
Strengthening HIV Estimates: EPP/Spectrum 2015

Report and recommendations from a meeting of the
UNAIDS Reference Group on Estimates, Modelling and Projections
Geneva, Switzerland, 27-29 October 2014

REPORT & RECOMMENDATIONS



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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) based at Imperial College London. Participants of the meeting are listed at the end of this document.

Kelsey Case, December 2014

Introduction

The Joint United Nations Programme on HIV/AIDS (UNAIDS) *Reference Group on Estimates, Modelling and Projections* exists to provide impartial scientific advice to UNAIDS and other partner organisations on global estimates and projections of the prevalence, incidence and impact of HIV/AIDS. The Reference Group acts as an 'open cohort' of epidemiologists, demographers, statisticians, and public health experts. It is able to provide timely advice and also address ongoing concerns through both *ad hoc* and regular meetings. The group is co-ordinated by a secretariat based in the Department of Infectious Disease Epidemiology at Imperial College London.

Aim of the meeting

To review and discuss new analyses, new data available, new approaches and considerations for generating estimates of HIV in order to better inform and improve the tools currently recommended by UNAIDS; and to review and discuss the development of new methods and approaches.

Approach

The meeting featured presentations combined with group discussion to generate consensus recommendations. The list of participants is included in Appendix I and the meeting agenda is included in Appendix II.

The recommendations drafted at Reference Group meetings give UNAIDS guidance on how best to produce estimates of HIV/AIDS, provides an opportunity to review current approaches and also helps to identify information needs (earlier reports are published on the Reference Group website www.epidem.org). This transparent process aims to allow the statistics and reports published by UNAIDS and WHO to be informed by impartial, scientific peer review.

Report and Recommendations

I. Strengthening child HIV estimates

The parameters in Spectrum for HIV-related child mortality are based on the limited data available which are a fairly simplistic representation. Child mortality in the absence of ART is defined by survival curves with differential survival by timing of infection and age¹. These survival curves were calculated from pooled data from children up to 2.5 years of age and then extrapolations were made beyond this period under the assumption that children would have the same survival as those infected with HIV as young adults. For child mortality on ART, simple assumptions are made for survival in the first year on treatment (85%) and for all subsequent years (93%), with additional reductions for cotrimoxazole prophylaxis, defined in 2008². Different streams of work are underway to update this representation including the implementation of a child CD4 model in the Spectrum, updated survival curves in the absence of ART and updated assumptions for mortality on ART from leDEA data. In addition, estimates of all-cause child mortality from Spectrum were compared with demographic surveillance data and estimates from the Global Burden of Disease (GBD) study.

Implementing a CD4 model for children

A CD4 model can be implemented in the AIDS Impact Model (AIM) in Spectrum for children in similar fashion to the adult CD4 model but will require substantial amount of data to parameterise for children including:

- Progression and mortality by CD4 in the absence of ART
- Progression and mortality by CD4 on ART
- Distribution of ART by CD4
- Effect of cotrimoxazole by CD4

Milly Marston is conducting an updated review of survival in the absence of ART to inform revised survival curves by timing of infection, and the leDEA Consortium will have updated data for mortality on ART by CD4 in early 2015, and by age in late 2014, to inform parameterisation.

Short-term recommendations:

- ✓ **Wait to implement the child CD4 model to allow the model structure to be informed by the leDEA data. Do structure child mortality on ART by age using leDEA available in December.** *Follow-up: John Stover, leDEA consortium*
- ✓ **Explore inclusion of EID for diagnosis rate.** *Follow-up: John Stover*
- ✓ **Contact leDEA regarding data on cotrimoxazole use by age and CD4.** *Follow-up: Mary Mahy*
- ✓ **Additional analysis to inform updated child survival curves in the absence of ART: compare prevalence in women and prevalence in young adults (particularly males) 15 years later to identify if survival distributions are consistent with the data available.** *Follow-up: Milly Marston*

Long-term recommendations:

- ✓ **Consider joint estimation of paediatric CD4 progression and mortality.** *Follow-up: Imperial, Futures Institute, 2015*

All-cause mortality in children and adolescents

Milly Marston presented age-specific all-cause mortality data from Demographic Surveillance Sites (DSS) compared to Spectrum, focusing on children and adolescents. Key findings include:

- Southern Africa: Spectrum and DSS trends are divergent from 2005
- Eastern Africa: Spectrum has overall higher than expected deaths compared DSS
- Western Africa: Closer alignment between Spectrum and DSS but still some variation

Haidong Wang presented discrepancies in all-cause mortality from GBD compared to Spectrum also focusing on children and adolescents and found that Spectrum estimates were consistently higher (mean ratio 1.8x higher but variable) with the largest relative difference observed among ages 5-14.

Recommendations:

- ✓ **Compare all-cause mortality from ALPHA with UNPOP to try to disentangle differences observed compared to Spectrum (i.e. is the HIV mortality accounting for the differences); compare Spectrum estimates of prevalence at the national level to site level. *Follow-up: Milly Marston (John Stover to provide national HIV estimates).***
- ✓ **Compare age-specific all-cause mortality rates from GBD with ALPHA. *Follow-up: Milly Marston, Haidong Wang***
- ✓ **Follow-up with IHME regarding WPP2012 vs Spectrum (JS comparison did not find discrepancies).*Follow-up: John Stover, Haidong Wang***
- ✓ **Use complete life tables for HIV- from ALPHA as counterfactual for comparison with IHME life tables (also consider INDEPTH Network). *Follow-up: Basia Zaba, Haidong Wang***

II. Strengthening adult HIV estimates

Ongoing model development work in progress throughout 2014 include the joint estimation of CD4 progression and survival using pooled data from cohorts of seroconverters, new approaches to more appropriately represent uncertainty in Spectrum, and model validation.

Joint estimation of CD4 progression and survival

The aim of this work, led by Tara Mangal, is to jointly estimate progression of CD4 decline and survival by age, gender and region in order to inform revised parameters in Spectrum. Two models have been developed – a Hidden Markov model (HMM) and a spline model. This work is ongoing, two key limitations to address include the initial state probabilities (currently no effect of age/gender/region) and the CD4 bin structures which are different from those implemented in Spectrum. The CD4 bins in Spectrum were implemented in differing sizes in response to treatment initiation criteria and changes over time. Changing this structure in Spectrum would require re-analysis of the IeDEA data for mortality on ART (analysed for the specific CD4 bins). It would also render previous projection files invalid. For the spline model, the CD4 bin structure can be modified, but it is less clear for the HMM.

Preliminary results suggest there are broad similarities across the North American/Europe cohorts and the African cohorts; however, the progression parameters from the Asian cohorts are quite different with a more rapid decline observed.

Recommendations:

- ✓ **This work is ongoing, review early 2015.**
- ✓ **For implementation - use descriptive terminology for the three regional patterns to appropriately reflect the country data used for estimation.**

Appropriately capturing uncertainty in Spectrum

The joint estimation of CD4 progression and survival will allow for a more appropriate representation of uncertainty. In the interim, an alternative solution is needed. Futures Institute tested the use of the variances on mortality from the IHME GBD work, in order to artificially widen the bounds, but it was agreed that data-generated uncertainty is preferable to artificially widening the ranges.

Recommendations:

- ✓ **As an interim solution, take the simulated draws from IHME (mortality on ART and in the absence of ART) for data generated uncertainty as opposed to artificially widening ranges on mortality in the uncertainty analysis.** *Follow-up: Haidong Wang & John Stover, implementation end 2014*
- ✓ **Mortality on ART (longer-term): Contact leDEA to identify if they can provide ranges for the updated parameters for mortality on ART.** *Follow-up: Mary Mahy, Dec 2014*

Adding disengagement from treatment in Spectrum

Countries currently input cumulative numbers of people on ART for each year. There are no annual rates of disengagement; however, those lost-to-follow-up (LTFU) who go on to die are captured in the mortality rates which are informed by leDEA Consortium data (adjusted for mortality in those LTFU). It is well documented that there are a range of other outcomes for those lost to follow-up including transfer of care/re-initiation and disengagement from care (but still alive). Treatment outcomes are widely variable, vary by programme, and are generally difficult to ascertain.

Disengagement from care can be implemented in Spectrum but there is concern with how countries will interpret and input disengagement and the effect of over-estimation on mortality. Adding an annual rate of disengagement results in more new ART initiates (to maintain the same level of ART coverage) but new initiates are subject to the high mortality during the first 6 months on ART which has the overall effect of increasing mortality. From country data, there does seem to be a decrease in retention in care over time but it is believed this is likely due to silent transfer increasing over time as access to ART has expanded.

The current implementation of mortality on ART is linked with CD4 at initiation. Implementing a complex CD4 model structure for disengagement (and corresponding CD4 decline) would require an overhaul of this model structure. It would also require data for CD4 with disengagement.

Recommendations:

- ✓ **For the immediate term, add disengagement as a single drop-out rate and add a validation screen for new initiates. Concomitantly, start data gathering exercise for adding more complexity including:**
 - **New initiates and re-initiates**
 - **CD4 restitution on ART**
 - **CD4 with treatment disengagement**
 - **Viral load data***Follow-up: Futures Institute to implement, review early Dec 2014*
- ✓ **Strong guidance for countries regarding the drop-out rate – caution regarding over-estimation, want disengaged and alive as opposed to LTFU, transfers, mortality (i.e. low estimate), which should be informed by research data.** *Follow-up: Futures Institute & UNAIDS to incorporate in guidance documents*
- ✓ **For the longer term, build in additional complexity based on the data available.**
- ✓ **Contact leDEA member working closely with the datasets to identify full range of data available.** *Follow-up: UNAIDS*

Spectrum validation

Romain Silhol from Imperial is using general population (including child) cohort data from Manicaland, Zimbabwe to conduct an empirical validation of Spectrum. This work is ongoing.

Recommendations:

- ✓ **All-cause mortality (overall) discrepancy at younger ages: Review all-cause mortality in comparison with Manicaland.**

III. Issues surrounding use of ANC data to represent population-level trends

There have been ongoing discussions and review of available data regarding the representativeness of ANC data at the general population level. A recent manuscript from Jeff Eaton describes this issue in more detail³ which has important implications for the use of these data to inform estimates of trends in the general population. As coverage of ART is scaled-up to high levels, it is also important to consider differences in treatment coverage in ANC compared to the general population which will also have implications for generating estimates.

ART coverage in ANC compared to the general population

ART coverage in the general population is used to calculate the effect on incidence (incidence reduction) but EPP fits to both ANC and household survey data. Coverage of ART in pregnant women (prior to pregnancy) is likely not reflective of coverage in the general population as HIV+ women captured in ANC are likely to be younger, healthier (i.e. able to get pregnant) and may not realise they are infected. Data entered by countries for the proportion of pregnant women on ART before their current pregnancy (supported by evidence from Manicaland, Zimbabwe) indicate ART coverage in ANC may be much lower than coverage in the general population. It was also discussed that it is the coverage of ART in the male partners of women attending ANC that is key to informing this parameter.

Over-estimating ART coverage in ANC will over-estimate the ART effect and can over-estimate incidence declines. One potential solution is to separate out the ART effect for ANC and household surveys and to fit separately (two runs for a given r , one for ANC data using ART coverage prior to pregnancy, one for survey data using national ART coverage). However, this process will double the fitting time and creates data challenges for the historical period and for countries without data for ART coverage in pregnant women prior to pregnancy.

Currently, the ART reduction parameter is a fixed parameter but it can also be fitted as a free parameter. Results from investigation of treating this as a free parameter using an informative prior (70% reduction, standard deviation 15%, normal distribution) were quite variable. It was discussed that reviewing the posterior mean and whether it hovers around a certain value in most countries will give confidence that this parameter can be estimated, but if the mean is highly variable it is an indication it cannot be well estimated as a free parameter.

Apportionment of ART is another issue which occurs ad hoc in EPP and may be under/over apportioned in the sub-populations (i.e. urban/rural). More detailed treatment data are needed to better inform this apportionment and will also be important in the future for sub-national estimates.

Issues surrounding use of ANC trends to represent trends in the general population

In generalised epidemics, ANC surveillance is the key data source used to estimate HIV epidemic trends in the general population. As epidemics age and the burden of prevalence shifts to older ages, where women are less likely to be represented in ANC, trends in ANC data may become less

representative of the general population and may overstate declines in prevalence. In order to correct for biases, both age-specific fertility patterns and HIV-related sub-fertility need to be accounted for. However, the effect of ART on fertility (and over time) is still unclear. In December, the ALPHA network will review cohort data for fertility by duration of infection. There are some data to suggest there is fertility “rebound” in HIV+ women on ART. As ART access expands and women commence lifelong treatment earlier (option B+), it is possible that ART may also prevent some HIV-related sub-fertility.

Age-structured models (under development) can address these issues, but an alternative approach is needed for the immediate term. There are several potential approaches that were discussed with recommendations for methods to test and review.

It was discussed that a first step is to learn from current differences between pregnant women and the general population assumed in Spectrum. Spectrum internally calculates prevalence among pregnant women (which does illustrate a high peak and rapid decline). Information from the 2013 Spectrum files can be extracted to calculate adjustments to ANC. Prevalence and incidence are taken from EPP and distributed sex and age in AIM. Separately, there are schedules of age-specific fertility which inform the age-distribution of pregnant women and then there is the age-specific fertility adjustment for HIV-infected women. All of these processes are captured in Spectrum (and not based on what is directly observed in surveys).

Recommendations for data collection:

- ✓ **Collect age-structured ANC data.** *Follow-up: UNAIDS to advocate for this data collection*
- ✓ **Collect more detailed ANC data including whether already on ART prior to pregnancy. Consider also collecting information regarding residence of women attending ANC.** *Follow-up: UNAIDS to advocate for this data collection*
- ✓ **Collect more detailed ART data (urban/rural, sub-national, key populations, age and sex) to allow for improved ART apportionment and to inform estimates at the sub-national level.** *Follow-up: UNAIDS to advocate for this data collection*

Short-term recommendations for methods:

- ✓ **Test Tim Brown method:** Separately model pregnant women (prevalence and ART coverage) and the general population (prevalence and ART coverage). Then, further investigate fitting the ART reduction parameter (use an informative prior centred at 80% reduction, check that priors and posteriors on this parameter are the same) or maintaining as a fixed parameter but with modified fixed values. *Follow-up : Tim Brown, review progress Dec 2014*
- ✓ **Test John Stover method:** Non-mechanistic approach passing prevalence to Spectrum and making all adjustments here - multiply time dependent factors (year by year) by ANC data. *Follow-up : John Stover, review progress Dec 2014*
 - *Does not require modifications to EPP*
 - *Investigate this approach in countries where ANC data appear to be pulling down overall estimates*
- ✓ **Test Jeff Eaton method:** In EPP fitting, relate ANC data to re-weighted prevalence according to sub-fertility estimates by CD4/ART (essentially, multipliers on ANC by CD4 over time). *Follow-up : Jeff Eaton, review progress Dec 2014*
 - *Investigate in more detail using data from ALPHA (including the extent to which low coverage of ART among pregnant women may be due to CD4 cell count)*
 - *Investigate this approach in countries where ANC data appear to be pulling down overall estimates*
 - *Compare model predictions to data from pregnant women*
 - *Will the multipliers differ for on ART vs not on ART?*

- Use ranges around multiplier for uncertainty
- Metrics for comparison include goodness of fit and the “slicing” through two households surveys

Long-term recommendations for methods:

- ✓ **Age-structured models for generalised epidemics.** *Follow-up : Le Bao, Sam Clark, Jeff Eaton, review progress April 2015, implementation Nov 2015*
- ✓ **Use of case-report data and mortality data for concentrated epidemics.** *Review progress April 2015, implementation Nov 2015*
- ✓ **Spatial analyses at finer geographic levels.** *Review progress April 2015*

Switching from surveillance in ANC to PMTCT

Many countries are currently planning to switch from HIV surveillance in ANC to surveillance in PMTCT. The US Centres for Disease Control and Protection and partners are working to develop guidance for this switch. Moving from surveillance in ANC to PMTCT will have implications for generating HIV estimates, particularly in generalised epidemic countries.

Recommendations for countries moving from ANC surveillance to PMTCT:

- ✓ **Overlap in PMTCT/ANC sites is needed to inform trends in prevalence over time with the number required related to level of detail countries want – sub-national estimates will require multiple overlapping sites at the lower levels of interest.**
- ✓ **Continue to test at the national and sub-national level.**

IV. Strengthening HIV estimates in concentrated epidemics

There are many ongoing streams of work to improve HIV estimates in concentrated epidemics; these include the development of new methods and approaches for generating estimates and the further refinement of those methods currently available.

Improving estimates in Latin America

Countries with strong data collection and surveillance systems want to base estimates around these more robust data. In Latin America, many countries would prefer to have data from vital registration and case-reports inform estimates of HIV and related indicators. For longer-term methods, new model developments are underway that will represent the epidemic and incorporate the various data sources available including case report and mortality data. For the immediate term, John Stover has developed two tools available for use now which provide simple interim solutions:

1. Mortality adjustment tool – incidence is re-scaled to match mortality.
2. Incidence fitting tool – where incidence is assumed to follow a double logistics function, a Nelder Mead Simplex fitting optimiser is used to find the incidence trend that produces the best fit to estimates of PLHIV, new cases and AIDS deaths.

The latter approach can also be used to estimate the variation around the parameter values which can then be used to represent uncertainty. It was discussed that while these tools should be available for use, there are data quality and data bias issues to consider when fitting to estimates of PLHIV, AIDS deaths, and in particular, case report data.

Recommendations:

- ✓ **Use both tools – simple re-scaling tool and the double logistics tool. However, countries will need strong guidance regarding the important distinction between incidence and “new cases” with the latter corresponding (in the model) with an average assumed stage of infection at diagnosis.** *Follow-up: Futures Institute, implementation early Dec 2014*

- ✓ **Test this approach on additional countries, add uncertainty around incidence.** *Follow-up: Futures Institute, early Dec 2014*
- ✓ **It is difficult to make general guidelines applicable for all countries; countries are encouraged to leverage the best data available to generate estimates. Countries will need to review the data and assess data quality and adopt the methods best suited for the data available (which may be multiple methods).**
- ✓ **Provide documentation on how the tools were previously used to offer additional guidance for countries.** *Follow-up: UNAIDS & Futures Institute, Jan 2015*
- ✓ **Strong triangulation required (other available data, changes in testing trends over time and new diagnoses if using case-report data) and should be performed in advance of the process and again when validating results.**
- ✓ **Consider inputting ranges for the conditions on new infections instead of directly using case-report data to inform the fitting.**

Calibrations for concentrated epidemics

Concentrated epidemic files are generally structured by key sub-populations, fit to surveillance data for each and then ANC surveillance data are usually used for the “remaining male” and “remaining female” population curves. Use of ANC data requires adjustments to account for biases when applied to the general population, and because people in higher risk sub-populations may also appear in the ANC data (thus potential to overestimate prevalence and incidence). However, in nearly half of the concentrated epidemic country files reviewed, no adjustments were made and those that were made were not necessarily reflective of guidance recommendations⁴. If remaining population data are not downward adjusted, there is potential for substantial over-estimation.

It was discussed that countries in Asia often use a remaining male sub-population with zero prevalence to avoid over-estimation (recognising that infected males are accounted for in key populations). Other countries use sex ratio data to inform the adjustment; however, if key populations are very important to an epidemic (e.g. clients, MSM and IDU), these data need to be backed out of the ANC adjustment. Additionally, countries that use case-report data to inform need to consider that case reports are lagged incidence and the gender balance may change substantially over time.

It was discussed that adjustments which change current (or previous) levels of HIV are often politically difficult to navigate; countries do not want substantial changes in their estimates that are solely due to modifications of the methods used (particularly those that may seem arbitrary) as opposed to new data available to inform. Results from the population-based survey in India will be available later this year and may be able to inform calibration from ANC to the general population.

Recommendations:

- ✓ **Where possible, build in additional time during the workshops to discuss data issues.**
- ✓ **Firm support for post-hoc adjustments for ANC data and further scrutiny of overall results with consideration of biases arising from high-risk populations included in ANC data.**
- ✓ **UNAIDS to consider stricter quality control for published estimates.**
- ✓ **Also consider the following:**
 - *Create table for entering data from other surveillance sources (case report, vital registration) as input to stimulate discussions for post-hoc adjustments.*
 - *Implement sex ratio in EPP as an input and use EPP to inform post-hoc adjustments.*
 - *Countries with strong case report data can use this to inform the adjustment (recognising that case reports represent lagged incidence which changes over time.)*

V. Estimates at the sub-national level

Countries increasingly aim to produce detailed estimates at sub-national levels in order to obtain programme-relevant information to support more local planning, decision making and resource allocation. The more limited data available at sub-national levels presents challenges for estimation. Multiple methods for generating sub-national estimates are currently available for use and more advanced methods are under development.

Generating state-level estimates in Nigeria

Countries are already able to generate sub-national estimates in Spectrum. Options include generating a single national file but fitting at the sub-national level or generating separate Spectrum files for each sub-national area. Nigeria used this latter method for their 2013 estimates producing estimates at the state level. Key challenges associated with this process include the lack of historical programme data at the sub-national level, limited HIV surveillance at lower levels and particularly for early years. This process also requires detailed demographic data, including assumptions for migration which poses a significant challenge. For Nigeria, the state files aggregated to produce a national fit had a different shape of the epidemic and different trends for incidence compared to the single national file. The key reason for these differences was the model choice for fitting with r-spline used for the single national file (given the wide range of data available for fitting at the national level) and EPP classic used for each of the state files which provides more structure and offers less flexibility in order to fit in more data-sparse settings. The aggregated national file also had a higher total population (migration not appropriately captured) and much greater uncertainty. This experience raises questions for how countries should create sub-national estimates, the data required to move to these lower levels and how to handle discrepancies at the national level. Additional key questions include:

- What are the criteria for “enough data” to move to sub-national estimates?
- Concentrated epidemics and sub-national estimates?
- How to manage the resultant large amount of files (quality control)?

Hierarchical approach for generating sub-national estimates

Le Bao has further developed his hierarchical approach and tested with Nigeria for use generating sub-national estimates; this method improved fitting but is time intensive (10 hours). The hierarchical approach is currently only implemented with the r-trend model and the method may be less promising to implement in the spline model because the parameters are coefficients of basis functions at fixed time points.

It was agreed that the hierarchical approach is the desired method for future use and interim solutions will be used as an incremental shift from national to sub-national until the hierarchical approach is available.

Geospatial analyses at the sub-national level

Pete Gething and Samir Bhatt from Oxford University have constructed a geostatistical framework for HIV prevalence which takes survey prevalence data and disaggregates by age and sex (across time and space). The next issue to address is moving from prevalence to incidence, and then adding ART coverage by age and sex (and across time and space). Incidence will come from EPP or a new Reference Group method (i.e age-structured models) in order to provide a consistent set of estimates. Additional advantages of this framework include: it allows for future incorporation of

many different data sources; it can appropriately reflect uncertainty; the 5K geographic area of focus can be aggregated upwards to any administrative level of interest.

Recommendations for approaches using the tools currently available:

- ✓ Encourage countries to consider more aggregate sub-national levels (i.e. region/zone) where more data are available.
 - Guidance that countries should exercise caution regarding use of local level indicators based on limited data
- ✓ Explore use of additional ANC data to better inform fitting at sub-national levels including:
 - Fit with all ANC data, but use lower weight for borrowed ANC data (ie sample size of 100)
 - Include ANC data from geographically proximate states (again testing with lowered weight for borrowed ANC data).
- ✓ Test the above strategies during the sub-national estimation workshop week of 3 Nov, review results afterwards, *Follow-up: UNAIDS, Reference Group, Futures Institute & East-West Centre, Nov 2014*

Recommendations for the hierarchical approach:

- ✓ LB to look at further iterations and test in more detail including:
 - Allowing correlation of states that are geographically proximate.
 - Aggregate results for Nigeria at the national level, comparison with previous fits (aggregate national file fitting with EPP Classic and national file fit with r-spline).
- ✓ Full endorsement of this work, aim for further developments and testing in early 2015, followed by implementation for use in 2016. *Follow-up: Le Bao*

Recommendation for geospatial analysis:

- ✓ Full endorsement for this work to continue, review progress in early 2015. *Follow-up: Pete Gething & Samir Bhatt*

2015 Estimation workshops

The next cycle of regional estimation workshops will occur in early 2015. The timing of this process will be slightly earlier than in previous years.

UNAIDS estimates schedule

In 2014, 113 countries submitted estimation files as part of the UNAIDS process. These estimates will continue to be published on an annual basis with regional workshops occurring every two years.

The following time frame is required in order to support the estimation process:

- End Dec 2014: Finalised EPP/Spectrum
- 1-14 Jan 2015: Model testing
- 19 Jan 2015: Final software delivery
- 27 Jan – 6 Feb: Training of Trainers
- 18 Feb – 25 Mar: Regional Workshops
- 31 Mar: Draft files due
- 15 Apr: Country feedback
- 15 Jun: Freeze database

Countries that do not currently produce estimates as part of the UNAIDS estimation process include Brazil, India, the Russian Federation, China and Western and Central Europe and North America. These countries will be strongly encouraged to produce estimates in 2015.

TB-HIV estimates

TIME is a suite of TB models implemented in Spectrum including the TIME Data, Estimates, Impact and Economics. TIME Estimates is the statistical model that takes regional estimates from GTB and disaggregates these to the country level. This approach was used in 2013 for national TB-HIV incidence and mortality estimates in southern and eastern Africa and is planned for use again in these regions, and perhaps others, in 2015. Questions remain regarding the logistical aspects of TB estimation at the workshops and methodological aspects including modifications to the current model structure, links with overall mortality and use at the sub-national level.

Recommendation for update from TB-MAC after decisions are made amongst key stakeholder organisations.

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Appendix I: List of Participants

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Appendix II: Meeting Agenda

Strengthening HIV Estimates: EPP/Spectrum 2015

27-29 October 2014

DAY 1

900	20	Meeting opening - Meeting aims, key issues, introductions	Peter Ghys, UNAIDS Tim Hallett, Imperial College London
Session 1 - Improving paediatric estimates (Chair: Peter Ghys)			
920	20	Paediatric CD4 model - Review of model, how updated analyses and data will inform - Review of adolescent progression	John Stover, Futures Institute
940	20	Updated child survival patterns in Spectrum - Proposed methods, data sources for child survival in absence of ART	Milly Marston, LSHTM
1000	10	Clarifying questions	ALL
1010	25	IHME - child and adolescent mortality, discrepancies with Spectrum - Including: Data sources used to inform child mortality	Haidong Wang, IHME
1035	10	Clarifying questions	ALL
1045	30	<i>Coffee break</i>	-
1115	45	Discussion & Recommendations - Agreement on methods to use (CD4 model) --> how to validate? - Additional data sources for updated survival analysis in absence of ART? - How to inform distribution of ART? - Revised method for adolescents?	ALL
Session 2 - GBD & UNAIDS estimates (Chair: Peter Ghys)			
1200	10	Joint estimation of CD4 progression and survival: Recap of Tara Mangal work	Tim Hallett
1210	15	Uncertainty bounds in Spectrum: Results from implementation of expanded variation around mortality from IHME	John Stover, Futures Institute
1225	5	Clarifying questions	ALL
1230	60	<i>Lunch</i>	

DAY 1 (cntd)

1330	30	Next steps in methods and model development for GBD HIV estimates - Including: Pre-ART assumptions and on-ART assumptions (and data sources), uncertainty, inferred progression models	Haidong Wang, IHME
1400	60	Discussion & Recommendations	ALL
1500	30	<i>Coffee break</i>	
Session 3 - Generating estimates in Latin America (Chair: Tim Brown)			
1530	15	Programme data available in Latin America & the Caribbean: <i>Quality, how to assess, known biases, recommendations for use</i>	Mónica Alonso González, PAHO
1545	15	Tool for fitting to PWHIV, case reports, deaths: <i>Brief review of how this tool was used for 2013 estimates and plans for future use</i>	John Stover, Futures Institute
1600	45	Discussion & Recommendations - <i>Guidance for use of this tool</i> - <i>Applicability for use in other regions</i>	ALL
Session 4 - Appropriately capturing ART in AIM (Chair: Peter Ghys)			
1645	15	ART programme data available in countries: <i>Data available for new initiates, transfers, all on ART, and quality of these data, median CD4 at initiation</i>	Daniel Low-Beer, WHO
1700	20	ART in AIM: Incorporating median CD4 at initiation, proposed structures (3) for adding disengagement from care	John Stover, Futures Institute
1720	40	Discussion	ALL
1800		Close	-

Day 2

Start	Duration	Subject	Speaker
Session 5 - Calibration in concentrated epidemics (Chair: Tim Hallett)			
900	15	Adjustment of ANC data to represent the general population in concentrated epidemics - Current assumptions - Country examples	Kim Marsh, UNAIDS
915	25	Discussion & Recommendations - Guidance for countries	ALL
Session 6 - Spectrum validation project			
940	20	Manicaland Spectrum validation project	Romain Silhol, Imperial
1000	30	Discussion	ALL
1030	30	<i>Coffee Break</i>	
Session 7 - Estimates at the sub-national level (Chair: Tim Hallett)			
1100	25	Geostatistical approach to describe variation in HIV epidemiology at the sub-national level: Methods and initial results for age-structured prevalence and ART surfaces	Pete Gething & Samir Bhatt, Oxford
1125	20	Discussion	ALL
1145	10	Generating sub-national estimates within the EPP framework: Process in Nigeria, key issues	Mary Mahy, UNAIDS
1155	20	Hierarchical approach for generating sub-national estimates within the EPP framework - Further progress in model development - Results applied to Nigeria (r-trend) and comparison with previous Spectrum file	Le Bao, Penn State
1215	45	Discussion & Recommendations - Recs for geostatistical work - Country guidance: Which model to use? How to use? When to use EPP classic? - Official national estimates: Also produce national file? Aggregate sub-national files?	ALL
1300	60	<i>Lunch</i>	ALL
Session 8 - Key issues in EPP: fitting the ART reduction parameter, addressing biases in ANC (Chair: Basia Zaba)			
<i>EPP update</i>			
1400	25	New features, remaining key issues to address - Fitting the ART reduction parameter - ART coverage in general population and coverage in ANC from Spectrum files	Tim Brown
1425	35	Discussion	
1500	30	<i>Coffee Break</i>	

DAY 2 (cntd)

<i>Data available to inform these issues, methods to address</i>			
1530	15	Data from Manicaland: ART coverage in pregnant women (prior to pregnancy) compared to general population women; HIV trends over time in pregnant women compared to all women	Simon Gregson, Imperial College London
1545	25	Revisiting biases in antenatal clinic HIV prevalence for estimating epidemic trends in the general population; new methods to address these biases	Jeff Eaton, Imperial College London
1610	65	Discussion & Recommendations	ALL
1715		Closure	

DAY 3

Session 9 - Coordination and looking forward (Chair: Simon Gregson)			
900	15	Country workshops and estimates process: <i>Next steps, software delivery, testing, timelines</i>	Mary Mahy, UNAIDS
915	10	Impact Modelling for Global Fund: <i>Goals/AEM</i>	Tim Brown/Mary Mahy
925	20	Update from TB-MAC: Plans for TB-HIV estimates at country workshops	Rein Houben/Carel Pretorius
945	10	Update from Incidence Assays meeting	Kim Marsh, UNAIDS
955	10	HIV Surveillance Initiative	James Hargreaves, LSHTM
1005	40	Discussion	ALL
1045	30	<i>Coffee</i>	-
Session 10 - Switching from surveillance in ANC to PMTCT (Chair: Simon Gregson)			
1115	10	Update re country guidelines for switching from surveillance in ANC to PMTCT	Mahesh Swaminathan, CDC
1125	15	Switching from surveillance in ANC to PMTCT: Issues identified in comparison of data from 9 countries	Ray Shiraishi, CDC
1140	15	Considerations for incorporating PMTCT as an additional data source with own calibrating parameter	Le Bao, Penn State
1155	50	Discussion & Recommendations	
1245	60	<i>Lunch</i>	
Closing session - Group discussion, final recommendations (Chair: Tim Hallett)			
1345	135	Final discussions and recommendation session - <i>Return to key outstanding decisions</i> - <i>Formalise plans for ongoing and future work</i>	ALL
1600		Meeting closure	Peter Ghys, Tim Hallett