Thematic Meeting 1:

New data, tools, and methods for estimating HIV incidence patterns and trends

Report and Recommendations from the first thematic meeting held by the UNAIDS Reference Group on Estimates, Modelling and Projections

Atlanta, Georgia, USA, 30-31 May 2018

REPORT & RECOMMENDATIONS

UNAIDS
JOINT UNITED NATIONS PROGRAMME ON HIV/AIDS
UNHCR UNICEF WFP UNDP UNFPA UNODC ILO UNESCO WHO WORLD BANK

The meeting of the UNAIDS Reference Group on Estimates, Modelling and Projections was organised for UNAIDS by the Secretariat of the Reference Group (www.epidem.org), managed at Imperial College London and the University of Cape Town. Participants of the meeting are listed at the end of this document.

June 2018, Sabrina Lamour, UNAIDS Reference Group Secretariat, epidem@imperial.ac.uk

Abbreviations

AEM	AIDS Epidemic Model
AIDS	acquired immunodeficiency syndrome
ANC	antenatal care data
ANC-RT	routine antenatal care data
ANC-SS	antenatal care data from surveillance sites
ART	anti-retroviral therapy
ASM	Age- and Sex-specific Model (for HIV incidence)
CDC	(U.S.) Centers for Disease Control
CSAVR	Case Surveillance and Vital Registration tool
DHS	Demographic Health Survey
ECDC	European Centre for Disease Prevention and Control
EPP	Estimation and Projection Package
FRR	fertility rated more than once, otherwise remove]
GBD	Global Burden of Disease study (by IHME)
HIV	human immunodeficiency virus
IHME	Institute for Health Metrics and Evaluation
PEPFAR	(U.S.) President's Emergency Plan for AIDS Relief
PHIA	Population-based HIV Impact Assessment
PMTCT	prevention of mother-to-child transmission of HIV
TBC	to be confirmed
UNAIDS	Joint United Nations Programme on HIV/AIDS
VL	viral load
VMMC	voluntary medical male circumcision (for HIV prevention)
WHO	World Health Organization

Background

UNAIDS Reference Group

The Joint United Nations Programme on HIV/AIDS (UNAIDS) relies on impartial scientific advice from international experts in relevant subject areas to provide guidance on how to best calculate estimates and projections of the prevalence, incidence, and impact of HIV/AIDS globally. The UNAIDS Reference Group on Estimates, Modelling and Projections acts as an 'open cohort' of epidemiologists, demographers, statisticians, and public health experts to provide scientific guidance to UNAIDS and partner organisations on the development and use of the tools used by countries to generate annual national HIV estimates, which are the source for UNAIDS Global HIV epidemic estimates. The group is coordinated by a secretariat managed at Imperial College London and the University of Cape Town.

Work at UNAIDS Reference Group has been organised broadly into tracks:

- 'Technical update' work streams: These work streams are oriented to conducting research and providing technical feedback and guidance on specific updates for the suite of tools used for annual UNAIDS estimates, i.e. Spectrum, Estimation and Projection Package (EPP), Case Surveillance And Vital Registration tool (CSAVR), etc.
- 'Thematic' meetings: These meetings are focused on convening new research to catalyze innovation on specific aspects of HIV estimates that require substantial conceptual or methodological development

Meeting Objectives

A variety of mathematical models are routinely used for inferring HIV incidence patterns and trends, including those available in the UNAIDS supported Spectrum software (which include EPP, CSAVR, AEM, ECDC) and others developed and used for estimating HIV incidence in particular settings. The common challenge that unifies these models is to infer HIV incidence trends, an unobserved latent process, and particularly for recent incidence trends and projections that are less well-resolved by data, one that is heavily dependent on the differing model assumptions. Furthermore, the data sources used to infer incidence vary, typically related to the epidemic context. Common data sources include household surveys and surveillance of HIV prevalence in the general population, surveillance among key populations, HIV case reports, clinical indicators at HIV diagnosis, and AIDS or all-cause mortality. Increasingly more diverse mixes of data sources are available in a given epidemic setting, highlighting the need for integrated and harmonized models capable of simultaneously synthesizing data from many sources.

This meeting was organised to focus on opportunities for specific further developments and improvements of the tools supported by UNAIDS and partner organizations for the creation of national HIV estimates. The meeting also provided an opportunity for model developers to present an overview of each of their methods for incidence estimation, encourage collaborative discussions, to improve method development. The objectives of this meeting were to:

- Review and generate recommendations about the models, data, and assumptions for estimating recent HIV incidence trends in epidemic estimation tools, particularly for EPP and CSAVR
- Identify promising new data sources and approaches for characterizing HIV incidence trends and transmission patterns and develop suitable approaches to incorporate these into estimation tools

Outline

The UNAIDS Reference Group held its first Thematic meeting on "New data, tools, and methods for estimating HIV incidence patterns and trends" at the Georgia Tech Hotel and Conference Center in Atlanta, USA, on 30-31 May 2018. The meeting featured presentations combined with group discussion, to generate consensus recommendations. The programme was divided into the following sessions across two days:

1. Model structure and assumptions for recent HIV incidence trends in generalised epidemics
2. Interpretation of data sources for incidence estimation in generalised epidemics
3. Model structure and assumptions for recent HIV incidence trends using case surveillance and vital registration data
4. Incidence estimation using case surveillance and vital registration data: country case studies

This report presents a summary of the presentations and discussions of the meeting. Copies of the presentations are available for UNAIDS Reference Group members on the Reference Group website (for non-members, please contact the Secretariat). The final recommendations and action items can be found towards the end of this report.

Immediately following this incidence meeting, the UNAIDS Reference Group also held a meeting on 'Technical Updates and Method Development for the UNAIDS Estimates 2018' on the 1st June 2018 (in the same venue), to further discuss and plan the software implementations and updates for 2019 round of estimates. The meeting also reviewed feedback from UNAIDS 2018 estimates and discussed methodological improvements for the global 90-90-90 HIV care cascade estimates.

The recommendations drafted at the Reference Group meetings give UNAIDS guidance on how best to calculate estimates of the HIV epidemic in populations, provide an opportunity to review current approaches, as well as help to identify which data are needed to inform those estimates. Earlier reports are published on the UNAIDS Reference Group website (www.epidem.org), which include additional information on the different modelling tools described in this report. Such transparent processes aim to allow the statistics and reports published by UNAIDS and partners to be informed by impartial, scientific peer review.

The list of participants and meeting agenda are included in Appendix I and Appendix II, respectively.

Session 1: Model structure and assumptions for recent HIV incidence trends in generalised epidemics

UNAIDS compiles HIV epidemic estimates from multiple countries across the world, generated using Spectrum software, which uses a variety of mathematical modelling tools to estimate incidence trends. Incidence trends for countries with generalised HIV epidemics are largely based on data from population surveys and antenatal care (ANC) facilities, and are commonly modelled using the Estimation and Projection Package (EPP) in Spectrum. Further insights into a countries' process for generating national estimates and their successes, challenges, and developments were presented by Kennedy Mutai for Kenya. EPP currently offers a range of modelling curves to generate incidence trends (e.g. r-spline and r-trend) though there have been rising concerns that these models lack the flexibility to accurately represent incidence trend patterns from observed data in the most recent years. Jeffrey Eaton presented results for a developing model comprised of a logistic function for the earlier years of the epidemic, combined with a stochastic random walk for the most recent and projected years (logistic-RW), in comparison with current EPP curves, for all EPP data sets. Future plans for method development, a systematic review of model performance and a review of the empirical basis for model priors were discussed, prior to the planned 2019 implementation of the logistic-RW into EPP (see Key Recommendations section). Implementation schedules for EPP changes were subsequently agreed at the Reference Group meeting (on 'Technical Updates and Method Development for the UNAIDS Estimates', Atlanta, 1 June 2018).

Discussions followed about determining the most appropriate metrics for model comparisons (e.g. accuracy of model fit indicators such as MLE or AIC) and whether any criteria should be set as to determine when to recommend switching between EPP models. It was agreed that review and evaluation of model comparisons should be conducted within the Reference Group, rather than left for the model end user, and that these metrics were thus not required to be listed within the software.

Methodologies, model assumptions and results of other incidence models for generalised epidemics were also presented at the meeting, which included the Thembisa model for South Africa (presented by Leigh Johnson), the OPTIMA model (Robyn Stuart), and the Goals age-sex model (Robert Glaubius). The models differed in their approach to modelling the epidemiology and interventions, and discussions followed as to which aspects of their designs that could be integrated into Spectrum. The Reference Group agreed that on voluntary medical male circumcision (VMMC) should be included in Spectrum and that further investigation should be performed for the incorporation of other epidemiological, demographic and/or intervention data e.g. pre-exposure prophylaxis (PrEP), age at sexual debut, etc. A more elaborate approach to disaggregation of the effect of antiretroviral therapy (ART) coverage in Spectrum were also recommended, as well as explicit linkage between viral load (VL) suppression and incidence estimation.

Session 2: Interpretation of data sources for incidence estimation in generalised epidemics

In countries where real-time data from HIV case reports and surveillance systems are unavailable or insufficient, information on HIV prevalence and incidence trends in generalised epidemic settings can be collected large-scale population surveys, e.g. from demographic health surveys (DHS's) or more recently, from population HIV impact assessments (PHIA's), though such type of studies are usually only conducted every few years. Complementary to survey data, data collected from pregnant women attending antenatal clinics (i.e. ANC data) can act as useful proxies for ongoing monitoring the epidemic within the general population, and inform about mother-to-child transmission. Many of the challenges and approaches to handle ANC data were then elaborated, which included the impact of different demographic parameters that interact with ANC data, such as changes in fertility rates between HIV-positive and HIV-negative women (presented by John Stover) or population differences in age and sex composition between Spectrum and DHS (Jeff Eaton). Given the presented evidence, the Reference Group recommended that the updated fertility rate ratios (FRR's) should be implemented in Spectrum for generalised epidemics, yet that further exploration was required to determine fertility patterns for concentrated epidemics.

ANC data is also more subject to large heterogeneity in data quality: differences in data completeness and ANC coverage can influence estimates and have also been shown to be subject to antenatal biases which change over time; Mathieu Maheu-Giroux and Leigh Johnson presented current analyses able to accommodate for these effects, respectively. The Reference Group supported the continued development these approaches to better understand and improve the incorporation of ANC data in Spectrum.

An overview of current efforts by CDC/PEPFAR in HIV case surveillance in generalized epidemics was presented by Wolfgang Hladik and Andrea Kim, followed by their plans for the roll-out of their HIV rapid recency testing assays by Katie Curran, to enable the collection of real-time surveillance data. Plans for the validation and the evaluation of the recency testing algorithms (RITA) were discussed and the session encouraged communication between the modellers and surveillance planners on the types of data that are required for the estimation. The Reference Group encouraged the collection of CD4 cell count data, in addition viral suppression and recommended continual liaison between modellers and surveillance implementers on the new surveillance methods, to ensure appropriate and timely incorporation into HIV estimation tools. The Reference Group also agreed that the incorporation of case-based surveillance data for generalised epidemics would be a long-term objective for software implementation (2019+).

Multiple analyses on novel data sources to supplement current approaches were presented at the meeting that could be considered for future incorporation into Spectrum. Results using data on testing history (presented by Ian Fellows) to account for misdiagnoses and de-duplication of results proved encouraging, and further exploration of changes in average diagnoses time over time was suggested. The Reference Group also proposed that data on HIV testing history could be included as an additional indicator in current case surveillance efforts by PEPFAR to improve ability for HIV incidence estimation.

Current research by CDC (presented by Ray Shiraishi) investigating population level viraemia as an predictor of incidence were endorsed and the Reference Group encouraged the extension of age-specific incidence estimation presented by Eduard Grebe to other settings. Katie Risher showed that a model simulation study could demonstrate the variation in incidence approaches of different models within a set of fixed characteristics. She presented results for MicroCOSM, HIV synthesis and EMOD-HIV models, where disparities between estimates were largely driven by differences in model assumptions. The usefulness of model was appreciated by the group, and it was agreed that simulations would provide an important avenue when contrasting and evaluating incidence models and their use-cases.

Sessions 3 & 4: Models and Data Sources for Incidence Estimation for Settings using Case Surveillance and Vital Registration Data

A variety of incidence tools are available to countries that predominantly use case reporting and/or vital registration data to report their national HIV estimates, which include the Case surveillance and vital registration tool (CSAVR) and the incidence tool developed by the European Centre for Disease Control (ECDC). The methodology and use for both of these models were presented at the meeting by Kim Marsh/Guy Mahiane and Chantal Quinten, respectively. Ongoing collaboration and further workshops with countries was encouraged to improve communication between modellers (e.g. in ECDC), UNAIDS and country teams, to better understand countries' model preferences for their HIV estimates, and to improve synchronisation between countries.

Ian Fellows presented a review of the model assumptions between different models that use CD4 depletion (including Spectrum, ECDC, US CDC and USNW models), where despite the discrepancies in parameter values (particularly those diagnoses rates and time to diagnoses), there was little difference in their incidence estimates, though great variation in their number of people undiagnosed.

Austin Carter from IHME presented their approach in using vital registration data for the Global Burden of Disease (GBD) study and demonstrated comparisons between GBD, Spectrum, ECDC and US CDC model. Furthermore, discrepancies in the allocation of the cause of death when using vital registration data, which may result in misclassifications of HIV- and AIDS-related deaths with other disorders, posed another concern

for the group. It was agreed that this issue would be addressed in more detail at the next Reference Group meeting (September 2018), in consultation with IHME.

In the last session of the meeting, experiences for incidence estimation from a variety of countries with case reports were presented, namely from Canada (Ping Yan), USA (Rick Song), Netherlands (Ard van Sighem), Australia (Richard Gray), France (Virgine Supevie) and the UK (Daniela de Angelis). Each of the models presented their assumptions and methodologies, highlighting the prominent differences in disease progression parameters between the models which may be further explored in model simulation studies. Migration and under-reporting/reporting delays were also major concerns for multiple countries, some of which have developed statistical methods to account for the latter (e.g. ECDC delay reporting accuracy tool). The ongoing development and use of tools for data cleaning prior to input into Spectrum was encouraged. The meeting ended with the group agreeing on a design specification for future incidence tool to improve current incidence estimation, with guidance on specific action items listed in the Key Recommendations section.

Key Recommendations (version 26-June-2018)

Recommendation/Action Item	Lead Person(s)	Proposed timeline
Session 1: Model structure and assumptions for recent HIV incidence trends in generalised epidemics Objectives: • Review current modelling approaches for recent incidence trends in generalised epidemic settings • Reach recommendations for model structures and assumptions for incidence estimation in EPP/Spectrum for generalised epidemics		
Estimation and Projection Package (EPP) Developments Incidence curve r(t) fitting: • Recommend implementation of the logistic-random walk model (logistic-RW) into EPP/Spectrum for 2019 round of UNAIDS estimates, subject to review of results, following further development and testing	East-West Center, Avenir Health, Jeff Eaton	Nov 2018
• Further development of logistic/RW specification and transition: ○ Exploring mixture and/or flexibility on timing between logistic function to random walk ○ Modelling increasing RW variance for transition ○ Linking parameters of the logistic curve to HIV prevalence	Jeff Eaton, Le Bao, Daniela De Angelis, East-West Center	Aug 2018
• Systematically review performance of logistic-RW model and compare to alternative model specifications and other current EPP models, to be reviewed by the Reference Group. ○ Comparisons should include a variety of epidemiological patterns, data availability profiles, with an emphasis on fitting recent incidence trends. Further information in meeting report for 'Technical Updates and Method Development for the UNAIDS Estimates', Atlanta, 1 June 2018	Reference Group, TBC*	Aug-Sept 2018
• Review and improve the empirical basis for model priors (e.g. starting and equilibrium value for r(t), hyper parameters for sigma, etc.)	Jeff Eaton	Aug 2018
• Consider suggestions for a better name for the logistic/RW model	All	Sept 2018
Age-specific prevalence data: • Incorporate age-specific HIV prevalence data in EPP inference and estimation of age-specific HIV incidence rate ratios in EPP	Jeff Eaton, East-West Center	Sept 2018
Mechanistic assumptions in models ART Coverage and transmission: • Propose an elaboration of assumptions about effect of ART coverage on reducing HIV transmission to capture transmission patterns by age, sex, and CD4 stage of infection ○ Elucidate the influence of assumptions about the effects of ART on transmission by comparing estimates assuming no transmission reduction versus current 70% reduction	Jeff Eaton, Leigh Johnson, Rob Glaubius, Robyn Stuart; Reference Group	Aug 2018

• Propose assumptions for modelling effects of VMMC on recent HIV incidence trends	Jeff Eaton	June 2018
<u>Viral Load (VL) suppression in Spectrum:</u> • As Spectrum/EPP are developed to estimate the viral load suppression 90-90-90 indicator, these estimates should be considered to be mechanistically related to HIV incidence estimates and projections in EPP	Avenir Health, Jeff Eaton, Leigh Johnson	Aug 2018
<u>Incorporation of additional epidemiological, demographic and/or intervention data:</u> Further investigation should consider ability for additional auxiliary data and mechanisms to improve estimates of HIV incidence patterns and trends, including: • PrEP (Pre-exposure Prophylaxis) • Age at sexual debut and age patterns of sexual activity	TBC	2019
Session 2: Interpretation of data sources for incidence estimation in generalised epidemics Objectives: • Review interpretation of current data sources for generalised epidemic settings • Plan for incorporation of novel data sources for incidence estimation in generalised epidemic settings		
Interpretation of Antenatal Care (ANC) Data		
• Update Spectrum default parameters for fertility rate ratio (FRR) by age, CD4 category and ART status for generalized epidemic settings in the next software version. Further considerations for implementation: ○ Application to subnational EPP and Spectrum files. ○ Comparison and validation with ANC-RT prevalence, ANC-RT ART coverage, PMTCT coverage, historical trends in child infections	Avenir Health, Secretariat, CDC, LSHTM	Aug 2018
• Further investigation to determine fertility patterns amongst HIV-positive and HIV-negative women in concentrated epidemics to determine need for PMTCT	TBC*	2019
○ Replicate survey-based FRR analysis in non-SSA countries with surveys including HIV testing (India, SE Asia, Caribbean)	Jeff Eaton	2019
• Assess implications for HIV incidence estimates of adjusted ANC-RT prevalence trends adjusted for coverage and completeness biases.	Mathieu Maheu-Giroux	Ongoing
• Continue multi-country analysis of model for adjustment for ANC-RT coverage and completeness	Mathieu Maheu-Giroux	Ongoing
• Consider implications for other epidemic settings of MicroCOSM model simulation of changes in ANC biases in South Africa	Leigh Johnson	Ongoing

Interpretation and inference from novel surveillance data and approaches Collaboration with surveillance implementers: The Reference Group actively encourages ongoing liaison between modellers and surveillance implementers on new surveillance methods to ensure appropriate and timely incorporation into HIV estimation tools. • Request for feedback on ancillary data items to collect with case-based surveillance and routine incidence surveillance in sub-Saharan Africa to maximize use of these platforms • Guidance on relative influence and importance of available data sources for estimation tools to guide future surveillance priorities and portfolios Interpretation of surveillance data: • Identify opportunities to characterize and cross-validate interpretation of data obtained using new surveillance strategies in settings with well characterized HIV incidence estimates (e.g. cohort studies, trial sites) • Pursue further development of approaches utilizing testing history, routine data, prior ART uptake to improve precision of incidence estimates by location and population groups for inclusion to HIV estimate tools • Develop an approach to incorporate HIV incidence data from population surveys into subnational EPP estimation • Curate a repository of simulated HIV epidemic datasets for testing and validation of new models and data sources across epidemic settings and estimation tools	Reference Group, CDC, PEPFAR TBC* Reference Group, TBC* Reference Group, TBC* CDC, Secretariat Reference Group	Ongoing Ongoing Ongoing Ongoing Sept 2018 2019
Sessions 3 & 4: Incidence estimation using case surveillance and vital registration data Objectives: • Review modelling approaches and assumptions for estimating incidence trends from case-surveillance and vital registration data • Understand data, assumptions and model structures underpinning recent incidence trends for bespoke country estimations models and compare results with Spectrum • Reach recommendations for data interpretation and model development in Spectrum for case-surveillance settings • Identify lessons and directions for expanding use of case surveillance and data to additional settings including SSA		
Desired incidence tool specification: The Reference Group recommends further development of estimation tools for use in settings with complex data availability and not well served by currently available tools. Such tools should include have the following characteristics: • Ability to handle limited, missing, and truncated data • Flexibility to use HIV diagnoses and/or mortality data • Capable of using CD4 data where available, but not essential • Capable of using AIDS cases where available • Ability to incorporate data on recent infection (primary HIV / assay), where available • Ability to incorporate surveillance prevalence data where available (e.g. key population survey used in EPP estimation)	Reference Group	Ongoing

• Indicators to be stratified by population risk group and be able to use age/sex stratified data, where possible • Thoughtful approach modelling HIV incidence trends at the end of the data period and for short-term epidemic projections • Handle international immigration and emigration • Assessment, evaluation and adjustments to account for misreporting, duplicate reporting, etc. may continue to occur outside of estimation model, as current practice with existing country estimation tools		
<u>Specific recommendations to guide further development:</u> • Compare existing approaches modelling time to diagnosis in a common framework (incidence trends, disease progression) and data sets • Review implications of and sensitivity to alternative models and parameterization for HIV disease progression for estimation of recent HIV incidence trends • Evaluate implications for recent HIV incidence trends and projections of modelling HIV transmission rate (*cf.* EPP) versus direct modelling of HIV incidence rate • Evaluate estimation methods for case surveillance data on simulated datasets • Establish a working group to propose modelling approaches for addressing international migration in estimation models	TBC* TBC* Josh D'Aeth (Imperial), Guy Mahiane Guy Mahiane UNAIDS, ECDC, Virginie Supervie, Richard Gray	Ongoing Ongoing 2018 2018 Ongoing

Appendix I: List of Participants

	Name	Affiliation
1	Robert Glaubius	Avenir Health, Glastonbury, CT, USA
2	Guy Mahiane	Avenir Health, Glastonbury, CT, USA
3	John Stover	Avenir Health, Glastonbury, CT, USA
4	Geoff Garnett	BMGF, Seattle, WA, USA
5	Michelle Morrison	BMGF, Seattle, WA, USA
6	Kathryn Curran	CDC, Atlanta, GA, USA
7	Irene Hall	CDC, Atlanta, GA, USA
8	Wolfgang Hladik	CDC, Atlanta, GA, USA
9	Andrea Kim	CDC, Atlanta, GA, USA
10	Anna Johnson*	CDC, Atlanta, GA, USA
11	Laura Porter	CDC, Atlanta, GA, USA
12	Ray Shiraishi	CDC, Atlanta, GA, USA
13	Ruiguang (Rick) Song	CDC, Atlanta, GA, USA
14	Peter Young*	CDC, Nairobi, Kenya
15	Tim Brown	East-West Center, Honolulu, HI, USA
16	Chantal Quinten	ECDC, Solna, Sweden
17	Ian Fellows	FellStat, San Diego, CA, USA
18	Jeff Eaton	Imperial College London, London, UK
19	Sabrina Lamour	Imperial College London, London, UK
20	Tara Mangal	Imperial College London, London, UK
21	Virginie Supervie	Inserm, Paris, France
22	Kate Grabowski	Johns Hopkins University, Baltimore, MD, USA
23	Kathryn Risher	LSHTM, London, UK
24	Mathieu Maheu-Giroux	McGill University, Toronto, Canada
25	Daniela de Angelis	MRC Biostatistics / PHE, Cambridge, UK
26	Joshua Gitonga*	NACC, Nairobi, Kenya
27	Kennedy Mutai	NACC, Nairobi, Kenya
28	Irum Zaidi	OGAC, Washington DC, USA
29	Robyn Stuart	Optima, Copenhagen, Denmark
30	Le Bao	Penn State College, State College, PA, USA
31	Ben Sheng	Penn State College, State College, PA, USA
32	Ping Yan	PHAC, Ottowa, Canada
33	Josh Salomon	Stanford University, Stanford, CA, USA
34	Ed Grebe	Stellenbosch University /SACEMA, Stellenbosch, South Africa
35	Alex Welte	Stellenbosch University /SACEMA, Stellenbosch, South Africa
36	Ard van Sighem	Stichting HIV Monitoring, Amsterdam, The Netherlands
37	Peter Ghys	UNAIDS, Geneva, Switzerland
38	Mary Mahy	UNAIDS, Geneva, Switzerland
39	Kim Marsh	UNAIDS, Geneva, Switzerland
40	Keith Sabin	UNAIDS, Geneva, Switzerland
41	Leigh Johnson	University of Cape Town, South Africa
42	Austin Carter	University of Washington/IHME, Seattle, WA, USA
43	Richard Gray	UNSW Kirby Institute, Kensington, Australia
44	Michel Beusenberg	WHO, Geneva, Switzerland
45	Jesus Maria (Txema) Garcia-Calleja	WHO, Geneva, Switzerland

* Remote participants

Appendix II: Agenda

UNAIDS Reference Group on Estimates, Modelling and Projections

Thematic Meeting 1: New data, tools, and methods for estimating HIV incidence patterns and trends

30-31 May 2018, Georgia Tech Hotel, Atlanta, USA

AGENDA

Day 1, Wednesday 30th May 2018

Time	Duration (mins)	Topic	Presenter(s)/ Lead Discussant
09:00	30	Meeting opening • Welcome and introductions • Overview of UNAIDS estimates • Meeting objectives and overview	 Peter Ghys Mary Mahy Jeff Eaton
Session 1: Model structure and assumptions for recent HIV incidence trends in generalised epidemics (chaired by Josh Salomon) Objectives • Review current modelling approaches for recent incidence trends in generalised epidemic settings • Reach recommendations for model structures and assumptions for incidence estimation in EPP/Spectrum for generalised epidemics			
09:30	25	Estimates in context: Experience from Kenya	Kennedy Mutai
09:55	50	Current EPP and developments • Assumptions of current EPP models • Perceived limitations of current models • Model for transmission rate • Age-specific data • Model comparison • Discussion	Jeff Eaton All
10:45	30	Coffee break	
11:15	45	Assumptions for recent HIV incidence trends from other models for generalized epidemics • Thembisa model • Optima model • Goals Age-sex model • Discussion	 Leigh Johnson Robyn Stuart Rob Glaubius All
12:00	30	Discussion and recommendations: • EPP model for 2019 estimates, including functional forms for transmission rate • Mechanistic assumptions about transmission dynamics and interventions in incidence estimates	Josh Salomon, All
12:30	60	Lunch break	
13:30	30	Discussion and summary of Session 1 recommendations	Josh Salomon, All
Session 2: Interpretation of data sources for incidence estimation in generalised epidemics (chaired by Mary Mahy) Objectives • Review interpretation of current data sources for generalised epidemic settings • Plan for incorporation of novel data sources for incidence estimation in generalised epidemic settings			
14:00	80	Using ANC data for assessing incidence trends • Current Spectrum/EPP assumptions about fertility, HIV & ART • Parameter estimates from DHS surveys	 John Stover

		• Modelling changing antenatal biases over time • Adjusting for routine data quality and completeness • Discussion & recommendations	Jeff Eaton Leigh Johnson Mathieu Maheu-Giroux Mary Mahy, All
15:20	30	Coffee break	
15:50	115	Novel data sources and analytical approaches for generalised epidemics • Overview of surveillance outlook • CDC/PEPFAR incidence surveillance platforms • Recent testing history • Age-specific incidence • Correlates of incidence • Model simulation of novel surveillance approaches • Discussion: key evidence gaps and analytical developments	Andrea Kim/Wolfgang Hladik Katie Curran Ian Fellows Eduard Grebe Ray Shiraishi Katie Risher All
17:45	15	Day 1 wrap-up	Jeff Eaton
18:00	–	Meeting Close	

Day 2, Thursday 31st May 2018

Time	**Duration (mins)**	**Topic**	**Presenter(s)/ Lead Discussant**
Session 3: Model structure and assumptions for recent HIV incidence trends using case surveillance and vital registration data (chaired by Geoff Garnett) Objectives • Review modelling approaches and assumptions for estimating incidence trends from case-surveillance and vital registration data			
09:00	10	Introduction to Day 2	Jeff Eaton
09:10	80	Models for case surveillance settings • Overview of current tools in Spectrum and current usage • CSAVR model • ECDC model	Kim Marsh Guy Mahiane Chantal Quinten
10:30	30	Coffee break	
11:00	40	Models for case surveillance settings (cont'd) • Review and synthesis of incidence estimation models • GBD model for case-surveillance settings	Ian Fellows Austin Carter
Session 4: Incidence estimation using case surveillance and vital registration data: country case studies (chaired by Geoff Garnett / Leigh Johnson) Objectives • Understand data, assumptions and model structures underpinning recent incidence trends for bespoke country estimations models and compare results with Spectrum • Reach recommendations for data interpretation and model development in Spectrum for case-surveillance settings • Identify lessons and directions for expanding use of case surveillance and data to additional settings including SSA			
11:40	15	Overview and summary comparison: CSAVR, GBD, and bespoke country models	Austin Carter
11:55	35	Country case studies for incidence estimation • Canada	Ping Yan, All

12:30	60	Lunch break	
13:30	120	Country case studies for incidence estimation (cont'd) • USA • Netherlands • Australia • France	Rick Song / Irene Hall, All Ard van Sighem, All Richard Gray, All Virginie Supervie, All
15:30	30	Coffee break	
16:00	30	Country case studies for incidence estimation (cont'd) • UK	Daniela de Angelis, All
16:30	60	Discussion: • Recommendations arising from bespoke models for enhancing UNAIDS supported tools • Confidence in recent incidence trends in case surveillance settings • Should models incorporate mechanistic representation of transmission dynamics or intervention impacts? • Opportunities to harmonize models, assumptions, inference approaches across settings	Leigh Johnson, All
17:30	15	Final recommendations and meeting wrap-up	Jeff Eaton
17:45	–	Meeting close	