सत्यमेव जयते

Expert Consultation on

Newer Methods of HIV Surveillance and Estimations in India

21–24 March 2018 | New Delhi

NACO

National AIDS Control Organisation

Ministry of Health & Family Welfare
Government of India

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SANJEEVA KUMAR, IAS
Additional Secretary & DG (NACO & RNTCP)
Tele. : 23061066 / 23325331
E-mail : dgnaco@gmail.com
ash-mohfw@nic.in

भारत सरकार
स्वास्थ्य एवं परिवार कल्याण मंत्रालय
निर्माण भवन, नई दिल्ली - **110011**
Government of India
Ministry of Health & Family Welfare
Nirman Bhawan, New Delhi - 110011

FOREWORD

HIV Surveillance in India has been one of the oldest and most integral components of a comprehensive AIDS response in country. HIV sero-surveillance was initiated as early as 1985 by Indian Council of Medical Research (ICMR) and has been credited with discovery of first HIV case in 1986. Over the years, the system has evolved into one of the world's largest and most robust surveillance system in country.
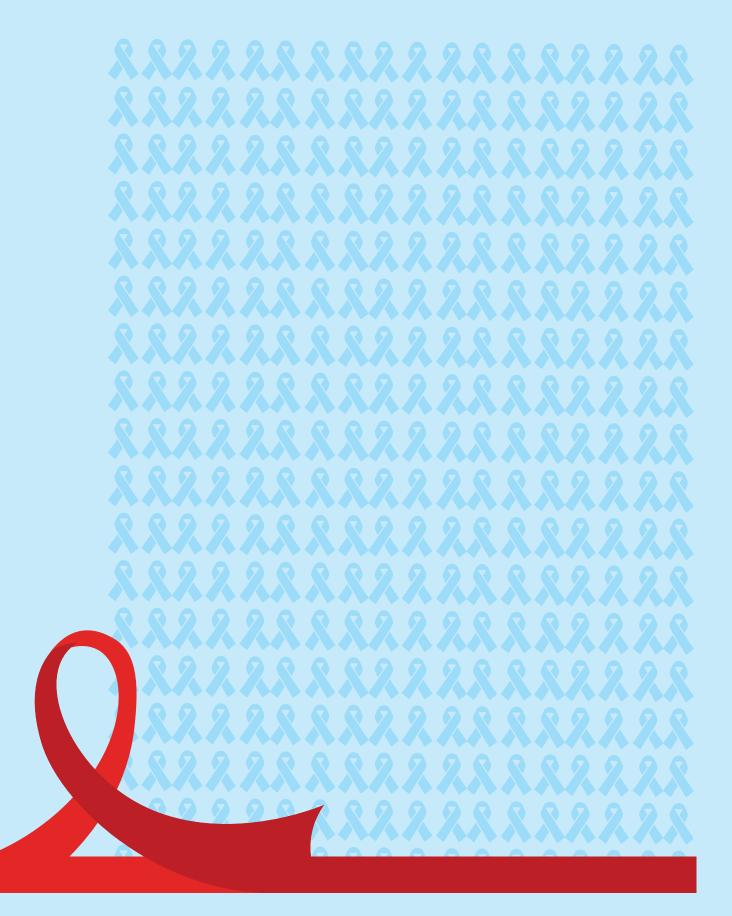
The first generation of surveillance focussed on monitoring HIV prevalence. As the programme matured, second generation of surveillance were launched which encompassed a comprehensive range of surveillance activities including that of behavioural surveillance. The current global context urges the system to not only provide evidences on level and trend of HIV prevalence, incidence and related risk behaviours but also on the progress on cascade indicators including that on virological status.

The Surveillance system in India evolved concurrently with the programmatic need and epidemiological considerations. The system, which was formally launched in 1998 at annual HIV sentinel surveillance at 196 sites, also implemented world's largest integrated bio-behavioural surveillance in 2014-15. However, as country committed to achieve End of AIDS as a public health threat by 2030, information needs increased in the form of country efforts to monitor the progress on fast-track targets. Also, the need for the integration of additional bio-markers like hepatitis in HIV sentinel surveillance has been considered a natural progression in view of similarity in route of transmission and at-risk population group. New and efficient surveillance strategy providing the periodic status on critical behaviors, knowledge and service uptake indicators has been an unmet need. Also, the information needs for district level planning and monitoring increased as programme managers demanded for district level estimation to measure the AIDS response progress.

In the light of the global developments in the form of END of AIDS and Fast Track targets, epidemiological considerations and programme need, National AIDS Control Organization, in collaboration with UNAIDS India, WHO India and CDC India, organized technical consultations on next generation of HIV surveillance and estimation activities in 2016 and 2018. The meeting was attended by wide range of stakeholders including, national and international experts as well as representatives from national institutes (Indian Council of Medical Research [ICMR], National Institute of Health and Family Welfare [NIHFW], National Institute of Medical Sciences [NIMS], All India Institute of Medical Sciences [AIIMS], National Institute of Epidemiology [NIE], National AIDS Research Institute [NARI], Post Graduate Institute of Medical Education and Research [PGIMER], National Institute of Cholera and Enteric Diseases [NICED], Regional Institute of Medical Sciences [RIMS]), State AIDS Control Societies (SACS) and partner agencies, Family Health International (FHI360), Population Council etc. The technical discussions from these meetings are being published the form of reports.

The expert consultations have been extremely rich in terms of quality of deliberations. While the consultations aimed to provide roadmap to the India's epidemic monitoring system, the contents may be relevant of any country aiming to upgrade its surveillance system. I am confident that the reports will be reference documents locally as well globally as countries aim to developing a surveillance system monitoring the progress on End of AIDS by 2030.

(Sanjeeva Kumar)

आलोक सक्सेना
संयुक्त सचिव
Alok Saxena
Joint Secretary

राष्ट्रीय एड्स नियंत्रण संगठन
स्वास्थ्य एवं परिवार कल्याण मंत्रालय
भारत सरकार

National AIDS Control Organisation
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PREFACE

Evidence driven policy making, intervention design and programme implementation is one of the hallmarks of India's AIDS response. A strong, institutional mechanism and an evolving surveillance system for epidemic monitoring has been the core to the spectrum of strategic information under national programme. Initiated as early as 1985, the surveillance system has evolved into one of the world's largest and most robust HIV surveillance system.

The national programme undertakes technical consultations periodically to review the current status and work out the future roadmap of HIV epidemic monitoring in India. Experts consultations in year 2016 and 2018 were in the series of such consultations to augment the HIV Surveillance and Estimations System in India in the era of Sustainable Development Goals.
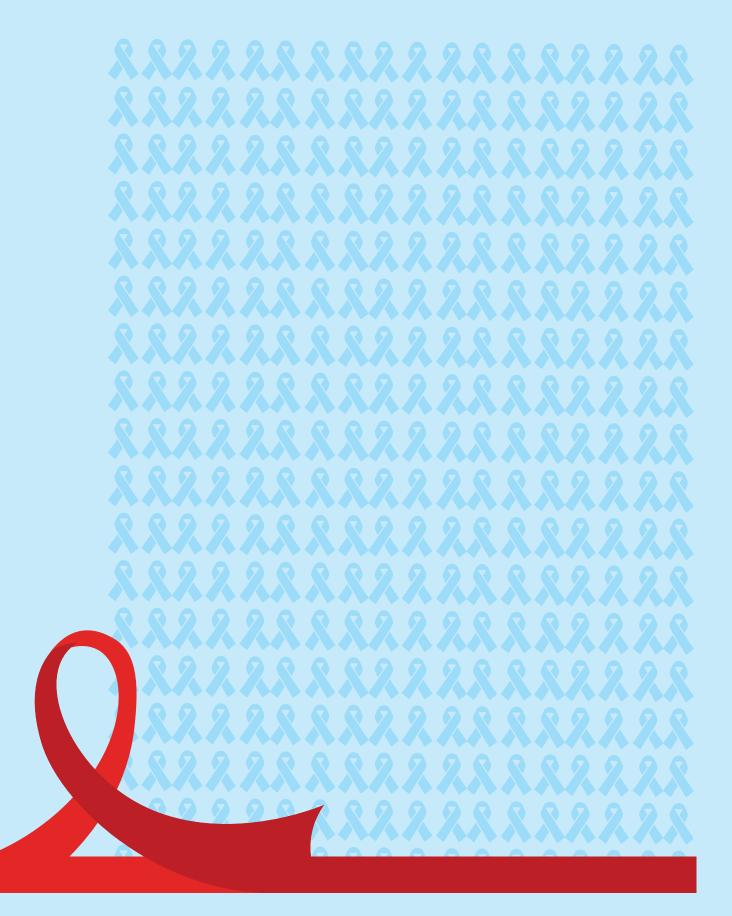
The reports present the objectives, methodology, recommendations and rationale from expert consultations on HIV surveillance and estimations in India. The publication of these report is particularly timely and relevant, as the country has started to take many new initiatives not only to augment the epidemic monitoring but also to strengthen the programme response to achieve the 'End of AIDS' as a public health threat by 2030. Many of the recommendations from these expert's consultation are either already implemented or vetted by Technical Resource Group (TRG) on HIV Surveillance and Estimation in India for future adoption. One of the key changes is to return HIV test results to participants facilitating linking with treatment services as well as to provide the cross-sectional progress update on treatment cascade. District level HIV burden estimation is under process; BSS lite has been in-principle approved by TRG while modalities for integration of Hepatitis are being worked-out.

The reports of 2016 and 2018 expert's consultations will be useful to all stakeholders as they further underline the outcome driven approach under the surveillance system of the National AIDS Response. I hope that these reports will be referred to by those who are working in the area of HIV epidemiology to understand why and how a disease surveillance system evolves and provides relevant evidences in the most efficient way to strengthen the decision support systems.

(ALOK SAXENA)

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

MESSAGE

Since its inception, strategic Information has been the backbone of the National AIDS response in India. Under the leadership of the National AIDS Control Organisation (NACO), there has always been a strong focus on consistently collecting, reporting, analysing and using epidemiological, behavioural, programme and related data to inform planning and decision making.

To monitor progress achieved and remaining miles to go re the 2020 Fast-Track targets of decline in new HIV infections by 75%, testing 90% of all people living with HIV, 90% of the people living with HIV tested are on treatment and 90% of those on treatment have viral load suppressed, eliminate mother to child transmission of HIV, reduction in annual AIDS-related deaths, there is an ever greater need to reach a more granular level of analysis using the location and population focus.
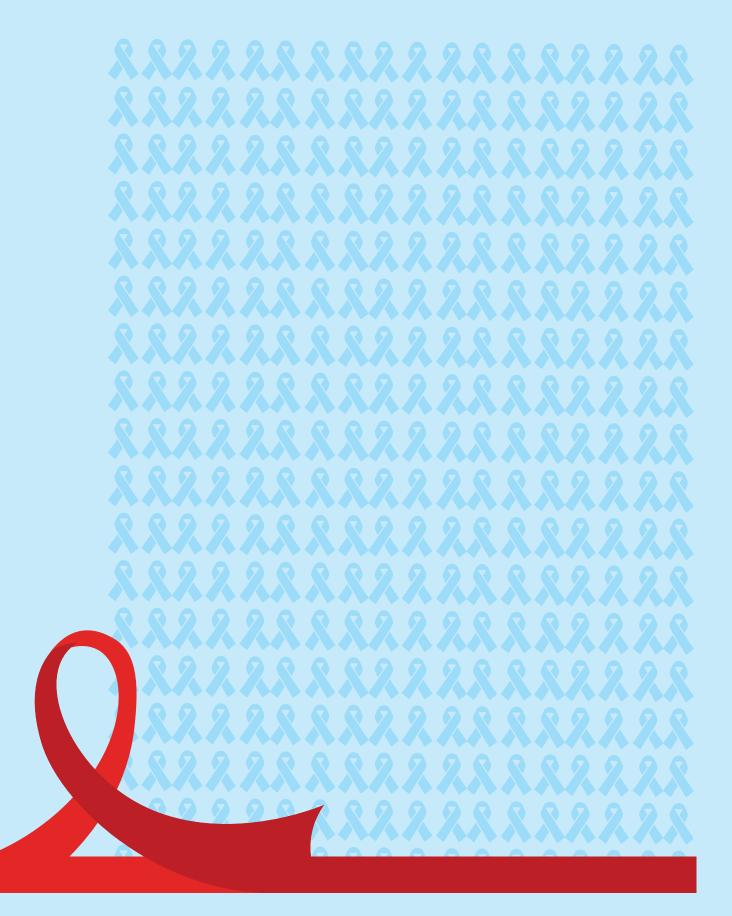
India already has one of the largest HIV Sentinel Surveillance systems in the world. Data from HIV Sentinel Surveillance is a key input to the HIV estimations on key indicators — which are generated in a highly rigorous, scientific and participatory manner led by the NACO with the Indian Council of Medical Research-National Institute of Medical Statistics (ICMR-NIMS). Moving forward and looking at methods to strengthen the existing systems — so that more granular information is periodically made available — NACO held a 2018 Expert Consultation to review its surveillance system and consider newer methods of Surveillance and Estimations. UNAIDS is pleased to have partnered with NACO, ICMR Regional Institutes, and other national, regional and international partners in this endeavour through this Expert Consultation.

Let me congratulate NACO, for this initiative to periodically revisit surveillance systems. In the context of Sustainable Development Goals (SDGs) and the need to adopt a holistic approach to health through adopting the universal coverage paradigm, India is heading in the right direction. Moving forward it is important to look at integration of surveillance of multiple diseases such as HIV, Tuberculosis, and Hepatitis to support the multi-disease elimination agenda.

This high-level experts' consultation brought together state, national, and international experts. I want to thank them for their contribution to the very rich discussions. I encourage all stakeholders to use this report which summarises the main recommendations from this expert meeting held in New Delhi from 21-24 March 2018. I am certain that other countries with similar epidemiological profiles will benefit from the learning from this best practice.

Dr Bilali Camara
Medical Epidemiologist
UNAIDS Country Director for India

NACO

डा. शोभिनी राजन
सहायक महा निदेशक

Dr. Shobini Rajan
Asst.Director General
Tel.   : 91-11-23731810
        : 91-11-43509956
Fax   : 91-11-23731746
E-mail : shobin@naco.gov.in
        : shobininaco2@gmail.com

भारत सरकार
स्वास्थ्य एवं परिवार कल्याण मंत्रालय
राष्ट्रीय एड्स निसंत्रण संगठन
9वां तल, चन्दलोक बिल्डिंग
36 जनपथ, नई दिल्ली–110 001

Government of India
Ministry of Health & Family Welfare
National AIDS Control Organisation
9th Floor, Chandralok Building,
36, Janpath, New Delhi - 110 001

ACKNOWLEDGEMENT

(Shobini Rajan)

CONTENTS

ACRONYMS

AEM	Asian Epidemic Model
ACASI	Audio Computer-Assisted Self-Interview
ART	Antiretroviral Therapy
BBS	Bio Behavioural Survey
CDC	Centers for Disease Control
CAPI	Computer Assisted Personal Interviewing
EMTCT	Elimination of Mother to Child Transmission
EPP	Estimation and Projection Package
HCC	Hepatocellular Carcinoma
HMIS	Health Management Information System
HSS	HIV Sentinel Surveillance
IBBS	Integrated Biological and Behavioural Surveillance
ICMR	Indian Council of Medical Research
IDSP	Integrated Disease Surveillance Program
KP	Key Population
PSE	Population Size Estimation
MDG	Millennium Development Goals
NACO	National AIDS Control Organization
NCDC	National Centre for Disease Control
NIMS	National Institute of Medical Statistics
NHM	National Health Mission
PWID	People Who Inject Drugs
RI	Regional Institutes
SACS	State AIDS Control Society
SDG	Sustainable Development Goals
UAT	Unlinked Anonymous Testing
UNAIDS	Joint United Nations Programme on HIV and AIDS
US	United States of America
WHO	World Health Organization

1 BACKGROUND

An Expert Consultation on Newer Methods of HIV Surveillance and Estimation in India was organized during 21–24 March 2018, at New Delhi, by the National AIDS Control Organization (NACO), Ministry of Health and Family Welfare, Government of India, in collaboration with United Nations Joint Programme on HIV/AIDS (UNAIDS), the World Health Organization (WHO), and the US Centres for Disease Control (CDC). The consultation was attended by approximately 90 international and national experts; national and regional institutes that work on HIV surveillance and estimation with NACO; headquarter, regional and country office members of development partner organizations such as UNAIDS, WHO, CDC, USAID and FHI360; community representatives as well as officials from NACO and State AIDS Control Societies (SACS).

This consultation followed the Expert Group Consultation for HIV Surveillance and Estimations held in September 2016, which laid the roadmap to improve epidemic tracking to aide and further strengthen programmatic responses. Some of the recommendations from this earlier consultation have already been implemented, for example the HIV Sentinel Surveillance (HSS) 2017 round adopted Linked Anonymous Testing to facilitate return of test results of positive specimen under HSS to programme managers. New HSS sites in the northern and eastern states have been initiated to saturate these states with at least one site in each of district. Questions and laboratory tests for determining the status of HIV testing and treatment cascade have been included in HSS 2017 for surveillance populations.

The second consultation meeting, held in March 2018, was therefore a logical next step in convening the same Expert Group to take stock of progress made with the strengthening of HIV surveillance and estimation systems and practices

Additionally, as recommended, programme and survey data has been further analysed to customize Spectrum assumptions to the Indian context. The implementation of these measures demonstrates the seriousness with which NACO and its partners have taken up the recommendations of the Expert Group, with the

Workshop participants group

objective to further augment the HIV surveillance and estimation system for decision making by policy makers, programme managers and all related stakeholders.

Some other recommendations from the 2016 Expert Consultation, relating to consideration of programme-based surveillance among antenatal care clients and key populations, conduct of key population size estimates, collecting behavioural data on key populations on a more regular basis than through Integrated Biological and Behavioural Surveillance (IBBS) surveys, derivation of district-based PLHIV burden estimation and integration of additional biomarkers in HIV surveillance, all needed more thought and planning. National programme worked to contextualize these recommendations to the Indian context, while laying out workable scenarios and options for roll-out.

The second consultation meeting, held in March 2018, was therefore a logical next step in convening the same Expert Group to take stock of progress made with the strengthening of HIV surveillance and estimation systems and practices. It was a suitable time to present results and discuss remaining gaps and to jointly decide,

based on various expert advice, on the best methodological approaches and the way forward in operationalizing recommendations, taking into consideration, all possible advantages and disadvantages.

1.1 Objectives

The objectives of the 2018 Expert Consultation on Newer Methods of HIV Surveillance and Estimation were:

1. To orient the country team on globally recommended technical framework for newer methods for Surveillance and Estimation

2. To review, appraise and modify the country team proposals on:

   a) Programme-based surveillance

   b) District level HIV estimations

   c) Integrated Sentinel Surveillance for HIV, Syphilis and HCV

   d) HSS Plus/BSS Lite

   e) Estimating the size of HRG population

The outcomes from this Expert Consultation were expected to guide NACO in the design and implementation of newer and more cost-effective surveillance and estimation models and approaches. These were expected to further strengthen the complementary surveillance and estimation models that are being used for the prioritization of locations and populations in the response to HIV and AIDS. The recommendations and decisions made at the consultation were expected to further reinforce the evidence-based decision making on the national AIDS response to achieve 2020 targets and end AIDS by 2030.

1.2 Meeting Structure and Proceedings
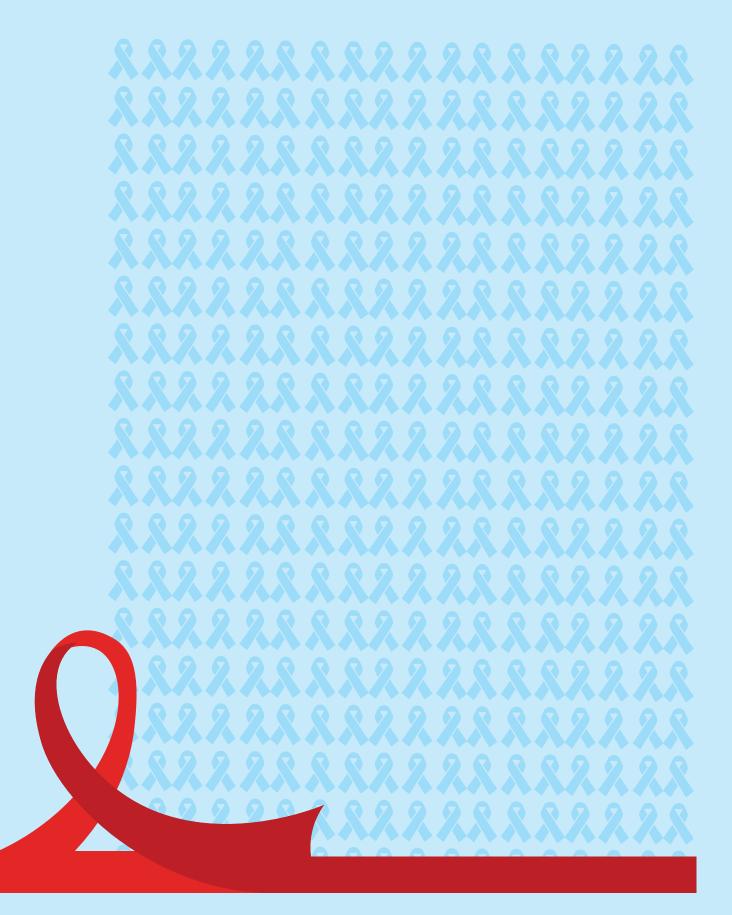
The four days of the meeting were divided and dedicated to key discussion topics to ensure that there was enough time for deliberation and decisions. The meeting began with an inaugural session, with very pertinent perspectives put forth by leaders from the Directorate General of Health Services, NACO, UNAIDS, WHO, CDC and USAID. The first day was dedicated to discussing approaches for programme-based surveillance for key and general populations. Day 2 was dedicated to the discussion around District HIV estimations; Day 3 covered Size Estimations for Key Populations, and HIV Sentinel Surveillance (HSS)-Plus/Behavioural Surveillance Survey (BSS)-Lite; while Day 4 was for discussing Integrated Surveillance for HIV, HCV, Syphilis, and the closing ceremony.

The meeting was planned in a format which allowed for an initial introductory background-setting presentation covering all aspects of the technical framework for each topic from a global perspective, followed by a session devoted to existing programme-specific data collection systems and the feasibility of their use for the newer proposed surveillance methodologies. Then, an India-specific technical framework was proposed, followed by a facilitated panel discussion and question-answer sessions, wherein the various technical and feasibility aspects of the topic were deliberated, and key issues were summarized, to conclude on the way forward. The start of each day was also marked by a technical summary of all decisions taken the previous day.

An India-specific technical framework was proposed, followed by a facilitated panel discussion and question-answer sessions, wherein the various technical and feasibility aspects of the topic were deliberated, and key issues were summarized, to conclude on the way forward

The hallmark of this consultation was the preparation that was undertaken, to propose various approaches, highlighting advantages and caveats of each approach, and implications for the national and state programmes. Members of the surveillance team in NACO, representatives from the Regional Institutes and from country teams of UNAIDS, WHO and CDC worked in smaller core technical groups, prior to this consultation, to prepare the proposed technical framework for each topic, which was to be presented at the consultation. This saved time upfront, in the consultation, since much thought was already given to the pros and cons of proposed methodologies, with suggestions for alternatives, hence giving experts an opportunity to opine on well thought-out recommendations, which greatly helped guide discussions towards decisions, instead of prolonged open-ended deliberation.

2 INAUGURAL SESSION

The inaugural session included talks by Dr S Ventakesh (NACO), Dr Jesus M Garcia Calleja (WHO Geneva), Ms Sara Heydari (USAID India), Dr Timothy Holtz (DGHT, CDC India), Dr DCS Reddy (Independent Expert), Dr Nicole Seguy (WHO India), and Dr Bilali Camara (UNAIDS India). The presidential address was delivered by Shri Alok Saxena (Joint Secretary, NACO) while inaugural address was delivered by chief guest Dr BD Athani (Director General of Health Services, Ministry of Health & Family Welfare, Government of India).

2.1 Key Messages

Some of the key messages from the session are provided below:

- All speakers commended NACO's willingness to change and evolve with the epidemic. One of the major strengths of India's response to the epidemic has been regular review of strategic information methods and systems to obtain evidence to improve policies and programmes.

Inaugural session, lighting of lamp ceremony

- HIV surveillance and estimations systems and methods have much improved over time in India. While they have been working well, there is always room for improvement. There also is a need to review them in the light of commitments made to the Sustainable Development Goals (SDG) and especially the need to achieve 90-90-90 targets by 2020 and 95-95-95 targets by 2030. This requires a move from the disease control mindset towards the disease elimination agenda.

- The consultation presented an opportunity to review surveillance systems and techniques and discuss representativeness of surveillance results of populations beyond programme coverage. The need to capture the situation of populations that are not yet covered by programmes (e.g., Targeted Interventions (TIs)) to achieve comprehensive surveillance in all relevant populations, both covered and uncovered, was emphasised.

- Quality surveillance data is essential for a people-centric approach, to determine the most affected geographic areas, the people most vulnerable, their networks and the risky behaviours exposing them to HIV infection. Three questions are critical to the deliberations:

  - Which data should be collected?

  - How should this data be collected?

  - How should the collected data be used effectively?

The underlying principle is to not collect non-critical data since it burdens the surveillance system and especially the service providers and other staff involved with data collection, management and reporting. Critical data shall be, to the extent possible, representative of population in areas covered and areas not covered by the programme. An improved analysis of already collected data (programme data) and their combined analysis with survey and surveillance data to inform programme implementation and decision-making are also critical.

- It is important to maintain focus on both the technical and programmatic advantages and disadvantages of each proposed data collection approach, to yield scientifically robust, feasible, implementable, cost-effective

> There also is a need to review HIV surveillance and estimations systems in the light of commitments made to the SDG and especially the need to achieve 90-90-90 targets by 2020 and 95-95-95 targets by 2030

and scalable approaches to better estimating denominators, and tracking the state of the epidemic.

- In the new era of cost-effectiveness and integration, the proposal for integrated surveillance (including hepatitis and syphilis) is timely in the interest of cost-sharing and enhanced effectiveness. Larger health delivery programmes, such as the National Health Mission (NHM), Revised National TB Control Program (RNTCP) etc have a much wider base, and can provide platforms for seeking HIV data from a much larger population. A word of caution, however, in doing so, is to ensure data quality while bringing together diverse systems, collaborate with regional institutes, and expand and strengthen the Strategic Information Team at NACO, for better dividends.

- The existing HIV estimation modelling exercise only goes to the state level. The need for district level information on incidence as well as the opportunities to use the wealth of programme data available at a more granular level was highlighted.

Shri Alok Saxena, Joint Secretary, NACO, reiterated that surveillance is central to understanding the national and state level epidemic patterns. He termed this as a landmark consultation. He highlighted the need for increased confidentiality in the collection and use of personally identifiable information, especially in the context of marginalized populations such as the key populations who we work for. He reiterated the need to reflect on how surveillance data can be used even more, to guide programmes, and how it can advocate for breaking silos to integrate systems.

Dr BD Athani, Director General of Health Services, commended NACO for the reduction in number of new infections and decline in AIDS-related deaths in the last decade. He lauded NACO's effort to carry out a systematic assessment of the magnitude and distribution of HIV in its populations, since that is a pre-requisite for understanding and dealing with any public health problem. Other achievements include reduction in the price of ART drugs both in-country as well as globally, and the passing of the HIV/AIDS Act ensuring legal protection for people living with HIV (PLHIV).

There is a need for increased confidentiality in the collection and use of personally identifiable information, especially in the context of marginalized populations such as the key populations who we work for

Addresses by Dr S Venkatesh, Dr BD Athani and Shri Alok Saxena

2.2 Felicitation of Experts

The following individuals were honoured for their contributions to the national response to HIV and AIDS in India by pioneering one of the best globally recognized surveillance systems and estimation processes:

Dr DCS Reddy, for his contribution in setting up and mentoring a high-quality surveillance system in 1998 that has now seen its 15th round.

Dr DCS Reddy receiving felicitation award from Dr BD Athani

Dr Arvind Pandey, for his contribution in developing an HIV estimation system which has been ensuring high quality HIV estimation processes.

Dr Arvind Pandey receiving felicitation award from Dr BD Athani

Dr Shashi Kant, for his contribution in developing a system that is transparent and open in spirit and thus always on the path of quality improvement.

Dr Shashi Kant receiving felicitation award from Dr BD Athani

Dr Sanjay Mehandale, for his contribution in surveillance and estimation activities such as use of random sampling method and standardization of training manuals

On behalf of Dr Sanjay Mehandale, Dr Sheela Godbole collecting felicitation award from Dr BD Athani

3 PROGRAMME-BASED SURVEILLANCE

3.1 Overview

Session Objectives:

1. To orient the country team on globally recommended technical framework for programme- based surveillance, and

2. To review, appraise and modify the country team proposals on programme-based surveillance

Session Chair: Dr DCS Reddy, Independent Expert

Session Co-Chair: Dr Vishnu Vardhan Rao, NIMS

The objectives of this session were to present the globally recommended technical framework for Programme-Based Surveillance (PBS) and to review, appraise and modify the country team's proposal on PBS. The session included presentations from Dr Jesus Maria Calleja (WHO HQ), Dr Nicole Seguy (WHO India), Ms H. ManngaihKim (NACO), Mr Sanjay (NHM), Dr Asha Hedge (NACO), Dr Sanjay Rai (AIIMS), Dr A Elangovan (NIE), Dr Sheela Godbole (NARI) and Dr PVM Lakshmi (PGIMER).

The presentations and discussions centred around two types of populations – pregnant women attending antenatal care (ANC) and

Technical Session 1 panel members: pre-lunch session

key populations including female sex workers (FSW), men who has sex with men (MSM), Hijras/transgenders (H/TG) and people who inject drugs (PWID). Surveillance among the former provide a clue into the distribution and prevalence of HIV within the general, low-risk population while the later helps track the epidemic among populations that are considered the reservoirs of HIV infection. All agreed that one of the key prerequisites of exploring the full potential of programme-based surveillance is to cut down the amount of data we force the facilities to collect so that they can collect fewer but better-quality data.

3.2 Programme-Based Surveillance: Global Perspective

The global context for programme-based surveillance was presented against the backdrop of the Sustainable Development Goals (SDGs) and especially the "Good Health and Well-Being" related SDG 3. Description of analytical frameworks and tools included references to recent resources such as guidelines available on strategic information, Bio-Behavioural Surveillance (BBS) Guidelines for populations at risk for HIV and the 2018 HIV incidence working group technical update. The presentations included discussions on the HIV testing and treatment cascade keeping in mind the need to disaggregate cascade indicator data by sub-population groups, as well as human rights and confidentiality principles in surveillance and data collection.

Owing to the importance of data systems in determining the feasibility of carrying out programme-based surveillance, all programmes that collect data on ANC and key populations, presented their data recording and reporting systems.

3.3 Programme-Based Surveillance in India: Context Setting

Over the years, data collection systems under the programme monitoring has evolved significantly. The number of data sources, over the last three decades, have expanded to collect data from more than 30 000 service delivery points. These service

Together, consolidated as well as individual reporting system, have many information that can complement and further strengthen the existing epidemic monitoring system to the most granular level

deliveries provide consolidated programme data from most granular level. Besides, there are client wise data management in the IT enabled systems like PLHIV-ART Linkage System (PALS), Inventory Management System (IMS) etc. Together, consolidated as well as individual reporting system, have many information that can complement and further strengthen the existing epidemic monitoring system to the most granular level. And thus, there is a need to work towards complementing the existing epidemic monitoring system through programme-based surveillance systems.

3.4 HIV Data Systems for General Populations

3.4.1 Mother and Child Tracking System under National Health Mission (RCH Portal)

The Mother & Child Tracking System (MCTS) is a centralized web-based application for improving delivery of health care services to pregnant women and children up to five years of age through name-based tracking of each beneficiary. The Reproductive & Child Health (RCH) portal is an augmented version of the MCTS application. Key features of the RCH app as well as the RCH application process flow were

Technical Session 1 – presentation on data recording and reporting system at integrated counselling and testing centers

described. The presentation also highlighted allied initiatives such as Kilkari (an IVR service on mobile phones), and ANMOL (a mobile or tablet-based application designed to capture field data in real time by auxiliary midwives (ANMs). From the perspective of HIV surveillance, the RCH portal includes two fields on HIV: one on HIV screening, and the other on referral to Integrated Counselling and Testing Centres (ICTC). The ANMOL tablet is designed to work both in online and offline modes and ANMs are required to update information on a weekly basis. Importantly, in case of pregnant women migrating to another state, tracking is still possible through the centralized database.

3.4.2 Data Recording and Reporting System at Integrated Counselling and Testing Centers

An overview of HIV Counselling Testing Services (HCTS), including the facility structure, registers, programme data and reporting systems at aggregate and individual levels was presented. In addition, a comparison of surveillance and routine programme information, strengths, limitations and potential of individual and aggregate data sets as well as findings from a recent Elimination of Mother-to-Child Transmission (EMTCT) data verification were presented.

3.4.3 Discussion

Discussions on feasibility of ANC surveillance in the programme context revolved around selection of aggregate and individual data sets from the National Health Mission's Programme which covers a much larger population of ANC mothers. Differences in their data and that of NACO were highlighted with the latter capturing a subset of the wider population, but in much more detail, and with variables which are useful for HIV surveillance. Issues involved in using different data sources, such as aggregate data from the Strategic Information Management System (SIMS) and the Health Management Information System (HMIS) and individual level (PPTCT registers, RCH portal) were also discussed. Ensuring data quality was identified as a problem with programme-based surveillance owing to the likelihood of incorrect or incomplete data entry, discordance between PPTCT and laboratory data, repetitive identifier, duplicate testing, non-availability of HIV test kits as well as privacy and confidentiality concerns.

The strengths and weaknesses of each dataset were presented and debated, and potential for duplication of registration and testing data, and reporting inefficiencies were taken into consideration.

3.5 HIV Data Systems for Key Populations

The TI-data management system including data collection tools and formats, the process of data flow from facilities to NACO, and the TI Database Management Tool (TMT) were presented. The mechanism for checking data at site-level is through Project Officers (POs) from Technical Support Units (TSUs) who monitor, cross-check and verify TI data on a quarterly basis. However, there is no mechanism at data entry level that sets the range and consistency of data as a means of validity check. The existing system of TI data reporting will be transitioning to integration within SIMS. The background of the current scenario of TI and HSS was presented, highlighting the advantages and disadvantages of using programme data to replace HSS data.

3.5.1 Discussion

The data collection systems, while important, comprises only a small aspect of the full picture. What matters most is how information from these systems is used in a timely and effective manner. In Thailand pieces of information collected on key populations and trends in focus areas are

An example from India is that of programme officers of the Technical Support Units (TSUs) who undertake quarterly visits to TIs for validation of data, during which information of additional key populations surfacing can also be captured in a standardized way to throw light on newer hotspots and samples. Inherent to this process is addressing bottlenecks in analytical capacity at the district level, which needs strengthening of systems and individual capacities from the bottom up. Capacity building of programme staff for surveillance purposes is imperative.

3.6 Proposed Technical Framework for Programme-Based Surveillance: ANC

The proposed technical framework should focus on individual level data that is census-based coming from randomly selected, representative sites with good quality real time data collection that would later expand to all sites. A road map for initiating programme-based surveillance (PBS) was proposed in the following phases, recognizing that it will be quite a few years for the system to mature and complement the current system as well as offer a robust alternative in the long run.

Technical Session 1 – presentations on proposed Technical Framework for Programme-based Surveillance: High Risk Group

being used to refine modelling. In the Philippines, cascade analysis enabled an enhanced understanding of important elements related to the key populations.

- Phase I: Data Items and Quality Assessment – 2018-19
- Phase II: Feasibility assessment of PBS in select states– 2019-20
- Phase III: Strategize and expand – 2020-22

Technical Session 1 – presentations on proposed technical framework for programme-based surveillance: pregnant women

- Phase IV: Analyse and review vis a vis existing surveillance – 2022-24
- Phase V: Consider phasing out HIV Sentinel Surveillance 2024-26

It was decided that verification and cross-validation of individual and aggregate data across different data management systems would be needed. This will be a gradual and iterative process until there is confidence in the coverage and quality of data in the dataset which is finally chosen for PBS. A phased approach will be followed starting with a data items and quality assessment in the first phase, in ensuring that all data systems (i.e., data from ANC HSS, PMTCT and ICTC programmes) and participant selection will be cross-checked. An assessment will be conducted in the second phase in select districts with strongest PMTCT and ICTC data to assess the feasibility of doing it. The cost implications will also be evaluated, and validation of data undertaken through the RCH/ANMOL portal for correction of denominators.

One caveat with moving to a census approach for the collection of programme samples under PBS will be the loss of ability of the programme to carry out additional testing on HSS samples, and losing some migration data for spouses of ANC, traditionally collected in HSS. However, experts agreed that over the next 5-7 years, after ensuring quality of data and wide enough coverage, it may be possible to move to a census-based approach for PPTCT-based surveillance and consider phase out HSS from 2024.

3.7 Proposed Technical Framework for Programme-Based Surveillance: Key Populations/ High-Risk Groups

For programme-based surveillance among key populations (KPs), which in India are called High Risk Groups (HRGs), it was agreed that the Targeted Interventions (TIs) current ecosystem was already more conducive for PBS. Data are already digitalised, and beneficiaries are followed up for long periods of time – this may offer an opportunity to derive observed HIV incidence also. TI data can be utilized for monitoring the level and trend of HIV among KPs registered with TIs. Considering that data offers wider and granular coverage, by using TI programme data the sampling frame can be bigger and more geographically diverse and representative, allowing even for much granular prevalence estimations. TI based PBS is a cost-effective approach, since the existing human recourse of TI projects can be utilized, and there is no need for a separate sample collection and testing under this approach. Implementing this approach for surveillance requires standardization of the process of data definitions, data collection, data cleaning, and analysis. Analysis and tracking of year-wise and age-wise HIV positivity by different typologies of KPs is an important need, as stressed by experts.

One caveat is that people who do not access services at TIs may be missed out. Moreover, people who test HIV positive will not come for HIV testing again, which is why HIV positivity in TIs generally gets lower over time and cannot be used as an indicator of prevalence in the populations.

3.8 Panel Discussion

Some common concerns about implementing PBS were discussed. It was felt important to consider the implications of competition between traditional surveillance and new programme-based M&E methods without the surveillance. Challenges with traditional surveillance is that it is periodic; while programme data comes in routinely and should be able to provide information on how the epidemic is moving. It was agreed that while programme data can be used for surveillance, it would be unwise to completely drop surveillance surveys since disruption in service delivery would disrupt surveillance, and the prevalence estimates would be very sensitive to kit stock-outs and other programme delivery challenges.

The group agreed that although the deliberations are headed in the right direction, it is important to understand that programme data does not necessarily have to replace surveillance data. All methods have inherent biases and limitations, and HSS/IBBS will still need to be conducted periodically to assess population-based information on the state of the epidemic and the results from the programme response.

On the question of continuing continuum of care from the prevention point of view, it was stated that no single country has been able to completely

> All methods have inherent biases and limitations, and HSS/IBBS will still need to be conducted periodically to assess population-based information on the state of the epidemic and the results from the programme response

link prevention, care and treatment although it is not impossible. Some countries use unique identifiers or digital IDs for specific populations such as PWID. However, issues of security and confidentiality need to be seriously considered.

Another discussion centred around creation of dedicated teams for quality assurance and parallel implementation of old and new systems at least for the next two to three future rounds of HIV surveillance, to ensure the quality and reliability of the data that will be collected.

Technical Session 1 – panel discussion

4 DISTRICT LEVEL HIV ESTIMATIONS

4.1 Overview

Session Objectives:

1. To orient the country team on globally recommended technical framework for district level estimates, and

2. To review, appraise and modify the country team proposals on district level estimation methods.

Session Chair: Dr DCS Reddy, Independent Expert

Session Co-Chair: Dr S Venkatesh, DDG (NACO); Dr Arvind Pandey, NIMS-ICMR; Dr Srikala Acharya, Mumbai DACS

Different global models and approaches used to produce HIV estimations at sub-national and district level were presented by Dr Keith Sabin (UNAIDS Geneva), Mr Taoufik Bakkali (UNAIDS), Mr Wiwat Peerapatanapokin (EWC), Ms Sherry Yin (CDC), Ms Nalini Chandra (UNAIDS) and Ms Deepika Srivsatava Joshi (CDC). An increasing need for sub-national focus was underscored in keeping with the need to decentralize the programme to better address heterogeneous epidemic context. NACO too, has been emphasizing a decentralized, sub-national level programme response as part of its national AIDS control annual action planning. The results of the modelling are used for programme planning and resource allocation as well as to evaluate programme effectiveness at different levels. It was emphasized that estimates are not precise measures. The choice of method depends mainly on what epidemiological data are needed, data

Technical session opening and introduction of experts

availability and the need to use the maximum existing data. Surveillance data inputted in the model shapes epidemic trends, population-based survey data the level of the epidemic.

Different models such as Spectrum, process models, geospatial models, hierarchical models for concentrated epidemics and simple Excel-based disaggregation methods were reviewed to stimulate discussions on tools which would be more adaptable to the India context at the district level. Every method requires serious effort on data preparation, and there is no one perfect model. Some models however, require more data inputs than others which is not in all the districts. Capacity also varies across areas and this must be taken into consideration. Most important, choice of methods and tools will depend on what estimations are needed for. The purposes for producing HIV estimations vary and need to be clarified.

Technical Session 2 – pre-lunch presentations on district estimation methods

Questions and discussions after the presentation centred on whether one could use different modelling tools in different places depending on how much data is available in different contexts. Experts agreed that to the extent possible, a single method shall be used for the district level estimations for consistency and standardization. However, additional methods may be used for selected states depending upon the local considerations of epidemiological need, data availability and programme capacity.

The advantage of using data from contiguous geographical areas is that this model relaxes the need for complete dependence of data from individual districts. This model could be used to apply estimates created from one set of data to another area where there is none or less information available to get a better estimate for the state or a group of districts. The model is still being refined by Pennsylvania State University, which together with UNAIDS, would be ready to apply it in the Indian context.

4.2 Hierarchical Model for Concentrated Epidemics

First the hierarchical model was presented which helps model HIV epidemics at sub-national and sub-population level by applying data from other areas. This newer model is used to estimate HIV epidemics at finer scales with focus on areas and groups that have different epidemic patterns. It is particularly helpful where data availability is imbalanced. It produces district level estimates by applying models to observe data (i.e., ANC data) and can also be used to aggregate results to generate state or national estimates. Examples of use of this modelling approach in Nigeria and Thailand were presented.

4.3 Disaggregation Method Using Proxy Incidence

The disaggregation method uses proxy incidence to generate district estimations. It requires input of results from a national model (AEM or Spectrum) and applies proxy incidence and M/F ratio by state, province, or district. Spectrum software is used with direct incidence input option to generate estimates for key indicators (i.e., number of PLHIV, new infections, deaths, etc.) over time for the total population as well as for males and females separately. Examples from Thailand, Cambodia and Maharashtra were illustrated as well as from Malaysia and Myanmar.

Results were presented from an experiment of applying the disaggregation method to Mumbai, Thane, Pune and the remaining districts of Maharashtra. For this purpose, the proxy incidence from ANC sentinel surveillance (15-24 yrs.) was used for female population. It was assumed that the male/female ratio is the same for all districts. Estimates were produced for the four districts for incidence among males and female, number of PLHIV, new infections and AIDS-related deaths.

The discussion centred on age disaggregation of prevalence data and the possibility of using HSS ANC data from a younger age groups to get trends in incidence. There are specific sites for pregnant women in the age group of 15-24 years in Maharashtra since 2006. The importance on clearly defining the choice of data for determining proxy incidence was discussed at length for the case of Maharashtra. PMTCT data can also be used if this is available for a long time.

The advantage of the disaggregation method using proxy incidence is that there is no inconsistency between national, state level and district level estimates, as estimates add up at the higher level which is the starting point for disaggregation. Limitations of this method were discussed, as was the option of grouping districts to have more robust prevalence data points. It was emphasis that epidemiological understanding of levels, trends and patterns in the epidemic over time is critical to inform policy and programmes, and guide investment in responses. The example from Myanmar showed that this method is also suited to model the epidemic under different scenarios of interventions by making assumptions on programme coverage and intervention unit costs.

4.4 Disaggregation Methods Using Spectrum

Other approaches were next presented to develop district estimates. One option included using the state projection/state results from spectrum followed by spreadsheet / Excel sheet steps for district level estimates.

Other options were disaggregating the Spectrum state file by sub-epidemics (district wise) with multiple sub-epidemic curves generated; and using Spectrum software to crease district wise.

These three options were looked at in terms of data needs, effort level, advantages and when each may be used (Table 1).

Table 1. Spectrum Disaggregation Methods				
Method	**Data Needs**	**Effort Level**	**Advantages**	**Limitations**
1. State projection/ state result + spreadsheet/ Excel	Prevalence by state	Low	Easiest approach does not need lots of data	Too simplistic, limited options for outcomes
2. Spectrum state projection with sub-epidemics	Surveillance data by districts	Medium	Captures critical epidemic dynamics by districts	Limited surveillance sites at district level
3. Spectrum multiple district specific Spectrum files	Surveillance data, demographic data, and program data by district	High	Captures full epidemic dynamics and variations	Limited demographic and surveillance sites at district level

The approach of using Spectrum to produce district level estimations was presented with focus on Maharashtra, specifically the districts of Mumbai, Thane, Pune and the "remaining districts" in the state. The presentation illustrated step by step, two approaches that can be used in Spectrum: (1) independent district projection, and (2) disaggregated state projection through sub-epidemics. The aggregate result of the district HIV estimates generated using approach 1 and approach 2 were compared with the estimations produced earlier for the state of Maharashtra by NACO/NIMS with the help of the NWG on HIV Estimation. The process and outcomes of each approach were discussed. The results are consistent between the two approaches and those for the state of Maharashtra.

In the discussions, it was suggested that approach 2, that is, Spectrum state projection disaggregated by sub-epidemics, would be pragmatic considering the data needs and is not much data heavy. Where enough data is available, district specific estimates can be produced using approach 2. In case where sufficient data is unavailable, districts may be clubbed together. The clubbing of districts, however, needs to be done based on geographic contiguity, or considering administrative divisions, or epidemiological context, or programme requirements. This possibility requires further discussion. There was agreement that guidelines be developed on key steps and methods for calibration.
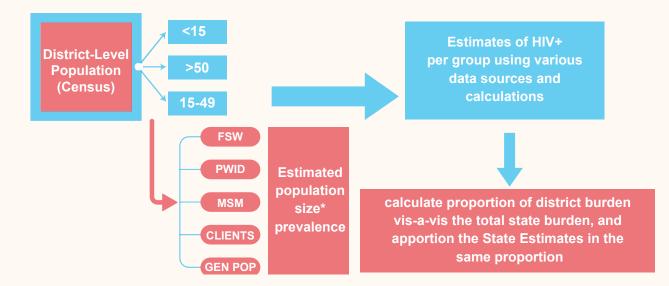
> Where enough data is available, district specific estimates can be produced using approach 2, that is, disaggregated state projection through sub-epidemics. In case where sufficient data is unavailable, districts may be clubbed together

4.5 Workbook Methods

The last presentation was on workbook method which was relatively straightforward. Introducing the topic, it considered various issued such as data availability, ease of derivation of estimates (system requirement, capacity to generate/ training needed, time needed), ability to obtain

Technical Session 2 – post-lunch presentations on district estimation methods

epidemic trend data and data disaggregated by sub-populations. It also emphasized the need to formulate clear assumptions and validate results from the workbook method against state level Spectrum estimates.

The method essentially disaggregated the district population into three age groups of <15 yrs., 15-49 yrs. and >=50 yrs. The adult population (15-49 yrs.) is further divided into high risk population, clients and general (i.e. low risk) population. On each population sub-group, specific prevalence rate is applied and PLHIV size is estimated for each of the sub-group. HIV positive children (<15 yrs.) and adults (50+ yrs.) are calculated as a proportion of positives at the state level as from the Spectrum State estimates. The district estimates thus generated are aggregated and proportional contribution in total estimates is worked out. The district specific proportional contribution thus worked out is applied on State Spectrum estimates to obtain the final district estimates to ensure consistency.

4.6 Panel Discussion

In the panel discussion, strengths and weaknesses of each method presented by speakers were elaborated on, especially regarding data needs, capacity, precision, level of effort, etc. It was made clear that, essentially, methodological choices depend on what epidemiological data is required at the district level; what will be the data need and what will be the capacity for implementing the method besides the technical rigor of the method.

It was noted that programme planning starts at the district level and as such there is a need to understand denominators as well as epidemiological dynamics to identify focus areas, set targets and understand heterogeneity. It is also important to identify what is needed to achieve 90-90-90 and how to include in the denominator those which are outside the programme areas and not reflected in public sector data. Minimum data needs include the number of PLHIV, new infections/incidence, AIDS-related deaths and information on the need of PPTCT.

Another question was if one single method should be used or a mixed method approach. Panellists concluded that for the sake of consistency it is advisable to use one single method. But in case there is more data and other suitable pre-conditions such as capacity and need, a mixed method approach can be considered.

There was agreement that all methods that were discussed are subject to limitations. Numbers per se are of lesser importance than strategic information needed to identify locations and population groups at higher risk of HIV.

One crucial issue that must be kept into consideration is capacity. The strengthening of the surveillance system has so far been done in India with the help of Regional Institutes (RIs). RIs need to continue to be involved including through participation in decision-making concerning choice of methods, systems and processes. It is also important to ensure SACS teams are part of the process to ensure wide ownership. Therefore, their capacity must be built with the support of RIs.

Panel discussion on district level HIV estimates

In general, any initiative to produce or strengthen surveillance and estimation data will require a clear set of objectives and strategies. The effort needs to be conceptualized from the beginning to the end, which is the point when data is analysed and used to inform policy and programmes. Participation of all relevant stakeholders is essential as this will facilitate understanding of the strengths and limitations of the data, and its programmatic implications at different levels.

It was discussed that the Expert Group should agree to use one relatively simple model across all priority districts in India. If some districts have the capacity to utilize additional and more advanced models, this can be considered. In case of newly established districts, data can be generated from existing surveillance sites or borrowed from neighbouring or "mother" district. The role of case-based surveillance was also discussed as well as the need to calibrate estimations to take urban versus rural differences into consideration.

There was agreement that estimates for all 700 Indian districts may not be a pragmatic approach. Districts that are critical because of high or rising HIV burden or otherwise programmatically important districts should be prioritized. A modular, staged approach is needed for taking these estimations to scale. It is important to put in place the right architecture and systems which are required for a sustainable implementation of updates in estimations at subnational level, including effective technical oversight, quality assurance, coherence, consistency and capacity-building. Where it is not possible to produce an estimate for a single district because of insufficient data, consideration can be given to merging or grouping districts together.

Ultimately it was recommended to test several different estimation approaches including in data-rich and in data-poor settings. Testing of the methods presented at the consultation beyond the few districts initially selected (Mumbai, Pune, Thane in Maharashtra) is necessary. Districts in an additional 4-5 states should be chosen including Uttar Pradesh. Criteria for evaluating the suitability of estimation methods should include strategic information needs, simplicity, precision, consistency, data intensity, capacity, etc. A working group will be created and define parameters more in detail. It will also lay out the strategy for the testing of methods on the ground.

> It is important to put in place the right architecture and systems which are required for a sustainable implementation of updates in estimations at subnational level, including effective technical oversight, quality assurance, coherence, consistency and capacity-building

It was emphasized that, while methods and tools are provided by experts, the process and results are owned by the national team. NACO will drive the process and decide when district, state and national level estimations need to be produced or updated. The ultimate clients of the estimations are decision-makers including programme managers and policy makers. India has much benefited from expert advice like that of John Stover from Avenir Health, who has steadily advised NACO in a timely manner and provided practical technical assistance. This type of support is what is greatly appreciated in-country and should be expanded. NACO requested experts gathered in the expert consultation to share method and tools, build capacity and give directions – provide technical guidance beyond the consultation in the next steps of decision making. They said that India can benefit from troubleshooting and technical guidance from experts.

5 SIZE ESTIMATIONS OF KEY POPULATIONS

5.1 Overview

Session Objectives:

1. To orient the country team on globally recommended technical framework for population size estimation, and

2. To review, appraise and modify the country team proposals for virtual mapping.

Session Chair: Dr Bilali Camara, UNAIDS Country Director, India

The day started with a focus on issues related to estimating the size of key populations, including female sex workers (FSW), men who have sex with men (MSM), Hijras/Transgenders (TG) and people who inject drugs (PWID). The results from India's 2008-09 mapping and size estimation exercise which are being used till date was discussed. Since then, national estimates have

been updated periodically based on re-validations done with the help of Technical Support Units (TSUs) at TI level. Ninety percent of districts use these numbers for preparation of annual action plans and related budgeting. A robust population size estimation exercise such as the one from 2008-09 has not been repeated, but more comprehensive estimations are more than ever required in this important phase of epidemic response.

The aim of this session, chaired by Dr Bilali Camara (UNAIDS), was to orient the country team on globally recommended approaches by sharing lessons and best practices from India as well as other countries with special consideration of changing risk behaviours and strategic information needs. Presentations in this session were made by Dr Tobi Saidel (PEMA) & Dr Savina Ammassari (UNAIDS), Mr Taoufik Bakkali (UNAIDS), Mr GS Shreenivas (Linkages/FHI360) and Mr Mark Berry (CDC).

Technical session on key population size estimation – introductory comments

5.2 Population Size Estimation: Global and India Experiences

The first presentation provided a background on the technical framework for population size estimation of key populations (KPs). It summarized experience with design and implementation of KP population size estimation (PSE) in India and countries around the world. India uses a combination of mapping data and periodic "re-validation" which are methods described in the draft *White Paper on Population Size Estimations* prepared by NACO with UNAIDS and partners. The country has never systematically implemented any of the other commonly used PSE methods such as Capture-Recapture or Multiplier techniques on a large scale. Although TIs update mapping data regularly, the last formal national size estimate based on mapping data took place in 2008-09 whose results are also used under the TI programme to monitor progress and evaluate results.

Technical session on key population size estimation – presentation on global and India experiences

The framework recommended globally for obtaining local and national level PSE was described to have the following stages:

Stage 1

Collate new and existing data for direct local area estimates using one or multiple methods

Stage 2

Triangulate results from multiple data sources to reach consensus on local area estimates

Stage 3

Use extrapolation approach to obtain higher level (regional or national) size estimations

5.2.1 Stage 1 – *Collate new and existing data for direct local area estimates using one or multiple methods*

Mapping Methods

These methods are used to estimate KP sizes by counting KP members directly. They are alternately referred to as census, enumeration, programmatic mapping, geographic mapping, ethnographic mapping or social mapping. They are primarily limited to counting KP members who visit physical venues on a frequent basis (e.g. daily/weekly/monthly). Data collection usually involves a combination of direct observations and key informant interviews of KPs and non-KPs. Results can be adjusted to account for double-counting, turnover, frequency, mobility, and overlap with non-venue-based sites (e.g. virtual sites).

Key Populations Survey-Based Methods

These methods combine survey data with other overlapping data sources to estimate KP size. Multiplier methods use data from two or more sources with overlapping population sharing the same characteristics. One of the sources is usually a KP population-based probability survey. Other source typically uses routine program data, or data from the distribution of a unique object or related to a unique event. The exercise involves understanding the number and percentage of individuals that are included in both data sources. The Capture-Recapture method is like multiplier methods and involves tagging people from two or more overlapping data sources and tracking number and percentage of KPs who are part of both (or more) sources. Finally, another set of methods use successive sampling or Bayesian models which employ prior knowledge about PSE in conjunction with data on network sizes and sequential nature of data collection in a respondent-driven sample (RDS) survey. A newer method that is also utilized is the *New RDS Estimator*.

General Population Survey-Based Methods

These methods combine survey data with other overlapping data sources to estimate KP sizes. The Network Scale-up is based on questions about high-risk behaviours among acquaintances of respondents in general population surveys. Another option is to derive PSE from the *proportion of general population reporting behaviour* in a representative general population survey like NHFS in India. The proportion is established based on respondents who report engaging in risk behaviours characterizing key populations in a general population survey out of the total number of respondents.

5.2.2 Stage 2 – *Triangulating Results Using Multiple PSE Sources*
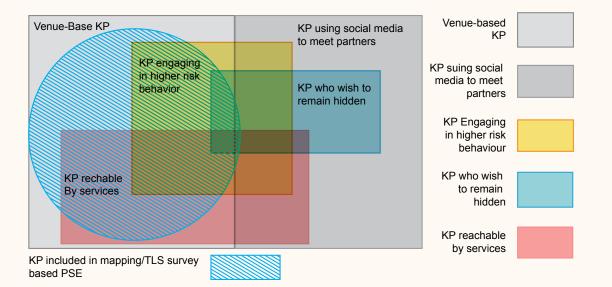
As there is no gold standard or perfect method because each method has both strengths and weaknesses, triangulation of results from use of different methods is essential. This also helps reach consensus on a plausible range of size estimates—considering findings from multiple methods and corroboration of PSE with other available data (i.e., programme coverage data, pre-assessments of surveillance surveys). When triangulating, consideration must be given to many causes of systematic bias, including the inability to accurately identify KPs during mapping, lack or representativeness of survey data due to various reasons (e.g., sampling error, misclassification of respondents), multiplier data not matching definitions used in surveys, etc. This can potentially cause substantial over/under estimates (e.g. survey uses venue-based sampling, program data includes both venue-based and non-venue based KPs). Problems with data quality is another issue to be considered. Neither large sample sizes nor statistical methods can correct these types of biases.

5.2.3 Phase 3 – *Extrapolation to move beyond local estimates*

Because local area size estimates are usually available in only a subset of purposively selected geographic areas, extending these "direct" estimates to regional or national level is necessary. This involves extrapolation which means applying an algorithm using assumptions about size and proportion of KPs in areas having direct local estimates to areas not having such estimates. Some common approaches include: simple or stratified imputation (categorizing areas based on key characteristics) such as regression analysis or Bayesian Hierarchical Modelling. It was also emphasized that identifying variables that are predictive of the expected number of KPs in general population is challenging. Using data that are not predictive can introduce more error rather than improving estimates, so this step must be done with caution.

Key issues for further discussion were posed, such as who would need to be counted/estimated and targeted; who is included in current size estimates and who is missing; how current approaches should be adapted to get closer to the reality existing on the ground; and how precise estimates need to be.

Emphasis was set on changing epidemic settings and vulnerability and risk behaviours where increasing use is made of smart phones and of social apps and media for networking. As a result, key populations do not frequent physical venues as assiduously than in the past. This has made enumeration through physical mapping difficult. Also, with changing risk behaviours, definitions and categorizations may have become obsolete, while there remains a need for consistency in definitions and strategic information over time. Recommendations included counting and providing services to highest risk subset; bridging gap between the reachable and those at risk; and improving understanding of size and risk levels of those currently unreached or unreachable.

5.3 Social Media-Based Size Estimates: A Case Analysis

This presentation discussed the results of population size estimations by using social apps published in the paper titled *'Population Size Estimation of Gay and Bisexual Men and Other Men Who Have Sex with Men Using Social Media-Based Platforms'*.[1] It underscored the importance

When triangulating, consideration must be given to many causes of systematic bias, including the inability to accurately identify KPs during mapping, lack of representativeness of survey data due to various reasons
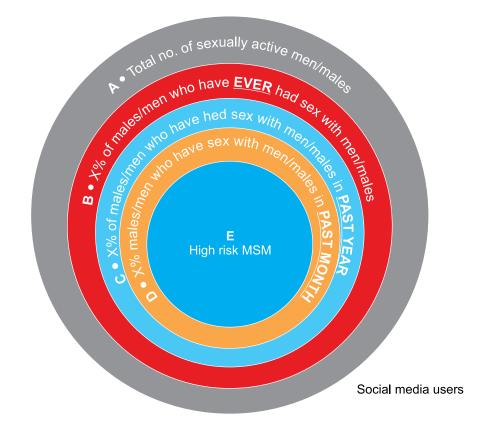
Technical session on key population size estimation – presentation on social media-based size estimates: a case analysis
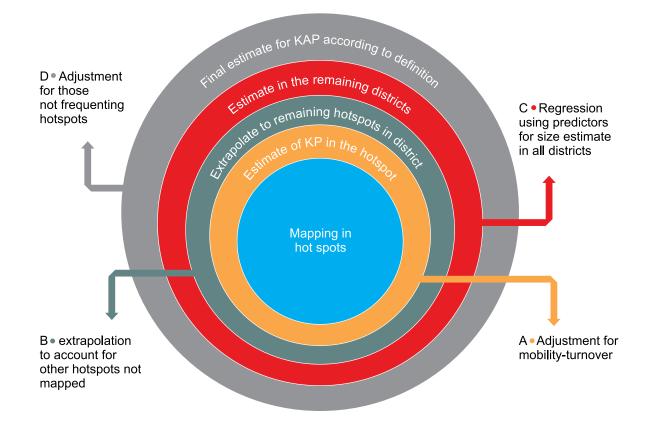
of considering careful use of different definitions and how this affects estimation results in a major way. Comparison of PSE produced in and across various countries show that a major reason why population size estimations vary hugely is that different definitions are employed (e.g., all MSM vs only those at higher risk).

In virtual mapping, the challenge of ensuring consistent definitions is amplified, as techniques do not allow to adequately classify or disaggregate the reach or counting. It is therefore important to be clear on who the estimations represent. The use of multiple methods was recommended as each (e.g., survey, mapping) has limitations. It is also important to triangulate estimates from different sources and generate consensus among experts on estimation values or ranges. It concluded that there is still a long way to go from virtual mapping to final size estimation.

[1] Baral S, Turner RM, Lyons CE, Howell S, Honermann B, Garner A, Hess III R, Diouf D, Ayala G, Sullivan PS, Millett G
Population Size Estimation of Gay and Bisexual Men and Other Men Who Have Sex With Men Using Social Media-Based Platforms JMIR Public Health Surveill 2018;4(1):e15
URL: http://publichealth.jmir.org/2018/1/e15/

A • Total no. of sexually active men/males

B • X% of males/men who have **EVER** had sex with men/males

C • X% of males/men who have hed sex with men/males in **PAST YEAR**

D • X% males/men who have sex with men/males in **PAST MONTH**

E
High risk MSM

Social media users

Discussions highlighted the need to consider who is reflected in the PSE – all population at risk, programme targets, high risk or/and low risk, reachable or/and not reachable. One must ask the question of whether PSE do really represent the KPs they were set out to estimate. The need for multiple methods to be used to estimate the number of KPs to better inform mathematical models and the scale of HIV programme coverage was underscored by presenter and in discussions.

Final estimate for KAP according to definition

Estimate in the remaining districts

Extrapolate to remaining hotspots in district

Estimate of KP in the hotspot

Mapping in hot spots

D • Adjustment for those not frequenting hotspots

C • Regression using predictors for size estimate in all districts

B • extrapolation to account for other hotspots not mapped

A • Adjustment for mobility-turnover

5.4 Proposed Technical Framework for Mapping of Key Population Operating through Virtual Networks

The presentation described the initiative undertaken by the Linkages project to estimate MSM population through social networks, particularly on Facebook and dating apps such as Grindr and Hornet in Mumbai, Thane, Pune and Vijayawada. A new system for HIV programmes to visualize density and number of location-based dating app users was described. Density mapping data aids in honing in on the ideal timings to post messages and advertisements targeted at this population. The project's strategy for virtual engagement and support was also illustrated.

Technical session on key population size estimation – presentation on pilot MSM population size estimation through social networks

Ensuing discussions dealt with ethical considerations such as consent in online surveys while keeping in mind the challenge of maintaining documents and records with private service providers that the respondents are being linked to. Legal issues will also need to be considered if the project intends to go beyond mapping and linking and enters the complexities of service or programme areas.

5.5 Bayesian Methods to Estimate Population Size of Key Populations

The presentation started off by reminding participants that a lot of methods that directly estimate KP exist, but they have many inherent problems. They produce an estimate for a certain catchment area like a city, not the entire subnational unit. Methods are not implemented in every subnational unit. KPs are usually a small proportion of the population and are hidden. Data from programmes is not enough. It is difficult to know how many people are not covered by programmes, and even if this is known, numbers can change.

Following this preamble, the basics of Bayesian statistics in PSE was described, particularly in the context of the need for appropriate estimation methods to directly estimate key populations. Bayesian synthesis integrates multiple estimates from different sources while Bayesian linear regression uses estimates and predictive

Technical session on key population size estimation – presentation on bayesian methods to estimate population size of key populations

covariates. Bayesian synthesis has been used to estimate the size of populations at risk for HIV in Bangladesh, England, Poland and Cote D'Ivoire. The Shiny App package was explained which allows users to do their own Bayesian synthesis.

The presentation was concluded with a discussion on the challenges, and benefits of using Bayesian methods. Challenges in the use of this kind of method is that it requires statistical expertise and is difficult if data quality is poor or data is lacking. The benefits instead are that these methods borrow strength from different data sources, can deal with systematic biases or irregularities and can be used to extrapolate estimations to areas with little/no data with appropriate confidence bounds.

5.6   Panel Discussion

There was agreement amongst members of the group, to deliberate on the most feasible approaches to estimate and update the KP sizes, in fact, even ascribing higher priority to a pragmatic, quick, low-cost, and more feasible approach over one which would be very scientifically rigorous, but which does not have these other desired attributes. With ever-changing dynamic hotspots, and with a mobile population, if a traditional programmatic mapping would be attempted, it would be 5 years, before we would see anything meaningful, by which time the estimates would be redundant, since the population densities and distribution would have changed.

Hence, after several discussions on the technical framework of estimating KP sizes, and a reminder of the approaches used globally, it was decided that:

■   The data available under sampling frame development from India's Integrated Biological and Behavioural Surveillance will be explored and appropriate mapping estimates will be applied to work-out a size estimate from this rich resource.

■   In the existing hotspots, the TSU PO feedback mechanism will be explored, wherein through a standardization and digitization of the quarterly hotspot mapping and KP size verification process, one could potentially assimilate the revised numbers provided, and aggregate into the district and state-based estimates.

■   Mapping needs to be strengthened to make it more routine, regular and robust while maintaining independence. The experiences of regional institutes, which has resulted into standardized methods and tools for large scale epidemic monitoring, can be used to standardize the institutionalized programme monitoring through technical support units' structure.

■   The limitation of using data through virtual networks is that it can only be used for country-level estimations. At the mi-cro-level, traditional methods such as capture-recapture or respondent driven sampling (RDS) can be used, besides multiplier and reverse tracking methods. It was agreed that due care should be taken to identify the extent of overlap between virtual and physical spaces and account for and rectify the double count potential.

■   The ongoing national drug use survey commissioned by the Ministry of Social Justice and Empowerment is expected to provide an estimate of injecting drug users at state and country level. The survey used the same methodology of RDS across all sites and engaged the State AIDS Control Societies, TIs, OST Centres and rehabilitation centres. The data from this initiative will be helpful in the proposed PSE process.

■   Another specific suggestion was to apply multipliers, post-hoc to the 2014-15 IBBS sampling frame data, and reverse tracking method using already collected sampling frame development data including hotspot information formats and cluster information sheets. The group agreed that these approaches are fraught with challenges and would not be an easy option, especially since the needed multiplier questions were not factored in at the time of planning but may be explored as there are very limited data sources on size estimates are available in country.

■   Experts also reminded India country team of the critical importance of building that element into the planning for the next IBBS which was agreed to by participants.

Panel discussion on key population size estimation

6 HSS PLUS/BSS LITE

6.1 Overview

Session Objectives:

1. To orient the country team on globally recommended technical framework for HSS Plus, and

2. To review, appraise and modify the country team proposals for HSS Plus.

Session Chair: Dr Arvind Pandey, Advisor to DG-ICMR

Co-Chair: Dr Shashi Kant, Professor and Head, CCM, AIIMS

In this session the possibility of conducting in India an HSS Plus was discussed. Presentations were made by Dr Keith Sabin, UNAIDS Geneva, Dr Pradeep Kumar, NACO, Ms Deepika Srivsatava Joshi, CDC India. First, experience with conducting HSS Plus from other countries like Vietnam was presented, followed by an illustration of the proposed framework of HSS in India. Use of a short questionnaire as part of HSS allows to collect key behavioural information on a regular basis to qualify and explain prevalence trends. The key point made in this session was that collection of behavioural data need not to be huge and cumbersome. Questions can be built into the HSS systems to get the information needed to understand the predictors of prevalence, especially on behaviours including sexual practices, condom use and needle sharing but also regarding access to services. This allows for analysis of data at local levels, rather than only at the national level for global HIV indicator reporting.

Technical session on HSS Plus/BSS lite

Panel discussion on key population size estimation – presentation on global experiences

6.2 Technical Framework for HSS Plus: Global Experiences

On the framework for HSS Plus, an example from Vietnam was presented, wherein behavioural questions are collected to qualify and explain the prevalence trends that were being generated through regularly repeated HSS. Less than 20 questions asked in the Vietnam HSS allowed to collect behavioural data at little additional cost and avoided time and efforts associated with design and implementation of time consuming IBBS surveys. By building into HSS brief and incisive questions, one can get the information needed to understand trends in behaviours affecting HIV transmission. Questions need to be limited to only a few most important ones, especially regarding behaviours such as condom use, sharing of injecting equipment, etc. Obtaining such

behavioural data from specific HSS sites helps to assess the situation and trends at the local levels, hence inform design and implementation of programmes by adequately tailoring interventions to specific needs.

6.3 Proposed Technical Framework for HSS Plus/ BSS Lite (HRGs)

Next, the "draft zero" of the proposed technical framework for India was presented. This included illustration of identified data needs for the measurement of core indicators related to service uptake, behaviours, stigma and discrimination and programme impact. The importance of adherence to the principles of cost-effectiveness and avoidance of provider bias was emphasised as well as need to ensure use of robust and pragmatic methods in HSS that could be regularly

Technical session on HSS Plus/BSS Lite – presentation on proposed framework for India

repeated. It was proposed that in tandem with the HSS, a sample of existing sites would randomly be selected with the help of Regional Institutes. In these sites, a behavioural questionnaire would be administered to respondents. Two main caveats were identified in relation to this approach. Firstly, the non-inclusion of populations not covered under the programme or accessing services. Secondly, that such an approach could only provide reliable behavioural estimates at the state level, whereas more granular information at the district and local levels is needed to focus interventions.

6.4 Panel Discussions

Much discussion ensued including on the need for more in-depth analysis of existing TI programme data that is regularly collected and includes valuable behavioural data. The need to obtain data also on behaviours of population members who are not registered with TIs or actively accessing services was underscored. In addition, the important need to gather behavioural data from key populations operating exclusively or largely in the virtual space was stressed. It was suggested that phone-based methods, using randomly selected key population members could be an option to reach people beyond the programme coverage area. Such phone-based methods as well as phone SMS- or app-based questionnaires could offer more anonymity and help maintain confidentiality, while providing more comprehensive and unbiased samples.

Some suggestions that were debated by participants included:

- HSS plus/BSS lite shall be initiated in country as an alternative to large scale full-fledged integrated bio-behavioural surveys. A modular approach should be followed.

- Choosing hotspots around the TI catchment area should be the starting point. But use of simple snowball methods to enrol key populations in HSS Plus and other types of surveillance from areas beyond the programme is critical to avoid having only the TI-registered populations as denominator.

- Using Respondent Driven Sampling (RDS) in some places in addition to the hotspot snowball sampling methods, to get better representation of the overall key population.

> Phone-based methods such as phone SMS- or app-based questionnaires using randomly selected key population members could be an option to reach people beyond the programme coverage area. Such methods could offer more anonymity and help maintain confidentiality, while providing more comprehensive and unbiased samples

- Using polling booth surveys conducted by TSUs annually to understand behaviours of key populations. Polling booth survey methodology will likely reduce, if not remove, social desirability and provider bias.

- Employing tablet-based ACASI techniques or colour coded CAPIs is also beneficial in this respect and helps gathering data also from less educated or illiterate populations. Experience with use of such methods should be compiled and lessons learned analysed (e.g., experience of KHPT).

- Analysis of TI-based programme data which is rich in behavioural indicators. As discussed on Day 1 of the consultation, the format in which this data can be aggregated and accessed will need to be decided along with TI Division at NACO.

- Analysing new registration data for TIs to see any discernible difference between those in the programme and those naive to services.

- Participants also emphasized the need to repeat IBBS and conduct it periodically, at least every 4–5 years, since these provide the most representative data to monitor and evaluate changes in behaviours.

7 INTEGRATED SURVEILLANCE FOR HIV, HEPATITIS AND SYPHILIS

7.1 Overview

Session Objectives:

1. To orient the country team on global recommendations for Integrated Surveillance, and

2. To review, appraise and modify the country team proposals for Integrated Surveillance.

Session Chair: Dr Shashi Kant, Professor and Head, CCM, AIIMS

Co-Chair: Dr Naresh Goel, DDG, NACO

This session's focus was on how to better integrate surveillance for HIV and other diseases such as TB, hepatitis and syphilis. The latest improvements in incidence assays were also discussed. Presentations were made by Dr Bharath Parikh, CDC Atlanta; Dr Jesus Garcia Calleja, WHO Geneva; Dr Sandhya Kabra, National Center for Disease Control; and Dr Sheela Godbole, NARI Pune.

Technical session on HSS Plus

Dr Bharat Parekh, CDC, Atlanta

Dr Jesus M Garcia Calleja, WHO Geneva

Dr Sandhya Kabra, NCDC

Dr Sheela Godbole, ICMR, NARI Pune
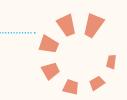
Dr Shashi Kant, AIIMS New Delhi

7.2 Incidence Assays and Analysis: Current Status

The first presentation described different types of HIV incidence assays and their characteristics and classification. Those testing for antibody avidity or how strongly HIV antibodies bind to HIV are used because antibody avidity increases over time after seroconversion, hence is used as a measure. It is a surrogate marker of time since infection. These assays are employed to detect and distinguish recently infected persons (weak antibodies) from those with long-term infections (strong antibodies).

Examples of field validation in Swaziland, a blood donor study in Namibia and population-based HIV impact assessment in Zambia were discussed; the single rapid incidence test device was presented as well with simultaneous diagnosis of HIV infection and duration of HIV infection. This is a simple and easy to use method and a cost-effective surveillance tool for tracking prevalence and incidence as well as for contact tracing and partner testing. This tool is believed to have high potential for the scale-up of targeted prevention and for disrupting HIV transmission. It has been piloted in Central America, Vietnam and Malawi.

7.3 Need for Integrated Surveillance: Global Perspective

Against the backdrop of the Sustainable Development Goals (SDGs) and the principles of Universal Health Coverage (UHC), this presentation described the shift in strategic information. The new guidelines on Person-Centred HIV Patient Monitoring and Case Surveillance (2017) were discussed and the link between HIV patient monitoring and case-based surveillance in a comprehensive strategic information system highlighted. The aim of case-based surveillance is to monitor the epidemic and impact of responses. It is defined as the "systematic reporting and analysis of standardized information about persons (i.e. cases) diagnoses with HIV to a public health agency responsible for HIV prevention, control and action". The purpose is to obtain standardized information from each reported case while maintaining individual-level data confidential. Several ethical principles that need to be followed were described. The importance of ensuring standardization of sentinel events and indicators was also

> The aim of case based surveillance is to monitor the epidemic and impact of responses. The purpose is to obtain standardized information from each reported case while maintaining individual-level data confidential

highlighted. Countries need to collect data on the core indicators especially the six key cascade indicators described in the guidelines. They also need to make sure that records are de-duplicated and data quality is improved because case-based surveillance should provide de-duplicated counts of persons diagnosed with HIV.

7.4 Hepatitis Surveillance Under National Centre for Disease Control

Dr Kabra presented on viral hepatitis surveillance which has been done in India since 1992. The National Centre for Disease Control (NCDC) is the nodal agency for this activity. NACO officials have participated as members in meetings of the Technical Resource Group (TRG) for surveillance of viral hepatitis. Surveillance is done for acute hepatitis, chronic infections and for sequelae. For acute hepatitis, it helps detect outbreaks and risk factors and describes trends in different types of hepatitis. Surveillance data is also used to estimate the proportion of chronically infected and estimate the burden of disease for both the general population and key population. Incidence of sequelae such as Hepatocellular carcinoma

(HCC) and Cirrhosis are tracked as well. Hepatitis surveillance, as a component of the Integrated Initiative for Prevention and Control for Viral Hepatitis, has been approved by the Mission Steering Group and is expected to be rolled out starting from April 2018. The NCDC will also be setting up diagnosis, care and treatment for hepatitis C under the National Health Mission (NHM). There is huge potential to integrate surveillance in coordination with NACO, within existing synergies for hepatitis B, C and HIV.

7.5 Proposed Technical Framework for Integrated Sentinel Surveillance in India

Next, the strengths, weaknesses, opportunities and threats of surveillance for multiple infections such as syphilis, hepatitis B and C were presented. Sample types and tests for each were described, as was the method of sample collection during HSS among key and bridge populations with a proposal to integrate additional biomarkers in the coming round of HSS. Sample size considerations and ethical issues as well as implementation considerations in key populations were discussed.

7.6 Panel Discussion

Key discussion points included:

■ Integration is possible but requires adequate coordination at different levels across sectors.

It is equally important to consider how the data are analysed and used.

■ The integration of hepatitis as additional bio-markers in HIV sentinel Surveillance shall be considered top priority for the next round of HIV Sentinel Surveillance in view of similarity en route to transmissions and population at risk.

■ The current system is based on dried blood spot (DBS) for high risk groups as there are challenges in managing serum samples. The possibility of looking at some specific sites to pilot shifting to alternative options with guidance from National Centre for Disease Control (NCDC).

■ There has been no data available at NACO for syphilis in key populations since 2007. However, syphilis testing can be taken up at facilities where hepatitis testing is done, especially with the goal of eliminating neonatal syphilis.

■ The concept of integration needs to be clearly defined in surveillance and in care. HSS follows linked anonymous testing strategy and facilitates offering of confirmatory services to screened reactive respondent as a part of routine services. The Integrated Disease Surveillance Programme (IDSP) has central, state and district level units and a network of laboratories. Formats can be tuned to a new integrated platform into which all data will be fed from the existing systems across the departments of the Ministry of Health and Family Welfare.

Panel discussion on integrated surveillance

8 CLOSING SESSIONS

8.1 Summary of Key Discussions

The main recommendations from the consultation's deliberations during each of the five technical sessions were summarised at the end of Day 4 by Dr Pradeep Kumar, NACO. These are as follows:

8.1.1 Programme-based HIV surveillance

- The need to conduct surveillance and develop estimations has intensified as not only HIV prevalence, incidence and behaviours must be tracked but also progress with the strengthening of the HIV prevention to treatment cascade.

- Programme-based surveillance is an important additional tool to further characterize and address the epidemic and should complement periodic HIV surveillance through HSS and IBBS. Strengthening of data recording and reporting systems will be essential for programme-based surveillance.

- TI current ecosystem is more conducive for implementation of programme-based surveillance. Data are already digitalized, and clients followed up on for a long time. Therefore, HIV incidence may be estimated also, but standardization in methods across locations and populations will be needed.

- The MCTS (RCH) portal which is being developed offers an opportunity for more sustainable tracking of HIV incidence in general population. However, more work is needed with NHM to improve recording of HIV results to reliably capture all known positives.

Closing Session – panel members

- PPTCT-based surveillance should be piloted in select high coverage States, following a data quality assessment in piloting programme-based surveillance.

8.1.2 District Level HIV Estimates

- District level estimations will be developed in India based taking global technical framework and lessons learned into account.

- Five methods may be piloted based on district estimation experience in India

    1. Disaggregation Method Using Proxy Incidence

    2. Sub-national Estimates: Spectrum Disaggregation method using excel

    3. Spectrum Method for District Level Estimates – (A) Independent district projection

    4. Spectrum Method for District Level Estimates – (B) Disaggregated state projection into districts and populations.

    5. Excel-based workbook method

- One standardised method will be chosen for use in all priority districts who can additionally use other methods depending on needs and resources available.

- Principles for choice and adaptation of methodology:

    1. Need and purpose

    2. Data availability

    3. Capacity needed to carry out estimation

    4. Resources needed, including human and financial

    5. Sub-group analysis and feedback into cascade

    6. Replicability to all districts across India

- Owing to decentralized response, need for HIV burden estimates for all districts or only cluster of districts if little data.

- Depending on these criteria, different methods might be needed.

- Results from use of each method will provide an estimate which can be cross-verified with Spectrum-based estimates which are considered the gold standard or reference point.

- For the pilot 3-4 states (data rich and data scarce) will be selected to try the methods available.

- Around 5% variation in results from use of these different methods and Spectrum state estimates can be tolerated.

- Greater granularity of data obtained will be useful as it provides valuable information for specific populations which require programmatic focus

8.1.3 Population Size Estimations

- Global perspectives on estimating key population sizes is recognized.

- India reviewed global and national experience and produced Population Size Estimates White Paper to guide decisions and action.

- There are some innovative experiences with virtual mapping of KPs, especially MSM, a technique which can help cover estimations of KPs who do not frequent physical venues.

- Key issues need to be discussed to move forward on production of PSE include:

    - At what level PSE are needed – national/state/district level?

    - Periodicity of estimates

    - Feasibility of replication across states

    - Time and cost

    - Use of existing implementation structures

    - Scientific rigor and precision

Proposed recommendations for implementation of PSE in India include:

- Use existing data from programme/size estimates for quick update of the size estimates data.

- Apply appropriate estimation method on data from India's Integrated Biological and Behavioural Surveillance and triangulate the results with existing programme/mapping estimates. Triangulate estimates from different sources including survey by Ministry of Social Justice and Empowerment.

- In the existing hotspots, the Technical Support Unit (TSU) Programme Officer (PO) feedback mechanism will be explored, wherein through a standardization and digitization of the quarterly hotspot mapping and KP size verification process, one could potentially assimilate the revised numbers provided, and aggregate into the district and state-based estimates.

- Mapping needs to be strengthened to make it more routine, regular and robust while maintaining independence. The experiences of nodal/regional institutes of HIV surveillance, which has resulted into standardized methods and tools for large scale epidemic monitoring, can be used to standardize the institutionalized programme monitoring through technical support unit structure.

- Carefully examine the virtual estimation methods from various perspective including those from legal and ethical perspective. Issues like extent of overlap between virtual and physical spaces shall be debated and accounted, and appropriate method for double counting shall be worked. The revised mechanism shall be discussed further.

- If resources are available, full-fledged size estimation exercise may be taken. If the next round of IBBS is being considered, multiplier methods may be integrated in the next round of IBBS.

8.1.4 HSS Plus/BSS Lite

- Lessons from other countries on HSS Plus, such as the Vietnam example, were acknowledged.

- For development of the India technical framework for HSS Plus/BSS Lite consideration should be given to data needed at different levels, especially state, type of behavioural indicators, sample selection and provider bias associated with TI involvement.

- Proposed recommendations:
  - Implement HSS Plus/BSS Lite in a modular approach.
  - Standardize and use polling booth surveys conducted by TSUs annually to understand behaviours of KPs.

- Introducing an ACASI-enabled methodology will likely reduce, if not eliminate, social desirability and provider bias.

- Explore to collect behavioural/qualitative data by using snowballing sampling methods at selected hotspots, to sample populations at the community level. Also use RDS in some places for community-based samples, without bias of TI sampling frame. Compare profiles and behaviours of respondents.

- Digitize and analyse TI programme monitoring data with focus on behavioural indicators.

- Conduct periodic IBBS, maybe every five years, to get population-based data for behaviours.

- Follow a modular approach in strengthening SI systems – using places with better data and capacity to test more sophisticated and rigorous methods and tools. 8.1.5 Integrated Surveillance

8.1.5 Integrated Surveillance

- There is a clear need for integrated surveillance in populations with common risk behaviours for different diseases including syphilis, hepatitis and HIV, especially for KPs.

- New specimen collection techniques may solve existing blood screening challenges (e.g., syphilis).

- Ensure adequate evaluation in the process as roll-out occurs.

8.2   Concluding Remarks

Dr Jesus M Garcia Calleja, WHO Geneva, congratulated the Government of India for periodically reviewing its surveillance systems in line with WHO/UNAIDS recommendations of revisiting surveillance systems every 2-3 years. In the context of Sustainable Development Goals (SDGs) and the need to adopt a holistic approach to health through adopting the universal coverage paradigm, India is heading in the right direction despite the challenges imposed by a complicated epidemic. He expressed his satisfaction with the overall discussions and recommendations and said he was looking forward to seeing implementation of agreed recommendations.

Dr DCS Reddy, Independent Technical Expert, acknowledged the excellent perspectives provided by international experts particularly on experiences in other countries. He appreciated their approach in providing advice as being thought provoking, rather than instructional. He stressed that decisions were needs-based and context-based and suggested that a core team would need to sit together and contextualize lessons learned to move forward to modify and improve surveillance systems in India using available opportunities, particularly in terms of integrated surveillance.

Dr Keith Sabin, UNAIDS Geneva, highlighted the challenges related to limited resources, and a need to prioritize and implement them in a large and complex national framework. He suggested focusing on district level estimates and analysing local programme monitoring data to inform programmatic decisions. India faces unique difficulties because of the large size of the country and epidemic diversity, which is why one needs to use local data and estimates that will help create efficiencies and savings.

Dr KS Sachdeva, DDG, NACO, stated that this was the right time to look at specific geographic areas and to concentrate on better focused and tailored efforts. He underscored that proposed processes need not always be a zero-sum game; some aspects may need investment of resources, particularly to produce key population size estimations. He added that he looked forward to taking home useful learning from this important consultation.

Dr Srikala Acharya, APD, MDACS, speaking from the programme point of view, appreciated the useful information from the consultation and implement recommendations at the sub-national level. She also appreciated the suggestions on how to intelligently use strategic information from programme monitoring and evaluation as early alerts.

Dr Shashi Kant, AIIMS New Delhi, suggested making a list of requirements for the proposed HSS Plus and prune the list down as per necessity, according to whether data was available from other sources. It would be essential to engage personnel

to conduct and devise the questionnaire in such a way that reasonable quality data can be collected within a short time. It would also be prudent to look at different methods that can be replicated in the future without additional costs.

Dr Pamela Ching, CDC India, stated that surveillance data needs to be reliable and measured consistently, recognizing the critical role of programme-based surveillance. The decision on what method to use needs to be based, not on which works best, but on which best uses data that is already available. There is a need to concentrate on behavioural surveillance and use of technology such as ACASI. Surveillance methods should be easily adapted, ensuring simplicity, flexibility and acceptability of users. It should be representative and timely. Some challenges include understanding drivers, interactions between key and bridge populations, linking HIV surveillance systems with those of other chronic diseases and use of data to improve quality of health care. With continued efforts and introduction of more efficient and innovative strategies informed by evidence, India may well be on its way to eliminating HIV.

Dr Nicole Seguy, WHO India, commended the progress made against the backdrop of the 2016 Expert Consultation and phased approach which India had chosen which was benefitting from inputs on new methods from international experts. She lauded the efforts made by the organizing team in preparing for this consultation and stated that this level of expertise and commitment has only been seen in very few countries.

Dr Bilali Camara, UNAIDS India, considered this consultation as an important opportunity to address HIV in India, calling attention on what matters the most and analysing and using it. He stressed the importance of integration and stated that budgets were limited only if programmes operate in isolation. He encouraged NACO to help the public health system to use the cascade concept and looked forward to working with the TB and hepatitis programmes to get a clear cascade on testing, treating and cure with inclusion of hepatitis. He congratulated NACO on this expert consultation which has brought together state, national and international experts, and thanked participants for their commitment to India, on behalf of humanity. He also felt that this exceptional experience should be shared with the rest of the world. 8.3 Valedictory Address

8.3   Valedictory Address

Shri Alok Saxena, Joint Secretary, NACO, declared that the deliberations of this four-day consultation had lived up to its high expectations, and expressed gratitude to international experts, in-country technical experts and participants. On the issue of integration, he felt that a second look would be needed on how strategic information should be produced and used without compromising citizens' rights to privacy and confidentiality. While resources are undoubtedly an issue, an appropriate surveillance design is required to effectively address AIDS and end the epidemic in India. He stressed on the need to optimize resources through use of adequate information technology. Shri Saxena acknowledged all development and technical

partners as well as the country team for organizing a successful expert consultation and for their contributions to ensure evidence-based decision-making.

8.4 Closing Remarks

Dr S Venkatesh, Additional Director General NACO, appreciated the excellent meeting and substantive deliberations, for which planning work started two months earlier with preparatory meetings and technical discussions. He acknowledged the organizing team's efforts to develop a well-knitted agenda that can be recommended as best-practice model. Dr Venkatesh believed that the sessions have yielded concrete recommendations from which both surveillance and programme implementation will benefit in the long run. Stressing on the importance of documenting experiences so that others can learn from them, he looked forward to sharing a detailed report in a short time.

GLIMPSES OF DAY

ANNEXES

Annex 1: Agenda

Expert Consultation on
Newer Methods of HIV Surveillance & Estimation in India

Taj Mahal Hotel, Man Singh Road,
New Delhi, Delhi 110001

21–24 March 2018

21 March 2018		
Inaugural		
08:45	**Registration**	
09:30-09:45	Welcome	Dr S Venkatesh, Deputy Director General NACO
09:45-10:10	Opening Remarks	Ms Sara Heydari, HIV/AIDS Division Lead, USAID India Dr Timothy Holtz, Director, DGHT, CDC India Dr DCS Reddy, Independent Expert
10:10-10:20	Remarks	Dr Nicole Seguy, Team Leader, Communicable Disease, WHO India
10:20-10:30	Remarks	Dr Bilali Camara, Country Director, UNAIDS, India
10:30-10:45	Presidential Address	Shri Alok Saxena Joint Secretary, NACO
10:45-10:55	Felicitation of Experts	
11:55-11:10	Inaugural Address by Chief Guest	Dr BD Athani Director General of Health Services
11:10-11:15	Vote of Thanks	Dr Pradeep Kumar, NACO
11:15-11:30	Group photo followed by High Tea	

Day 1 (Continuation)	
Technical Session 1: Programme-Based Surveillance **Session Objectives:** 1. To orient the country team on globally recommended technical framework for Programme- Based Surveillance, and 2. To review, appraise and modify the country team proposals on Programme-based Surveillance	
Session Chair: Dr DCS Reddy, Independent Expert **Session Co-Chair:** Dr Vishnu Vardhan Rao, Director, ICMR-NIMS	
11:30-12:00	Technical framework for Programme-Based Surveillance: Global Perspective	Dr Jesus M Garcia Calleja, WHO Geneva
12:00-12:10	Programme-Based Surveillance in India: Context Setting	Dr Nicole Seguy, WHO India
12:10-12:30	Data Recording and Reporting System under Targeted Intervention	Ms Kim Hauzel, NACO
12:30-13:00	Mother and Child Tracking System under National Health Mission (RCH Portal)	Shri Sanjay, Deputy Director (Statistics), NHM
13:00-14:00	**Lunch**	
14:00-14:30	Data Recording and Reporting System at Integrated Counselling and Testing Centers	Dr Asha Hegde, NACO
14.30–15.00	Proposed Technical Framework for Programme-Based Surveillance: High Risk Group	Dr Sanjay Rai, AIIMS New Delhi Dr A Elangovan, ICMR-NIE, Chennai
15:00-15:30	Proposed Technical Framework for Programme-Based Surveillance: Pregnant Women	Dr Sheela Godbole, ICMR-NARI, Pune Dr PVM Lakshmi, PGIMER Chandigarh
15:30-16:00	**Tea**	
16:00-17.15	Panel Discussion on Country proposal for Programme-Based Surveillance	**Moderator:** Dr Nicole Seguy, WHO India **Panellists:** Dr Pradeep Kumar, NACO Dr Jesus M Garcia Calleja, WHO Geneva Dr Keith Sabin, UNAIDS Geneva Dr Sherry Yin, CDC Atlanta Dr DCS Reddy, Independent Expert Dr Bhavani Singh, NACO Dr Shashi Kant, AIIMS New Delhi
17:15-17:30	Summary and Way Forward	Dr DCS Reddy, Chair Dr Kuldeep Singh Sachdeva, Co-Chair
17:30-17:35	Wrap-up	Ms Mariyam, NACO

Expert Consultation on
Newer Methods of HIV Surveillance and Estimation in India

22 March 2018		
Technical Session 2: District Level HIV Estimations		
Session Objectives: 1. To orient the country team on globally recommended technical framework for district level estimates, and 2. To review, appraise and modify the country team proposals on district level estimation methods		
Session Chair: Dr DCS Reddy, Independent Expert **Session Co-chair:** Dr S Venkatesh, DDG (NACO)		
Time	*Title*	*Presenter*
10:00-10:15	Recap	Dr Pradeep Kumar, NACO
10:15-10:45	Technical framework for Sub-national/ District Level Estimates: Global Perspective	Mr Taoufik Bakkali UNAIDS RST AP
10:45-11:15	Hierarchical Model for Concentrated Epidemics: Methods, Results and Issues for Considerations	Dr Keith Sabin, UNAIDS Geneva
11:15-11.45	**Tea**	
11:45-12:30	Disaggregation Method Using Proxy Incidence	Dr Wiwat Peerapatanapokin, EWC
12:30-13:00	Sub-national Estimates: Spectrum Disaggregation using Excel	Ms Sherry Yin, CDC Atlanta
13:00-14:00	**Lunch**	
14:00-14:30	Spectrum Method for District Level Estimates: Application in Indian Context (Methods, Results and Issues for Considerations)	Ms Nalini Chandra, UNAIDS India
14:30-15:00	Workbook Methods: Application in Indian Context (Methods, Results and Issues for Considerations)	Ms Deepika Srivastava Joshi, CDC India
15:00-15:30	**Tea**	
15:30-17:00	Panel discussion on suitable method/s for district level estimation	**Moderator:** Mr Taoufik Bakkali, UNAIDS RST AP **Panellists:** Dr Pradeep Kumar, NACO Dr Keith Sabin, UNAIDS Geneva Dr Jesus M Calleja, WHO Geneva Dr Wiwat Peerapatanapokin, EWC Dr DK Shukla, NIMS-ICMR Dr Arvind Pandey, NIMS-ICMR Dr Srikala Acharya, APD, MDACS
17:00-17:15	Summary and Way Forward	Dr DCS Reddy, Chair Dr S Venkatesh, Co-Chair
17:30-17:35	Wrap-up	Ms Mariyam, NACO

23 March 2018		

Day 3: Technical Session 3: Size Estimations of Key Population

Session Objectives: 1. To orient the country team on globally recommended technical framework for Population Size estimation

2. To review, appraise and modify the country team proposals for virtual mapping

Session Chair: Dr Bilali Camara, UNAIDS Country Director, India		
Time	*Session*	*Presenter*
10:00-10:15	Recap	Ms Deepika Srivastava Joshi, CDC India
10:15-10:35	Technical Framework for Population Size Estimation: Global and India Experiences	Dr Savina Ammassari, UNAIDS India Dr Tobi Saidel, PEMA
10:35-10:50	Social Media-based Size Estimates: A Case Analysis	Mr Taoufik Bakkali, UNAIDS RST AP
10:50-11:10	Proposed Technical Framework for Mapping of Key Population Operating through Virtual Network	Mr GS Shreenivas, Linkages FHI360 India
11:10-11:30	Bayesian Methods to Estimate Population Size of Key Populations	Dr Mark Berry, CDC Atlanta
11:30-11:45	Tea	
11:45-12:45	Panel discussion on proposed Technical Framework for Mapping of Key Population Operating through Virtual Network	**Moderator:** Dr Savina Ammassari, UNAIDS India **Panellists:** Dr Bhawani Singh, NACO Dr Jesus M Garcia Calleja, WHO Geneva Dr Ashok Row Kavi, Humsafar Trust Mumbai Dr Keith Sabin, UNAIDS Geneva Dr A Elangovan, NIE Chennai-ICMR Dr. Mark Berry, CDC Atlanta Dr Bitra George, FHI360 India
12:45-13:00	Summary and Way Forward	Dr Bilali Camara, Chair
13:00- 14:00	Lunch	

Technical Session 4: HSS Plus

Session Objectives: 1. To orient the country team on globally recommended technical framework for HSS Plus

2. To review, appraise and modify the country team proposals for HSS Plus

Session Chair: Dr Arvind Pandey, Advisor to DG-ICMR Session Co-chair: Dr R S Gupta, DDG, NACO		
14:15-14:45	Technical Framework for HSS Plus: Global Experiences	Dr Keith Sabin, UNAIDS Geneva
14:45-15:15	Proposed Technical Framework for HSS Plus/BSS Lite (HRGs)	Dr Pradeep Kumar, NACO
15:15-15:30	Tea	

Time	Title	Presenter / Panellists
15:30-17:00	Panel discussion on Country Proposal for HSS Plus	**Moderator:** Dr Keith Sabin, UNAIDS Geneva **Panellists:** Dr DCS Reddy, Independent Expert Dr Pradeep Kumar, NACO Dr Jesus M Garcia Calleja, WHO Geneva Dr Keith Sabin, UNAIDS Geneva Dr Sanjay Rai, AIIMS Delhi Dr Mark Berry, CDC Atlanta
17:00-17:30	Summary and Way Forward	Dr RS Gupta, Co-chair Dr Arvind Pandey, Chair

24 March 2018

Day 4: Technical Session 5: Integrated Surveillance for HIV, HCV and Syphilis

Session Objectives: 1. To orient the country team on global recommendations for Integrated Surveillance, and

2. To review, appraise and modify the country team proposals for Integrated Surveillance

Session Chair: Dr Shashi Kant, Professor and Head, CCM, AIIMS, Delhi
Session Co-chair: Dr Naresh Goel, DDG, NACO

Time	Title	Presenter
10:00-10:15	Recap	Ms Deepika Srivastava Joshi, CDC India
10:15-10:30	Incidence Assays and Analysis: Current Status	Dr Bharath Parikh, CDC Atlanta
10:30-10:55	Need for Integrated Surveillance: Global Perspective	Dr Jesus M Garcia Calleja, WHO Geneva
10:55-11:15	Proposed Technical Framework for Integrated Sentinel Surveillance in India	Dr Sheela Godbole, NARI Pune
11:15-11:45	**Tea**	
11:45-12:45	Panel Discussions on Integrated Surveillance for HIV, Syphilis and HCV	**Panellists:** Dr DCS Reddy, Independent Expert Dr Pradeep Kumar, NACO Dr Nicole Seguy, WHO India Dr Sunita Upadhyay, CDC India Dr Shivali Kamal, NACO Dr MK Saha, NICED Kolkata **Moderator:** Dr Sheela Godbole, NARI Pune
12:45-13:00	Summary and Way Forward	Dr Naresh Goel, Co-chair Dr Shashi Kant, Chair
13:00-14:00	**Lunch**	
14:00-14:30	Summary of Key Discussions	Dr Pradeep Kumar, NACO
14:30-15:00	Remarks	Dr DCS Reddy, Independent Expert Shri Alok Saxena, Jt Secretary, NACO Dr Pamela Ching, CDC India Dr Bilali Camara, UNAIDS India Dr Henk Bekedam, WHO India
15:00-15:20	Valedictory Address	Shri Sanjeeva Kumar, Additional Secretary & Director General, NACO
15:20-15:30	Vote of Thanks	Dr S Venkatesh, NACO
15:30-16:00	**High Tea**	

Annex 2: List of Participants

	Title	Name	Organization
1	Dr	A Elangovan	National Institute of Epidemiology - NIE
2	Ms	Abhina Aher	India HIV/AIDS Alliance
3	Mr	Abrahim Lincoln	NACO
4	Shri	Alok Kumar Verma	MoH&FW
5	Shri	Alok Saxena	Joint Secretary, NACO
6	Dr	Amitabh Adhikari	CDC Atlanta
7	Dr	Amitav Das	Odisha
8	Dr	Arvind Pandey	National Institute of Medical Statistics
9	Dr	Asha Hegde	NACO
10	Mr	Ashok Kumar Dogra	UNAIDS
11	Dr	Ashok Row Kavi	Humsafar Trust
12	Dr	BD Athani	Director General of Health Services, MoH&FW
13	Dr	Bharat Parekh	CDC Atlanta
14	Dr	Bhawani Singh	NACO
15	Dr	Bilali Camara	Country Director, UNAIDS
16	Dr	Bitra George	FHI360 India
17	Mr	Chirag Sidana	CHAI
18	Dr	DK Shukla	NIMS-ICMR
19	Dr	Damodar Sahu	National Institute of Medical Statistics - NIMS
20	Dr	DCS Reddy	Former HoD, Dept of PSM, IMS,BHU
21	Dr	Deepak Balasubramanian	NACO
22	Ms	Deepika Srivastava Joshi	CDC India
23	Mr	Dwijaraj Bhattacharya	CHAI
24	Mr	G S Shreenivas	FHI360 India
25	Dr	Govind Bansal	NACO
26	Mr	Haresh Patel	WHO
27	Dr	Heema Gogoi	NCDC
28	Dr	Jesus M García Calleja	WHO
29	Mr	Jiban Baishya	USAID India
30	Dr	K S Sachdeva	NACO
31	Dr	Keith Sabin	UNAIDS HQ
32	Ms	Kim Hauzel	NACO
33	Dr	MK Saha	National Institute of Cholera and Enteric Diseases - NICED
34	Dr	M Vishnu Vardhan Rao	NIMS
35	Dr	Manish Bamrotiya	NACO
36	Mr	Manish Kumar	Punjab TSU

37	Ms	Mariyam	NACO
38	Dr	Mark Berry	CDC HQ
39	Ms	Nalini Chandra	UNAIDS India
40	Dr	Nandini Kapoor Dhingra	UNAIDS
41	Dr	Naresh Goel	NACO
42	Dr	Nicole Seguy	WHO India
43	Mr	P Sujith	NACO
44	Dr	Partha Rakshit	NCDC
45	Ms	Pamela Ching	CDC India
46	Mr	Pankaj Choudhury	NETSU, Guwahati
47	Mr	Parthasarathy	FHI 360
48	Dr	Pradeep Kumar	NACO
49	Mr	Prakash Narwani	Rajasthan State AIDS Control Society
50	Dr	Preety Pathak	Uttar Pradesh State AIDS Control Society
51	Dr	PVM Lakshmi	Post Graduate Institute of Medical Education and Research - PGIMER
52	Mr	Rajat Shuvra Adhikary	WHO
53	Mr	Rajeenald Dhas	VHS
54	Dr	S Venkatesh	NACO
55	Dr	Sandhya Kabra	NCDC
56	Dr	Sanjay Rai	All India Institute of Medical Sciences - AIIMS
57	Ms	Sara Heydari	USAID India
58	Dr	Saravana Murty	FHI-360
59	Ms	Savina Ammassari	UNAIDS India
60	Dr	Shashi Kant	All India Institute of Medical Sciences - AIIMS
61	Dr	Sheela Godbole	National AIDS Research Institute - NARI
62	Ms	Sherry Yin	CDC, Atlanta
63	Dr	Shivali Kamal	NACO
64	Dr	Shrikala Acharya	Mumbai (DACS)
65	Ms	Sophia	FHI360
66	Mr	Sudhakar Joshi	Maharashtra TSU
67	Ms	Suman Singh	NACO
68	Dr	T Gambhir Singh	RIMS, Imphal
69	Mr	Taoufik Bakkali	UNAIDS RST
70	Mr	Tejus Mulik	NACO
71	Dr	Timothy Holtz	CDC India
72	Dr	Tobi Saidel	Partnership for Epidemic Analysis (PEMA)
73	Ms	Upma Sharma	CDC
74	Mr	Vimlesh Purohit	WHO India
75	Dr	Wiwat Peerapatanapokin	East-West Center, University of Hawaii

GLIMPSES OF DAY

GoI/NACO/SIMU-Surv/ExpConsult2018/011218

HIV Surveillance in India has been one of the oldest and most integral components of a robust epidemic monitoring in country. It was initiated as early as in 1985 by Indian Council of Medical Research (ICMR) and has been credited with discovery of first HIV case in 1986. Over the years, the system has evolved into one of the world's largest and most robust surveillance system in country.

In the light of the global developments in the form of END of AIDS and Fast Track targets, epidemiological considerations and programme need, National AIDS Control Organization, in collaboration with UNAIDS India, WHO India and CDC India, organized technical consultations on next generation of HIV surveillance and estimation activities in 2016 and 2018. While 2016 consultation provided the broad contour for next generation, the 2018 consultation detailed specific initiatives for augmenting the epidemic monitoring.

The report presents the objectives, methodology, recommendations and rationale for same from expert consultations on HIV surveillance and estimations in India. These reports further underline the outcome driven approach under the surveillance system of the national AIDS response. These reports will be of great help to all those who are working in the area of HIV epidemiology to understand why and how a disease surveillance system evolves and provide relevant evidences in the most efficient way to strengthen the decision support systems.

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