Meeting of the Programme Impact Modelling Advisory Group (PIMAG)

Second meeting
18–19 November 2019
Chateau de Penthes,
Geneva, Switzerland

Summary Report and Action Points

Background
This is the second meeting of the UNAIDS HIV Programme Impact Modelling Advisory Group (PIMAG). The main objective of this meeting was to review the preliminary results from modelling of the 2025 targets, and cross-validate them with other existing models. For more background information, see the note of the first meeting.

Opening remarks and introductions
Peter Ghys made opening remarks and introduced the agenda. Since the last meeting, UNAIDS has a new executive director who has expressed her interest in this process.

Session 1
Status of 2025 Target Setting process
Summary of Technical Consultations and proposed programmatic targets: Testing and Treatment, Prevention, Social Enablers, and PMTCT
Peter Ghys presented the objectives and an update on the process. Four thematic technical consultations have taken place; Testing and Treatment, Prevention, Social Enablers and PMTCT. Three are still to take place; Costs and Resources, Integration and Longer Term Technologies.

Proposed targets have come from different technical consultations and there is a follow up task to ensure consistency between the groups' results. There are different levels of detail, including in terms of inclusion of numerical target proposals, between the groups. We need to see how we distil these and how we address these in modelling. Social enablers are a big question in our framework. For the remaining technical working groups, we must consider sequencing and timing as one will impact on the next (eg. Integration will impact on Costing).

Discussion
The integration group should ensure that thought goes into changes in effectiveness and coverage (in total and in impact). Integration has to bring added value in terms of impact and/or efficiency. The integration work is starting with reviewing evidence on costs, benefits and efficiency gains. A question to consider is 'Should there be a drive towards integration or do we need to see more evidence here first?'

We want to keep the 2030 outcome goals and set interim 2025 programme targets. We should be aware of SDG targets. For example, a focus on differentiated groups seems to match the SDG target to Leave no one behind. Projections we use so far use population projections – these do not match the SDGs, e.g., impacts on infant mortality are not incorporated.

Action point

- UNAIDS will ensure consistency between the results which have come from different technical working groups.

Session 2
Recommendations of the steering committee (24–26 September)
Peter Ghys presented the key decisions of the steering committee. Targets and indicators are needed for social enablers, for example for stigma and discrimination. There should be targets for specific sub-populations and specific geographic areas. Regional targets should be presented, which will allow small countries' epidemics to be made visible. Ongoing work around PrEP should be brought into the modelling. A key recommendation was to develop a tool to see how the model has changed since the previous Fast-Track target-setting process.

Review of current modelling results, including by regions, by interventions and by population groups
Avenir Health presented preliminary impact results for 24 countries accounting for 79% of new HIV infections in 2018. The proposed targets achieve the following impact from 2010 to 2030;
- 84% reduction in new infections
- 93% reduction in new child infections
- 82% reduction in AIDS deaths

Refining the targets to provide more differentiation by risk would likely reduce the costs but not affect impact very much. Regarding effectiveness assumptions, we should consult on what the PrEP figures should be. In this model scale up begins in 2021. The models show a very similar end point for new HIV infections but a delayed response, which does have an impact on numbers of people infected.

Discussion
From a Communications perspective, the new HIV infections graph is problematic. It will be important to identify what's new in our messaging. The question of having a target for individuals who belong to more than one key population group was discussed, although it does not make a difference to the estimates of impact as the number of people on these groups are small.

Action points
   Avenir Health will:
   - o share a table with targets, estimates of effectiveness and the underlying evidence/sources,
   - o model PrEP by modality and by separating adherence and efficacy,
   - o work on the distribution of incidence by key population group and their partners with UNAIDS in order to align the two methodologies being used,
   - o explore distribution of HIV incidence by district using district level estimates of HIV incidence among 20–24 year olds (as opposed to 15–24 now),
   - o propose an approach to model countries/population groups that have already achieved 90–90–90 or other targets so that achievements are not reduced,
   - o align presentation of population groups for targets (AGYW, ABYM, >25 year olds with risky behaviours) and for impact (low risk individuals, high risk individuals),
   - o explore whether incidence distribution of FSW can be modelled on the basis of incidence distribution in the overall adult population (East West Center has

done an analysis that compares prevalence of both for eastern and southern Africa and west and central Africa), or on the basis of observed prevalence among FSW (and possibly their risk behaviours).

- UNAIDS should approach LSHTM and OGAC regarding early results of DREAMS, although it is not clear that there will be enough time for analysis of the figures.
- UNAIDS Communications should consider how we can present targets, impact and resource needs and to be consistent with the earlier cycle of messaging.

Session 3
Sensitivity analysis: Impact of higher targets for high transmission groups
A graph was presented showing an additional 3% reduction in new infections between 2020 and 2030 due to higher targets for condoms, PrEP and OST.

Action points
- Avenir Health to further investigate the effect of higher targets for high-transmitting groups (including ART at 95–95–95 for key populations and for high incidence districts).

Session 4
Social Enablers: Review of current inputs and recommendations for 2025 Targets
Jose Antonio Izazola presented an update on the social enablers target setting process. Enablers are defined as modifiers of programme effectiveness. Tentative targets were presented based on a targeted literature review for which there was evidence on HIV impact. These programme targets (2025 and 2030) and 2030 goals are expected to be modelled. The literature review will be finished by the end of this year.

Modellers were asked to:
- discuss their experience of including social enablers, in particular if these could be linked to HIV impact,
- assess whether the information from the literature review can be used as inputs into their existing models,
- advise on whether the use of Structural Equation Modelling (SEM) could be of use to produce inputs and assumptions in the current models given the lack of data on social enablers and HIV incidence and AIDS-related mortality? Or to suggest other approaches,
- advise on whether outcomes, other than HIV incidence and AIDS-related mortality by 2030 should be modelled to account for the zero discrimination vision.

There is a strong expectation of UNAIDS to model social enablers and to account for the zero discrimination vision. The alternative is to have a strong argument to explain why it can't be done.

Discussion
The PIMAG members find that social enablers are vague, without sufficient evidence on effectiveness. However, putting a target on a social enabler gives it added visibility and importance. One member was concerned about the origin of the resources to pay for social enablers, assuming that these should originate outside from the MoH. However, if enablers are modifiers of programme effectiveness, it would benefit health programmes to finance the majority of costs to address the bottlenecks via enablers, programmatic or social, while

seeking synergies with other sectors for possible co-financing and implementation. We need modelling to show the effect and cost of these enablers / barriers.

Methods and results for/from inclusion of social enablers in GOALS
A presentation was given on ongoing work with UNFPA on the impact and cost of programmes to end gender-based violence. There was no existing programme to cost, so they had to prepare a programme and looked to literature for interventions, results and costs. The model attributed only a portion of costs of big-ticket items to the HIV budget – notably cash transfers – which would have high impact on other sectors. So only the DALY attributed to GBV was costed to the programme. The costing assumes that other programmes will pay for the other cash transfer costs which are a benefit attributable to other sectors. Otherwise, there is no impact attributed to social enablers and a share of the total resource needs is attributed to social enablers based on National AIDS Spending Assessments.

Modelling of social enablers in Optima
Optima includes earmarked social enabler resources but doesn't make the link to effectiveness. Optima sees social enablers as indirect impact. Some items have been modelled – for example services to keep girls in schools, delay first sexual encounter, and reduce sexual partnerships with older men. Influence from social enablers on clean needle use could also be modelled in Optima HIV. There is work planned together with the Global Fund to assess the role of social enablers in the response to HIV in 11 countries in EECA.

Other experiences in modelling social enablers [from all modellers]
AEM have not attempted to model social enablers, but social enablers are sometimes included in the unit costs.

UCL have not explicitly modelled social behaviours. They could do so in terms of effectiveness. They need to understand the proposed programmes. They should know the threshold of cost considered acceptable to diagnose an undiagnosed person.

Heidelberg have a health system cost effectiveness model. They could integrate demand side constraints (testing, uptake of condoms, etc.) and supply side constraints. For example, they have looked at relationships between human rights protection and HIV prevalence among men who have sex with men. Language of penal codes in countries that protects human rights of men who have sex with men show lower prevalence rates. IPV reduces linkage to care and ART initiation in female sex workers. Quasi-experimental approaches could fill important evidence gaps on the effects and impacts of social enablers.

Programmatic targets on social enablers can match UNAIDS targets of 90/95% (potentially) but country targets (such as legislative change) should remain at 100%.

Action points
- Three modelers agreed that they will start testing the inclusion of the pieces of evidence from the targeted literature review (to be finalized by end of December 2019) on social enablers in the respective models. Results can be reviewed at the March 2020 PIMAG meeting.
    - In GOALS: scenario analysis – reducing level of achievement of coverage targets if enablers absent (retroactive modelling).
    - In Optima: scenario analysis on influencing HIV testing, condom use, access to PrEP, other parameters mediated by social enablers

- o AEM: need to review the information on the impact on condom use mediated by social enablers
- UNAIDS will share the final literature review report along with individual papers showing impact on HIV incidence/mortality by the end of the year.
- UNAIDS will continue to discuss with modellers the use of results from SEM, seeking advice and possible inputs useful for the existing models. UNAIDS will share results from a new round of SEM before March 2020.
- Work in progress (draft papers could be circulated for comments):
  - o Impact of social enablers on HIV incidence and mortality,
  - o Adapting the HIV investment framework, reframing the critical enablers needed for impact.

Session 5
Cross-validation of GOALS model, based on 2025 AIDS targets inputs
Optima (Eswatini, Zimbabwe, Malawi, Sudan)
Optima generally provides similar results as GOALS, although there are variations. There is no striking pattern between countries' results. The main question is whether the reduction in deaths and new infections is similar using the current modelling. There were queries about the calibration of starting figures. Global effectiveness values were used as default. These may be adjusted to country or context specific values when appropriate.

AEM (Cambodia, Indonesia, Myanmar)
GOALS and AEM in general give similar results on impacts. AEM does validate the GOALS results being used for the 2025 targets. As next steps, it would be important to better understand the discrepancies in GOALS and AEM on Cambodia, why GOALS can't get new infections down to same level as AEM, and continue work to compare and understand mortality differences between AEM and Spectrum.

GOALS
Rather than repeat the comparisons presented, Avenir Health presented Session 8 at this point. See Session 8.

Action points
- Overall, results of Optima, AEM and GOALS are consistent. Additional work will be conducted by the modelling teams, to understand any discrepancies. Optima and GOALS will do more comparisons of new infections distributed by age in Malawi.
- AEM will try to present results regarding incidence declines by intervention type and population group, if this is possible (similar to what was presented earlier for GOALS).

Session 6
Are economic criteria being used in GOALS/AEM in-country Investment Cases? How?
Challenges emerging from the investment framework application in countries were presented. One aspect relates to the inclusion of critical enablers in the prioritization of interventions. Challenges include: how to quantify the long-term cost savings of specific HIV investments; how to capture the social (incremental) benefits related to increased HIV-related social spending; and how to demonstrate the social benefits in order to include the prioritization of critical enablers in the investment framework. The ICER criteria currently used do not fully address these questions and therefore other alternatives need to be explored. Another aspect that needs to be included in the investment framework relates to

implementation efficiencies. A key challenge is measuring and quantifying efficiency in order to improve policy changes and optimized allocations and delivery.

Are economic criteria being used in Optima for in-country Investment Cases? How?
Optima's approach to projecting health and economic outcomes was presented.

Discussion on advantages and limitations of using Cost-Effectiveness (ICER) and cost-benefit analyses
Advantages and disadvantages of cost-effectiveness analysis (CEA) and cost-benefit analysis (CBA) were presented. At country level, there will be additional questions in relation to available and expected budgets, financing transition, cost-effectiveness, benefits to be realised in other health areas, etc.

Action points
- UNAIDS will consider doing both cost-effectiveness and cost-benefit analyses. UNAIDS will explore further the extended cost-effectiveness analysis (see Verguet et al, 2016).
- UNAIDS will attempt to capture benefits beyond HIV.
- UNAIDS will consider ways to effectively communicate economic benefits, in relation to populations, resource gap (appetite for resource needs estimates has reduced, since it is now available for many health areas), DALYs and lost opportunities.

Session 7
How to reflect HIV integration in different modelling exercises?
A presentation reflecting HIV interventions in modelling exercises was discussed. There are financial pressures and questions about the long-term sustainability of vertical programmes. Presented was an example of possible changes to delivery of ART, both with integration and with changed delivery modalities. Questions for modellers are: How do you capture health systems structures and processes in your models? What other data would be useful for you? How should we extract and present this data?

One Health Tool
Approaches to model integrated service delivery using the OneHealth tool were presented. Using this tool, we can look at the resources required to deliver health services for a wide variety of health services. The results from the OneHealth Tool are useful to show the health system costs when scale-up is desirable by one or more programmes to assess the system's capacity. It is useful to estimate and project total costs and impact, and not just those derived from the HIV programme only.

Action points
- The review on integration being conducted will focus on integration of health service delivery for diseases and conditions that are usually delivered separately but often affect the same types of end-users. It should also address prevention services delivered in the health sector (e.g. VMMC, PrEP).
- The review should also capture the policy intent of integration.
- The review will highlight where data is missing (a gap map).
- In GOALS, integration effects can capture changes in costs, benefits and eventually changes in efficiency for selected HIV activities and/or selected population groups.
- The possibility of using the OneHealth Tool to cost programme enablers, e.g. health facilities and staff, M&E systems, etc. should be assessed based on the unique

results at the health system level produced, considering the intensity of labour required.

Session 8
Review of Age-Specific Model (ASM) model in GOALS and its use to date.
Cross-validation of ASM with GOALS (Botswana, Malawi, Namibia, Tanzania)
A comparison of results from GOALS and ASM was presented. Both models are able to fit the historical epidemic well. ASM is better for incorporating the effects of the aging of the population of people living with HIV. Therefore, ASM is preferred for generalized epidemics. For concentrated epidemics, the aging effect will not be as pronounced due to renewal of female sex worker and people who inject drugs populations and contribution of key populations is more important – and therefore, GOALS is preferred for these.

Action points
- The age-specific model (ASM) appears more sensitive than the regular GOALS model, for age-specific interventions. Hence it will be used for the global process on 2025 target setting, and 2021–2030 resource needs and impact estimation, as well as for in-country investment cases.

Annex 1: Agenda

Day 1

Time	Session	Presenter(s)/Lead (s)
9:00-9:15	Arrival and welcome coffee	
9:15-9:30	Opening remarks and introductions	Peter Ghys
9:30-9:45	Introduction to the agenda and discussion topics	Peter Ghys
9:45-10:15	Session 1 Status of 2025 Target Setting process Summary of Technical Consultations and proposed programmatic targets: • Testing and Treatment • Prevention • Social enablers • PMTCT Discussion	Peter Ghys All
10:15-10:45	Coffee break	
10:45-12:30	Session 2 Recommendations of the steering committee (24-26 September) Review of current targets, modelling results, including by regions, by interventions and by population groups Discussion	Peter Ghys John Stover All
12:30-13:30	Lunch Break	
13:30-14:30	Session 3 Sensitivity analysis: Impact of higher targets for high transmission groups Discussion	John Stover All
14:30-15:30	Coffee break	
15:30-17:30	Session 4 Social Enablers: Review of current inputs and recommendations for 2025 Targets Methods and results for/from inclusion of social enablers in GOALS Modelling of social enablers in Optima Other experiences in modelling social enablers	Jose Antonio Izazola John Stover Sherrie Kelly All
17:30	Close of Day 1	UNAIDS

Day 2:

Time	Session	Presenter(s)/Lead (s)
9:00-9:15	Recap of day 1	Chair
9:15-10:30	Session 5 Cross-validation of GOALS model, based on 2025 AIDS targets inputs • Optima (Eswatini, Zimbabwe, Malawi, Sudan) • AEM (Cambodia, Indonesia, Myanmar) • GOALS	Sherrie Kelly Tim Brown John Stover
10:30-11:00	Coffee break	
11:00-12:30	**Session 5 Con't** Discussion	All
12:30-13:30	Lunch	
13:30-15:15	Session 6 Are economic criteria being used in GOALS/AEM in-country Investment Cases? How? Are economic criteria being used in Optima for in-country Investment Cases? How? Discussion on advantages and limitations of using Cost-Effectiveness (ICER) and cost-benefit analyses	Iris Semini/Altea Cico Sitruk Sherrie Kelly Paul Revill
15h15-15h45	Coffee break	
15:45-18:00	Session 7 How to reflect HIV integration in different modelling exercises? One Health Tool **Session 8** Review of Age-Specific Model (ASM) model in GOALS and its use to date Cross-validation of ASM with GOALS (Botswana, Malawi, Namibia, Tanzania) Discussion	Till Bärnighausen Karin Stenberg John Stover John Stover All
18:00	Summary and Close of meeting	UNAIDS

Annex 2: List of Participants:

1. Bärnighausen, Till (University of Heidelberg, Joining Remotely)
2. Brown, Tim (East West Center)
3. Hallett, Tim (Imperial College) (Tuesday)
4. Kelly, Sherrie (Burnet Institute)
5. Phillips, Andrew (UCL, Joining Remotely)
6. Revill, Paul (University of York)
7. Stenberg, Karin (WHO)
8. Stover, John (Avenir Health)
9. Zhang, Shufang (The Global Fund)

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3. Frescura, Luisa
4. Ghys, Peter
5. Godfrey-Fausset, Peter
6. Harty, Malachy
7. Izazola, Jose Antonio
8. Lamontagne, Erik
9. Mahalingam, Mahesh