1.90	0.03	0.07	0.14	-80.05	31	40	53
10	Haryana	0.18	0.22	0.26	42.03	49.98	60.67	0.04	0.07	0.12	1.23	2.04	3.40	-41.82	1.37	2.02	3.02	0.41	0.60	0.89	-76.32	384	475	596
11	Jharkhand	0.06	0.08	0.11	17.44	24.67	33.00	0.02	0.04	0.06	0.75	1.37	2.34	-15.03	0.44	1.01	2.06	0.17	0.39	0.79	-51.98	234	342	482
12	J&K and L	0.03	0.06	0.10	3.80	6.53	10.21	0.01	0.02	0.06	0.09	0.28	0.81	-35.75	0.32	1.06	2.36	0.04	0.14	0.32	-10.13	34	58	95
13	Karnataka	0.40	0.46	0.56	239.57	275.88	323.25	0.04	0.06	0.09	2.43	3.79	5.84	-62.87	6.28	10.09	15.78	4.20	6.74	10.55	-78.17	1448	1707	2079
14	Kerala	0.04	0.06	0.09	15.36	21.21	28.03	0.01	0.01	0.02	0.25	0.40	0.59	-66.80	0.19	0.34	0.67	0.07	0.12	0.24	-81.69	78	114	164
15	Meghalaya	0.25	0.42	0.69	5.18	8.69	14.34	0.15	0.37	0.76	0.49	1.19	2.46	221.02	0.95	2.22	5.24	0.03	0.07	0.17	30.36	144	234	382
16	Maharashtra	0.28	0.33	0.39	340.74	394.08	456.57	0.03	0.04	0.07	3.42	5.41	8.06	-55.81	3.20	4.69	7.48	3.99	5.83	9.31	-84.83	2252	2667	3145
17	Manipur	0.92	1.05	1.22	24.47	27.99	31.77	0.20	0.32	0.44	0.63	0.98	1.36	-34.89	20.02	26.59	35.70	0.63	0.84	1.13	-64.14	303	366	430
18	MP	0.07	0.08	0.10	47.80	54.77	65.55	0.01	0.02	0.03	1.10	1.54	2.55	-59.52	0.80	1.18	1.82	0.68	1.00	1.53	-77.83	460	536	675
19	Mizoram	2.24	2.70	3.25	19.78	23.80	28.48	0.87	1.31	1.91	1.03	1.55	2.24	3.48	11.43	15.80	21.76	0.14	0.19	0.27	-69.52	271	328	399
20	Nagaland	1.08	1.36	1.85	17.40	21.73	29.07	0.30	0.51	0.88	0.65	1.10	1.88	-32.68	8.65	13.98	25.06	0.19	0.31	0.55	-65.07	300	386	538
21	Odisha	0.10	0.14	0.19	38.71	52.11	68.54	0.02	0.05	0.08	1.02	2.18	3.77	-45.57	1.72	3.56	5.95	0.79	1.63	2.72	-45.51	381	534	769
22	Punjab	0.23	0.28	0.35	60.27	72.95	88.68	0.03	0.05	0.08	0.99	1.38	2.25	-70.52	1.27	1.91	3.01	0.39	0.58	0.92	-85.60	411	520	670
23	Rajasthan	0.09	0.10	0.12	56.18	67.19	79.84	0.02	0.03	0.05	1.27	2.28	3.68	-40.43	0.36	0.53	0.79	0.29	0.42	0.63	-80.29	624	788	961
24	Sikkim	0.05	0.09	0.14	0.27	0.47	0.77	0.01	0.05	0.13	0.01	0.03	0.09	13.33	0.19	0.51	1.25	0.00	0.00	0.01	-40.00	3	5	9
25	Tamil Nadu	0.18	0.22	0.24	137.58	162.86	180.87	0.01	0.02	0.03	1.00	1.50	2.07	-72.53	1.84	2.72	3.82	1.40	2.08	2.92	-81.11	661	774	892
26	Tripura	0.08	0.12	0.16	2.36	3.61	4.73	0.07	0.13	0.18	0.27	0.52	0.74	330.58	0.11	0.20	0.34	0.01	0.01	0.01	0.00	33	47	61
27	Uttarakhand	0.10	0.12	0.15	9.41	11.33	14.06	0.02	0.04	0.07	0.28	0.49	0.83	-37.45	2.38	3.42	4.97	0.27	0.39	0.57	-45.37	73	97	128
28	Uttar Pradesh	0.08	0.10	0.14	138.52	178.13	235.66	0.02	0.04	0.07	4.46	8.45	15.15	-25.51	0.58	1.05	1.96	1.35	2.43	4.53	-66.98	1691	2186	2911
29	West Bengal	0.07	0.08	0.09	62.52	69.20	77.64	0.01	0.02	0.02	1.06	1.53	2.27	-57.47	0.55	0.73	1.02	0.54	0.72	1.00	-87.49	460	517	599
30	A&N	0.06	0.14	0.38	0.20	0.43	1.15	0.01	0.04	0.31	0.01	0.02	0.12	-66.67	0.62	4.90	14.19	0.00	0.02	0.06	-13.04	2	4	15
31	Chandigarh	0.13	0.19	0.26	1.42	1.92	2.60	0.02	0.06	0.11	0.02	0.07	0.13	-42.74	0.39	0.54	0.76	0.01	0.01	0.01	-95.83	11	16	22
32	DNH&DD	0.13	0.19	0.25	1.08	1.54	2.09	0.05	0.08	0.12	0.05	0.08	0.12	6.76	0.52	0.93	1.71	0.01	0.01	0.02	-69.70	12	17	23
33	Puducherry	0.18	0.31	0.46	2.46	3.96	5.76	0.06	0.12	0.21	0.09	0.18	0.32	-54.29	3.19	10.40	19.55	0.05	0.16	0.31	123.29	17	30	49
34	Telangana	0.37	0.47	0.60	129.32	155.99	194.13	0.03	0.05	0.11	0.99	2.01	4.03	-70.95	2.98	4.65	8.42	1.12	1.75	3.18	-87.76	857	1073	1390
	India	**0.17**	**0.21**	**0.25**	**1992.06**	**2401.28**	**2906.77**	**0.03**	**0.05**	**0.08**	**36.72**	**62.97**	**104.06**	**-46.25**	**1.94**	**3.08**	**4.95**	**26.50**	**41.97**	**67.45**	**-76.54**	**16379**	**20612**	**26359**

An P= Andhra Pradesh; Ar P= Arunachal Pradesh; HP= Himachal Pradesh; J&K and L= Jammu & Kashmir and Ladakh; MP= Madhya Pradesh; A&N= Andaman & Nicobar

Annexure 6: State and UT-wise Adult HIV Prevalence (15-49 Years), 2015-2021, India HIV Estimates 2021

S No.	State/ UT	2015			2016			2017			2018			2019			2020			2021		
		LB	Estimate	UB	LB	Estimate	UB	LB	Estimate	UB	LB	Estimate	UB	LB	Estimate	UB	LB	Estimate	UB	LB	Estimate	UB
1	An P	0.81	0.95	1.12	0.76	0.90	1.05	0.71	0.85	0.99	0.67	0.80	0.94	0.64	0.75	0.88	0.60	0.71	0.84	0.56	0.67	0.79
2	Ar P	0.03	0.05	0.07	0.03	0.05	0.07	0.04	0.05	0.07	0.04	0.06	0.08	0.04	0.06	0.08	0.04	0.06	0.09	0.04	0.07	0.10
3	Assam	0.08	0.08	0.09	0.08	0.08	0.09	0.08	0.08	0.09	0.08	0.09	0.09	0.08	0.09	0.10	0.08	0.09	0.10	0.08	0.09	0.11
4	Bihar	0.11	0.15	0.21	0.11	0.15	0.21	0.11	0.16	0.22	0.11	0.16	0.22	0.11	0.16	0.22	0.11	0.16	0.22	0.11	0.16	0.22
5	Chhattisgarh	0.17	0.21	0.24	0.17	0.20	0.24	0.16	0.19	0.23	0.16	0.19	0.23	0.15	0.18	0.22	0.15	0.18	0.22	0.14	0.17	0.22
6	Delhi	0.27	0.32	0.38	0.27	0.32	0.38	0.27	0.32	0.38	0.27	0.32	0.38	0.27	0.32	0.39	0.26	0.32	0.38	0.25	0.31	0.39
7	Goa	0.35	0.41	0.49	0.33	0.39	0.47	0.32	0.38	0.45	0.30	0.36	0.44	0.28	0.35	0.43	0.26	0.33	0.42	0.24	0.31	0.41
8	Gujarat	0.18	0.21	0.24	0.18	0.21	0.24	0.18	0.21	0.24	0.17	0.20	0.24	0.17	0.20	0.24	0.16	0.19	0.24	0.16	0.19	0.23
9	HP	0.10	0.13	0.16	0.09	0.12	0.15	0.09	0.12	0.15	0.09	0.12	0.15	0.09	0.11	0.14	0.08	0.11	0.14	0.08	0.11	0.13
10	Haryana	0.19	0.23	0.26	0.19	0.22	0.26	0.19	0.22	0.26	0.19	0.22	0.26	0.19	0.22	0.26	0.18	0.22	0.26	0.18	0.22	0.26
11	Jharkhand	0.06	0.08	0.11	0.06	0.08	0.11	0.06	0.08	0.11	0.06	0.08	0.11	0.06	0.08	0.11	0.06	0.08	0.11	0.06	0.08	0.11
12	J&K and L	0.04	0.06	0.09	0.04	0.06	0.09	0.04	0.06	0.09	0.04	0.06	0.09	0.03	0.06	0.09	0.03	0.06	0.09	0.03	0.06	0.10
13	Karnataka	0.56	0.66	0.81	0.53	0.62	0.76	0.50	0.58	0.71	0.47	0.55	0.66	0.44	0.52	0.62	0.42	0.49	0.59	0.40	0.46	0.56
14	Kerala	0.05	0.08	0.10	0.05	0.07	0.10	0.05	0.07	0.10	0.05	0.07	0.10	0.05	0.07	0.09	0.05	0.07	0.09	0.04	0.06	0.09
15	Meghalaya	0.15	0.22	0.31	0.17	0.24	0.36	0.19	0.28	0.41	0.21	0.31	0.46	0.22	0.34	0.52	0.24	0.38	0.60	0.25	0.42	0.69
16	Maharashtra	0.40	0.47	0.56	0.38	0.44	0.53	0.35	0.41	0.49	0.33	0.39	0.46	0.31	0.37	0.44	0.29	0.35	0.42	0.28	0.33	0.39
17	Manipur	1.26	1.43	1.62	1.19	1.35	1.53	1.12	1.27	1.44	1.06	1.21	1.38	1.01	1.15	1.32	0.96	1.10	1.27	0.92	1.05	1.22
18	MP	0.09	0.10	0.12	0.09	0.10	0.12	0.08	0.09	0.11	0.08	0.09	0.11	0.08	0.09	0.10	0.07	0.09	0.10	0.07	0.08	0.10
19	Mizoram	1.95	2.23	2.57	2.05	2.32	2.69	2.12	2.42	2.82	2.19	2.52	2.94	2.23	2.61	3.07	2.23	2.66	3.17	2.24	2.70	3.25
20	Nagaland	1.15	1.40	1.81	1.14	1.40	1.81	1.14	1.39	1.81	1.14	1.38	1.82	1.13	1.38	1.83	1.12	1.37	1.85	1.08	1.36	1.85
21	Odisha	0.12	0.15	0.20	0.12	0.15	0.19	0.11	0.15	0.19	0.11	0.15	0.19	0.11	0.15	0.19	0.11	0.14	0.19	0.10	0.14	0.19
22	Punjab	0.26	0.32	0.37	0.26	0.31	0.37	0.26	0.31	0.36	0.25	0.30	0.36	0.24	0.30	0.36	0.24	0.29	0.36	0.23	0.28	0.35
23	Rajasthan	0.10	0.11	0.13	0.10	0.11	0.13	0.09	0.11	0.13	0.09	0.11	0.13	0.09	0.11	0.13	0.09	0.11	0.13	0.09	0.10	0.12
24	Sikkim	0.04	0.07	0.10	0.05	0.07	0.10	0.05	0.08	0.11	0.05	0.08	0.12	0.05	0.08	0.13	0.05	0.09	0.13	0.05	0.09	0.14
25	Tamil Nadu	0.25	0.29	0.33	0.24	0.28	0.31	0.23	0.27	0.30	0.21	0.25	0.28	0.20	0.24	0.27	0.19	0.23	0.26	0.18	0.22	0.24
26	Tripura	0.04	0.05	0.07	0.05	0.06	0.08	0.05	0.07	0.09	0.06	0.08	0.10	0.06	0.09	0.12	0.07	0.11	0.14	0.08	0.12	0.16
27	Uttarakhand	0.12	0.14	0.17	0.12	0.14	0.17	0.12	0.14	0.16	0.11	0.13	0.16	0.11	0.13	0.16	0.10	0.13	0.16	0.10	0.12	0.15
28	Uttar Pradesh	0.08	0.11	0.14	0.08	0.10	0.14	0.08	0.10	0.13	0.08	0.10	0.13	0.08	0.10	0.13	0.08	0.10	0.14	0.08	0.10	0.14
29	West Bengal	0.09	0.09	0.10	0.08	0.09	0.10	0.08	0.09	0.10	0.08	0.09	0.10	0.08	0.08	0.09	0.07	0.08	0.09	0.07	0.08	0.09
30	A&N	0.07	0.15	0.28	0.07	0.16	0.31	0.07	0.16	0.32	0.07	0.15	0.34	0.06	0.15	0.35	0.06	0.14	0.36	0.06	0.14	0.38
31	Chandigarh	0.19	0.22	0.27	0.17	0.21	0.26	0.16	0.21	0.26	0.15	0.20	0.26	0.15	0.20	0.26	0.14	0.20	0.26	0.13	0.19	0.26
32	DNH&DD	0.12	0.18	0.24	0.13	0.18	0.24	0.13	0.18	0.25	0.13	0.19	0.25	0.13	0.19	0.25	0.13	0.19	0.25	0.13	0.19	0.25
33	Puducherry	0.22	0.38	0.56	0.21	0.36	0.54	0.21	0.35	0.53	0.20	0.34	0.50	0.19	0.32	0.48	0.19	0.32	0.47	0.18	0.31	0.46
34	Telangana	0.51	0.62	0.77	0.48	0.59	0.73	0.46	0.55	0.69	0.43	0.53	0.66	0.41	0.51	0.64	0.39	0.49	0.62	0.37	0.47	0.60
	India	**0.21**	**0.26**	**0.32**	**0.20**	**0.25**	**0.31**	**0.19**	**0.24**	**0.30**	**0.19**	**0.30**	**0.29**	**0.18**	**0.22**	**0.27**	**0.17**	**0.21**	**0.27**	**0.17**	**0.21**	**0.25**

An P= Andhra Pradesh; Ar P= Arunachal Pradesh; HP= Himachal Pradesh; J&K and L= Jammu & Kashmir and Ladakh; MP= Madhya Pradesh; A&N= Andaman & Nicobar

Annexure 7: State & UT-wise HIV Incidence (Per 1000 Uninfected Population), 2015-2021, India HIV Estimates 2021

S No.	State/ UT	2015			2016			2017			2018			2019			2020			2021		
		LB	Estimate	UB	LB	Estimate	UB	LB	Estimate	UB	LB	Estimate	UB	LB	Estimate	UB	LB	Estimate	UB	LB	Estimate	UB
1	An P	0.11	0.15	0.22	0.10	0.14	0.21	0.08	0.12	0.20	0.07	0.10	0.17	0.06	0.09	0.14	0.05	0.09	0.13	0.06	0.08	0.12
2	Ar P	0.03	0.04	0.06	0.02	0.04	0.06	0.02	0.04	0.07	0.02	0.04	0.07	0.02	0.05	0.08	0.02	0.04	0.08	0.02	0.05	0.09
3	Assam	0.04	0.05	0.06	0.04	0.05	0.06	0.04	0.05	0.06	0.04	0.05	0.07	0.04	0.05	0.07	0.04	0.05	0.07	0.05	0.06	0.08
4	Bihar	0.05	0.08	0.11	0.05	0.08	0.12	0.05	0.08	0.12	0.05	0.08	0.12	0.04	0.08	0.13	0.04	0.07	0.13	0.03	0.07	0.13
5	Chhattisgarh	0.06	0.08	0.11	0.05	0.07	0.11	0.04	0.06	0.10	0.04	0.06	0.09	0.03	0.06	0.09	0.03	0.06	0.09	0.04	0.06	0.10
6	Delhi	0.12	0.16	0.22	0.10	0.13	0.18	0.08	0.12	0.17	0.08	0.12	0.18	0.08	0.12	0.18	0.07	0.12	0.18	0.08	0.14	0.22
7	Goa	0.06	0.10	0.14	0.06	0.10	0.15	0.06	0.11	0.15	0.05	0.10	0.15	0.04	0.09	0.14	0.03	0.07	0.12	0.03	0.07	0.12
8	Gujarat	0.05	0.07	0.09	0.05	0.07	0.09	0.05	0.07	0.10	0.04	0.06	0.09	0.03	0.05	0.08	0.02	0.04	0.07	0.02	0.04	0.07
9	HP	0.01	0.03	0.05	0.01	0.02	0.02	0.01	0.02	0.02	0.01	0.02	0.02	0.01	0.02	0.02	0.01	0.02	0.02	0.01	0.02	0.02
10	Haryana	0.08	0.11	0.14	0.08	0.11	0.15	0.08	0.11	0.15	0.08	0.11	0.16	0.07	0.11	0.16	0.05	0.08	0.12	0.04	0.07	0.12
11	Jharkhand	0.02	0.04	0.06	0.02	0.04	0.06	0.02	0.03	0.06	0.02	0.03	0.05	0.02	0.04	0.06	0.02	0.04	0.06	0.02	0.04	0.06
12	J&K and L	0.01	0.03	0.06	0.01	0.03	0.06	0.01	0.03	0.06	0.01	0.03	0.06	0.01	0.03	0.06	0.01	0.02	0.06	0.01	0.02	0.06
13	Karnataka	0.06	0.08	0.12	0.05	0.07	0.12	0.05	0.07	0.11	0.04	0.06	0.09	0.03	0.05	0.08	0.03	0.04	0.07	0.04	0.06	0.09
14	Kerala	0.01	0.02	0.03	0.01	0.01	0.03	0.01	0.01	0.03	0.01	0.01	0.02	0.01	0.01	0.02	0.01	0.01	0.02	0.01	0.01	0.02
15	Meghalaya	0.15	0.24	0.38	0.16	0.26	0.43	0.16	0.28	0.47	0.16	0.29	0.52	0.16	0.31	0.59	0.15	0.34	0.68	0.15	0.37	0.76
16	Maharashtra	0.04	0.06	0.09	0.04	0.06	0.08	0.03	0.05	0.08	0.04	0.05	0.08	0.03	0.05	0.08	0.03	0.05	0.07	0.03	0.04	0.07
17	Manipur	0.27	0.34	0.43	0.30	0.39	0.49	0.28	0.37	0.49	0.25	0.36	0.48	0.24	0.34	0.46	0.21	0.32	0.44	0.20	0.32	0.44
18	MP	0.02	0.03	0.04	0.02	0.02	0.04	0.01	0.02	0.03	0.02	0.03	0.04	0.02	0.02	0.03	0.01	0.02	0.03	0.01	0.02	0.03
19	Mizoram	1.30	1.62	2.02	1.30	1.66	2.09	1.34	1.74	2.22	1.27	1.69	2.22	1.13	1.57	2.09	1.00	1.44	1.99	0.87	1.31	1.91
20	Nagaland	0.51	0.72	1.05	0.49	0.69	1.03	0.50	0.69	1.03	0.47	0.66	1.00	0.45	0.66	1.02	0.34	0.55	0.91	0.30	0.51	0.88
21	Odisha	0.04	0.07	0.10	0.04	0.06	0.10	0.04	0.06	0.10	0.04	0.06	0.10	0.03	0.06	0.09	0.03	0.05	0.08	0.02	0.05	0.08
22	Punjab	0.10	0.14	0.19	0.09	0.13	0.19	0.08	0.12	0.18	0.06	0.10	0.16	0.04	0.07	0.12	0.03	0.05	0.09	0.03	0.05	0.08
23	Rajasthan	0.03	0.04	0.05	0.02	0.04	0.05	0.03	0.04	0.05	0.02	0.04	0.05	0.02	0.04	0.05	0.02	0.03	0.05	0.02	0.03	0.05
24	Sikkim	0.02	0.05	0.09	0.02	0.05	0.10	0.02	0.06	0.11	0.02	0.05	0.11	0.02	0.05	0.12	0.01	0.05	0.12	0.01	0.05	0.13
25	Tamil Nadu	0.03	0.04	0.06	0.03	0.04	0.06	0.02	0.03	0.05	0.02	0.03	0.04	0.01	0.02	0.03	0.01	0.02	0.03	0.01	0.02	0.03
26	Tripura	0.04	0.06	0.09	0.05	0.07	0.10	0.05	0.09	0.11	0.06	0.09	0.13	0.06	0.11	0.15	0.06	0.12	0.16	0.07	0.13	0.18
27	Uttarakhand	0.04	0.06	0.08	0.04	0.06	0.08	0.04	0.06	0.08	0.03	0.05	0.08	0.03	0.05	0.08	0.03	0.04	0.07	0.02	0.04	0.07
28	Uttar Pradesh	0.03	0.05	0.07	0.03	0.04	0.06	0.03	0.04	0.06	0.03	0.04	0.06	0.03	0.04	0.07	0.02	0.04	0.07	0.02	0.04	0.07
29	West Bengal	0.02	0.03	0.03	0.02	0.02	0.03	0.02	0.02	0.03	0.02	0.02	0.03	0.02	0.02	0.03	0.01	0.02	0.03	0.01	0.02	0.02
30	A&N	0.06	0.15	0.32	0.05	0.15	0.33	0.01	0.06	0.26	0.01	0.04	0.26	0.01	0.04	0.26	0.01	0.04	0.28	0.01	0.04	0.31
31	Chandigarh	0.04	0.08	0.13	0.03	0.08	0.13	0.03	0.08	0.14	0.03	0.07	0.13	0.03	0.08	0.13	0.02	0.06	0.11	0.02	0.06	0.11
32	DNH&DD	0.07	0.11	0.17	0.07	0.11	0.16	0.07	0.11	0.16	0.07	0.10	0.15	0.06	0.09	0.14	0.06	0.08	0.13	0.05	0.08	0.12
33	Puducherry	0.06	0.13	0.22	0.06	0.13	0.22	0.06	0.13	0.22	0.06	0.12	0.21	0.06	0.12	0.21	0.06	0.12	0.21	0.06	0.12	0.21
34	Telangana	0.07	0.11	0.18	0.06	0.10	0.16	0.06	0.09	0.16	0.05	0.08	0.15	0.03	0.06	0.12	0.03	0.06	0.12	0.03	0.05	0.11
	India	**0.04**	**0.06**	**0.11**	**0.04**	**0.06**	**0.10**	**0.03**	**0.06**	**0.10**	**0.03**	**0.06**	**0.09**	**0.03**	**0.05**	**0.09**	**0.03**	**0.05**	**0.08**	**0.03**	**0.05**	**0.08**

An P= Andhra Pradesh; Ar P= Arunachal Pradesh; HP= Himachal Pradesh; J&K and L= Jammu & Kashmir and Ladakh; MP= Madhya Pradesh; A&N= Andaman & Nicobar

Annexure 8: State & UT-wise AIDS-Related Mortality (Per 100,000 Population), 2015-2021, India HIV Estimates 2021

S No.	State/ UT	2015			2016			2017			2018			2019			2020			2021		
		LB	Estimate	UB	LB	Estimate	UB	LB	Estimate	UB	LB	Estimate	UB	LB	Estimate	UB	LB	Estimate	UB	LB	Estimate	UB
1	An P	25.57	35.22	48.34	24.04	33.34	45.50	20.47	28.70	39.58	16.37	23.40	32.85	14.09	20.16	28.80	11.36	16.34	23.76	11.82	17.40	25.50
2	Ar P	0.60	1.14	1.97	0.50	1.02	1.81	0.55	1.18	2.04	0.59	1.26	2.11	0.44	0.92	1.61	0.35	0.78	1.43	0.34	0.86	1.59
3	Assam	1.78	2.28	2.80	1.73	2.18	2.74	1.65	2.08	2.62	1.57	2.01	2.56	1.38	1.80	2.32	1.18	1.56	2.05	1.44	1.93	2.55
4	Bihar	1.65	3.30	5.79	1.48	3.03	5.47	1.36	2.84	5.14	1.22	2.58	4.69	1.06	2.25	4.21	0.88	1.83	3.46	0.86	2.01	4.00
5	Chhattisgarh	6.10	8.49	11.08	5.40	7.69	10.05	4.57	6.67	8.87	4.35	6.41	8.66	3.53	5.34	7.31	2.63	4.10	5.89	2.71	4.34	6.27
6	Delhi	3.06	5.07	7.85	1.81	2.57	3.67	1.44	2.06	3.05	1.41	2.11	3.24	1.58	2.45	3.95	1.83	3.03	5.29	2.39	4.61	8.56
7	Goa	8.09	13.53	20.93	7.32	11.82	18.42	6.38	9.90	15.46	5.06	7.63	12.15	4.26	6.36	10.39	3.13	4.52	7.27	2.93	4.48	7.57
8	Gujarat	1.33	2.11	3.41	1.27	2.08	3.47	1.12	1.81	2.96	1.07	1.72	2.78	0.91	1.38	2.12	0.71	1.08	1.65	0.72	1.16	1.94
9	HP	1.29	2.24	3.42	0.50	0.74	1.01	0.28	0.42	0.58	0.21	0.34	0.54	0.27	0.46	0.93	0.36	0.71	1.47	0.43	0.98	1.90
10	Haryana	5.44	7.78	10.57	6.43	8.82	11.67	5.00	6.92	9.35	5.67	7.74	10.24	5.03	6.84	8.96	1.79	2.36	3.19	1.37	2.02	3.02
11	Jharkhand	0.75	1.60	2.85	0.67	1.52	2.74	0.63	1.47	2.64	0.62	1.47	2.63	0.56	1.25	2.29	0.43	0.90	1.72	0.44	1.01	2.06
12	J&K and L	0.39	1.02	2.21	0.40	1.04	2.25	0.40	1.09	2.30	0.41	1.14	2.38	0.40	1.11	2.32	0.33	0.92	2.00	0.32	1.06	2.36
13	Karnataka	17.14	25.26	35.85	15.45	22.66	32.34	13.36	19.89	28.46	11.45	17.23	24.89	8.33	12.53	18.49	6.09	9.19	14.09	6.28	10.09	15.78
14	Kerala	0.56	1.17	2.30	0.51	1.10	2.21	0.47	0.98	2.03	0.41	0.83	1.71	0.29	0.53	0.99	0.21	0.38	0.68	0.19	0.34	0.67
15	Meghalaya	1.19	2.23	4.31	1.11	2.18	4.23	1.07	2.12	4.12	1.02	2.02	4.06	0.94	1.83	3.77	0.95	1.98	4.26	0.95	2.22	5.24
16	Maharashtra	9.91	14.54	20.96	9.55	13.76	19.72	8.28	11.84	17.07	7.36	10.52	15.09	4.52	6.24	9.02	3.09	4.30	6.35	3.20	4.69	7.48
17	Manipur	54.97	68.23	86.66	44.22	55.22	71.43	41.20	51.76	66.38	31.75	40.43	52.76	25.67	33.32	44.00	20.79	27.19	35.92	20.02	26.59	35.70
18	MP	2.75	3.70	4.89	2.31	3.19	4.30	1.94	2.73	3.74	1.75	2.48	3.44	1.32	1.88	2.67	0.84	1.16	1.71	0.80	1.18	1.82
19	Mizoram	26.97	39.59	56.96	26.40	39.17	56.00	24.32	35.80	50.85	18.32	24.97	34.28	15.52	20.98	28.61	13.31	18.22	24.79	11.43	15.80	21.76
20	Nagaland	24.10	36.54	53.18	22.61	34.26	50.07	19.17	29.60	44.53	17.16	27.05	41.81	13.86	21.71	34.66	9.51	14.13	23.25	8.65	13.98	25.06
21	Odisha	2.81	4.95	7.71	2.60	4.69	7.31	2.31	4.38	6.89	2.20	4.27	6.73	2.05	3.96	6.31	1.68	3.27	5.38	1.72	3.56	5.95
22	Punjab	6.49	9.95	14.12	6.35	9.83	13.81	5.21	8.15	11.71	4.03	6.26	9.20	2.54	3.69	5.40	1.55	2.21	3.22	1.27	1.91	3.01
23	Rajasthan	0.89	1.53	2.37	0.78	1.32	2.07	0.70	1.14	1.77	0.66	1.07	1.66	0.54	0.81	1.23	0.39	0.56	0.80	0.36	0.53	0.79
24	Sikkim	0.21	0.56	1.88	0.20	0.55	1.65	0.23	0.64	1.69	0.24	0.69	1.68	0.24	0.65	1.46	0.19	0.49	1.08	0.19	0.51	1.25
25	Tamil Nadu	4.19	6.95	9.43	3.74	6.15	8.39	3.16	4.93	6.64	2.65	4.06	5.46	2.14	3.16	4.22	1.73	2.50	3.37	1.84	2.72	3.82
26	Tripura	0.11	0.17	0.24	0.13	0.20	0.36	0.15	0.25	0.37	0.11	0.19	0.29	0.11	0.20	0.32	0.11	0.20	0.32	0.11	0.20	0.34
27	Uttarakhand	3.64	5.24	7.11	3.60	5.00	6.70	3.40	4.65	6.35	3.13	4.26	5.82	2.61	3.64	5.06	2.01	2.91	4.20	2.38	3.42	4.97
28	Uttar Pradesh	1.58	2.61	4.14	1.39	2.33	3.73	1.20	2.02	3.31	1.08	1.84	3.09	0.88	1.52	2.61	0.63	1.06	1.86	0.58	1.05	1.96
29	West Bengal	2.15	2.72	3.41	1.75	2.26	2.87	1.33	1.72	2.24	1.18	1.57	2.07	0.79	0.99	1.31	0.54	0.68	0.89	0.55	0.73	1.02
30	A&N	3.46	7.74	15.46	2.84	6.94	14.30	0.81	2.88	8.02	0.57	3.03	9.09	0.57	4.01	11.26	0.59	4.54	12.74	0.62	4.90	14.19
31	Chandigarh	6.03	8.12	11.27	5.09	6.94	9.57	4.13	5.73	7.83	2.80	4.01	5.77	2.02	2.87	4.31	0.75	0.97	1.29	0.39	0.54	0.76
32	DNH&DD	1.77	3.49	5.75	1.23	2.45	4.10	0.87	1.54	2.62	0.73	1.21	1.99	0.64	1.10	1.86	0.58	1.01	1.76	0.52	0.93	1.71
33	Puducherry	3.61	12.08	21.78	4.28	13.14	23.06	4.10	12.49	22.02	5.03	13.93	24.00	5.09	13.49	23.36	3.14	9.38	17.78	3.19	10.40	19.55
34	Telangana	14.01	22.32	33.07	12.67	20.33	30.53	11.77	18.80	28.36	10.25	16.05	24.41	4.21	5.88	8.79	2.83	4.10	6.68	2.98	4.65	8.42
	India	**4.87**	**7.71**	**12.40**	**4.47**	**7.07**	**11.37**	**3.87**	**6.13**	**9.86**	**3.38**	**5.36**	**8.61**	**2.47**	**3.90**	**6.28**	**1.81**	**2.87**	**4.62**	**1.94**	**3.08**	**4.95**

An P= Andhra Pradesh; Ar P= Arunachal Pradesh; HP= Himachal Pradesh; J&K and L= Jammu & Kashmir and Ladakh; MP= Madhya Pradesh; A&N= Andaman & Nicobar

Report printing was supported by UNAIDS India using the Grant or Cooperative Agreement Number GH002328 funded by the Centers for Disease Control and Prevention.

Model-based periodic HIV estimations are undertaken under National AIDS and STD Control Programme to provide an update on the current status of the HIV epidemic on key epidemiological parameters of prevalence, incidence, AIDS-related mortality and EMTCT need. HIV Estimations 2021 is the latest round in the series of HIV Estimations process. This report presents the method and State/UT-wide findings on key epidemiological parameters from HIV Estimations 2021.

UNAIDS

icmr NIMS
INDIAN COUNCIL OF MEDICAL RESEARCH | NATIONAL INSTITUTE OF MEDICAL STATISTICS

icmr NIE
INDIAN COUNCIL OF MEDICAL RESEARCH | NATIONAL INSTITUTE OF EPIDEMIOLOGY

icmr NICED
INDIAN COUNCIL OF MEDICAL RESEARCH | NATIONAL INSTITUTE OF CHOLERA AND ENTERIC DISEASES

icmr NARI
INDIAN COUNCIL OF MEDICAL RESEARCH | NATIONAL AIDS RESEARCH INSTITUTE