The Potential Impact of Treatment on HIV Incidence

Stellenbosch, South Africa
3-5 November 2011

Meeting Report [1]

Background

Recent epidemiological data have shown that HIV-infected individuals who take anti-retroviral therapy (ART) are substantially less likely to transmit HIV to their sexual partners. There has been much interest in expanding access to ART as a central component of HIV prevention strategies.

Mathematical modellers have considered the potential impact of ART on HIV incidence and prevalence in a variety of scenarios and settings over the past 15 years, with model estimates becoming more refined as improved data have become available. A meeting of the HIV Modelling Consortium on the potential population-level effectiveness of treatment for prevention was intended to provide a venue for systematic comparison of existing mathematical models and their findings, discussing strengths and limitations of existing modelling, and planning work on advanced topics of specific interest to those involved in programme implementation and public health policy.

The HIV Modelling Consortium

The HIV Modelling Consortium, funded by the Bill & Melinda Gates Foundation via a grant to Imperial College London, aims to help improve scientific support for decision making by coordinating a wide range of research activities in mathematically modelling the HIV epidemic. This includes:

- Identifying questions that demand mathematical modelling input and identifying new modelling results that may require further validation.
- Facilitating sharing of information, modelling techniques, data and expertise between research groups.
- Providing a forum for rigorous review of new mathematical modelling research and tools.
- Providing funding through sub-contracts to commission research to address those needs.

A steering committee of leaders in HIV programme and policy directs the focus of the work of the consortium. Further information on the HIV Modelling Consortium is available in a standard briefing document and information about other work packages undertaken by the HIV Modelling Consortium is available at the website www.hivmodelling.org .

Aims of the Meeting

[1] Available online at www.hivmodelling.org. Report prepared by Dr. Juan Vesga.

1. Systematically compare existing mathematical models of expanded HIV treatment for prevention in South Africa and identify the extent to which they agree and understand the reasons for any discrepancies in model predictions.

2. Identify aspects of treatment intervention programmes that may not be addressed adequately in existing modelling, and create a research agenda for incorporating these.

3. Identify and prioritise research of most urgent programmatic importance.

Focus of the Meeting

There are many potential ways in which ART could have an impact on reducing HIV incidence, including a "universal test and treat" approach and more focused interventions prioritising access to ART for those with high viral loads, discordant couples and and CD4 count specific thresholds, among others. This meeting provided an exceptional opportunity to gather experts in the field of HIV epidemiology, mathematical modelling, and HIV policy to discuss the potential impact of expanded HIV treatment in Sub-Saharan Africa. The meeting served as a forum to explore central concerns from the perspectives of programming, epidemiology, and policy making.

Beyond the academic discussion, this gathering intended to ascertain relevant questions for the application of ART as prevention, within the context of economic constraints.

From the outset, the meeting acknowledged that the topic of treatment for prevention is located at the crossroads of numerous subjects that cannot all be covered adequately in a single meeting. Other issues, such as combination prevention, portfolio optimisation, and spread of resistance were outside the scope of this meeting and will be the focus of future projects of the HIV Modelling Consortium.

Outcomes and Discussion

1. Systematically compare existing mathematical models of expanded HIV treatment for prevention and identify the extent to which they agree, and understand the reasons for any discrepancies in model predictions.

A systematic comparison of mathematical models was presented, allowing many separate modelling groups to evaluate their experiences and explore the technical and theoretical issues involved in HIV modelling and ART as prevention.

This exercise included 11 mathematical models that have been used for the estimating the impact of treatment on HIV incidence in South Africa. The models assessed the impact of ART by implementing a standardised set of ART-based interventions starting in year 2012 and comparing the epidemiological results to a counterfactual scenario with no ART provision. The specified interventions assumed that all eligible individuals initiated treatment at a constant rate with an average waiting time of 1 year, and systematically variatied ART coverage (50%, 60%, 70%, 80%, 90%, 95%, 100%), CD4 cell count eligibility threshold (CD4 < 200, CD4 < 350, immediately eligible) and variation in the retention levels in programmes (75%, 85%, 95%, 100%). Other characteristics and assumptions were left to the discretion of each modelling group.

Under these standard conditions, different modelling approaches were presented, with each accounting for a varied set of assumptions regarding the model structure, natural history of

HIV infection, demographic trends and sexual behaviour parameters. The main characteristics of the 11 models are presented in Table 1.

In general, different levels of impact on HIV incidence resulted from the 11 models, with the variation in results acting as the main focus of discussion. As an overall result, the impact of expanded ART in terms of incidence reduction was up to 60% in the short term (by 2020), for a selected scenario of CD4 eligibility <350 cell/mm^3, 80% ART coverage, and 85% retention in a treatment programme after 3 years. However, subsequent discussion and further standardisation of intervention implementation revised the range of results to be between 35 and 52%. Interpretation of these results must consider that such a reduction in HIV incidence is relative to a counterfactual scenario of 0% ART coverage. Although not realistic, this scenario could be reproduced in all models, and provided an indication of the overall impact that ART might have in settings that have successfully scaled-up access to ART.

Comparison of the assumptions behind the different models showed a diversity of structures, complexity, and parameters in models used to model project the impact of ART; A number of parameters and assumptions were hypothesised to affect the predicted impact of ART on HIV incidence. Factors expected to be associated with lower estimates of the impact of ART on incidence include:

- Allowing for heterogeneity in sexual behaviour
- Inclusion of age structure
- Low proportion of infections attributable to individuals with low CD4 cell counts
- A counterfactual scenario including HIV counselling and testing (assuming change of behaviour due to awareness of status)
- Different levels of infectiousness in the presence of ART
- Inclusion of drug resistance
- Switching based on immunological/clinical criteria
- Inclusion of ART interruption and discontinuation

However, it was not always possible to understand the different impact of the models in terms of these factors, which may be due to greater difference between models in terms of these factors than a what binary method of comparison (has it/does not have it) can indicate. Further scenarios for model comparison were planned to follow the meeting to understand reasons for underlying differences, including standardising the biological assumptions about transmission rates after ART initiation. In addition, modelling groups were asked to provide several 'diagnostics' for the behaviour of their model, including the time spent in different CD4 cell count categories and the heterogeneity in risk of infection as summarised with the Gini coefficient.

Participating Author	Model Name	Type	Gender	Age Structure	Stages of HIV	Heterogeneity in Sexual Mixing
Bendavid		Microsimulation	+	+	+	Individuals have different desired partner degree distribution
Cambiano	Synthesis Transmission model	Microsimulation	+	+	+	Includes 2 relationship types and casual

						partnerships
Eaton		Deterministic	+		+	3 sexual risk groups, assortatively mixing
Intellectual Ventures	EMOD	Microsimulation	+	+	+	3 types of partnership, heterogeneity in propensity for partner tyes
Granich		Deterministic	+			
Hontelez	STDSIM	Microsimulation	+	+	+	3 partner types + PAR
Humair, Bärnighausen		Deterministic	+		+	
Johnson	STD-HIV interaction model	Deterministic	+	+	+	20 different sexual activity classes
Long	HIV Portfolio Model	Deterministic	+		+	
Pretorius	GOALS	Deterministic	+		+	5 sexual risk groups
Stover	CD4 Model of HIV and ART	Deterministic	+		+	

Table 1: Main characteristics of the 11 models for the impact of ART on HIV incidence in South Africa.

2. Identify aspects of treatment intervention programmes that may not be addressed adequately in existing modelling, and create a research agenda for incorporating these.

Following the comparison of mathematical models, the focus of the meeting turned to aspects that may not have been fully reflected in earlier work of mathematical models.

The discussion underscored the need for models to reflect realistic assumptions about ART programmes based on empirical surveillance data. In particular, further collaboration between modellers and epidemiologists should focus on agreement about and proper interpretation of parameters of recruitment into programmes, adherence, retention, linkage to care and loss to follow-Up (LTFU) rates, since trial and real-life conditions could differ greatly, leading to optimistic parameterization of models. Data from ALPHA network studies, the IeDEA network and other cohorts can provide useful and realistic information regarding these 'leaky cascades' and aspects of HIV treatment programmes. A workshop of the ALPHA network on the topic of ART is planned for 2013 and the modeling consortium was encouraged to request analyses that the cohort studies in the ALPHA network should complete that would be most useful for modelling research.

The role of early HIV infection and its relative contribution to HIV incidence was one of the principal points of discussion (and a hypothesised source of differences between model projections in the model comparison exercise). One of the main arguments concluded that if a large proportion of HIV transmission occurs very early in infection (before treatment could be started, even in the most ambitious programs), then the potential impact of treatment on

reducing HIV incidence would be limited. Arguments in favor of that hypothesis cited genetic studies indicating high frequency of transmission events from those with early infection (in epidemics among MSM in industrialized countries). Data from the Rakai cohort showing an elevated transmission risk in the first months of infection which, when integrated in a mathematical of HIV transmission in Malawi (Powers *et al.*, Lancet 2011), suggested that approximately 40% of infections arise from people in the first few months of infection was also cited in support of this argument. Those that contested the position noted that small numbers of individuals in the Rakai study (23 couples) underpin the estimate for the period of elevated infectiousness. There is also an epidemiological trade-off when explaining observed rapid growth of epidemics between a highly infectious period of early infection, or a very high value for transmission probability overall, would both have the effect of limiting the impact of expanded ART interventions.

One of those aspects, encompassing additional issues itself, is the epidemiological context in which ART as prevention has been modeled. The most evident of these challenges is expanding ART in contexts of concentrated epidemics, which necessitates a better understanding of how to reach and involve key groups into ART programmes efficiently. In addition, differences in sexual behaviour might lie behind a concentrated dynamic of transmission, which indicates the need for models that evaluate the impact of expanding ART in a targeted manner, directed towards high-risk groups.

The experiences in countries that have provided access to ART for many years provide an opportunity for model projections to be tested. For instance, populations of from men who have sex with men (MSM) in Australia and the Netherlands test frequently and initiate treatment at high CD4 cell counts, but HIV incidence has not reduced to the levels to the levels that may be projected by mathematical models.

A disproportionate amount of existing modelling work for sub-Saharan Africa has focused on the epidemic in South Africa, or provinces within South Africa. However, extrapolation of results from South Africa is complicated by many important factors, including the economic gap between countries, health care infrastructure, density of health workers, and existing channels of access to services - all of which might affect the impact of an ART expansion intervention. It was agreed that it will be important to further analyze the questions about treatment expansion in many other settings.

Regarding allocation of resources, many considerations were discussed. The first concerned feasibility: many countries are already struggling to provide ART to those in the most immediate clinical need for ART, meaning that any expansion of ART to other groups is not currently relevant to public health policy. It was agreed that the potential reallocation of resources from other strategies should be the subject of further modelling and cost-effectiveness analysis. A call was made during the meeting to enrich the costing analysis of cost-effectiveness analysis exercises, by expanding the costing lists to include detailed valuation of service provision, health system capacity, the density of health centres in certain areas, the cost of access to care, and to identify the differences in infrastructure. The importance of using more realistic cost functions rather than cost accounting identities or uniform unit costs for projecting future costs of different interventions was emphasised, as well as the influence of different choices about discounting factors.

Treatment for prevention has its extreme example in 'universal test and treat' explored by Granich *et al.* (Lancet 2009). However, the provision of ART for preventive purposes is a continuum, and takes different forms along the way. Following the evidence coming from trials among discordant couples, it is reasonable to consider targeting serodiscordant couples as one method to prioritize an ART intervention. Challenges surrounding this strategy include establishing a unified definition of discordant couples and the relative contribution to incidence of those infections coming from external sources, which will determine the impact of such a strategy. In addition, it was also remarked that treating the index case within a couple, removes this individual as a possible source of external infection for other couples.

Decisions about how to prioritize access to treatment involve many factors. For maximum epidemiological impact ART should be prioritised according to indications that will reliably predict those likely to contribute most to onward transmission of HIV. However, therapeutic benefit may be maximised by allocating ART in a different way, and allocation strategies that may be optimal from these perspectives may not be feasible, acceptable or affordable. Populations that are already in contact with health systems could be the most straightforward to target, while viral load targeting relies on technology not yet available in most settings with the most severe epidemics. The particular issue of allocating treatment to those with the highest viral load was raised as it has been hypothesised that this could maximum the preventative impact of a fixed amount of ART. However, if those individuals with the highest viral loads also progress to low CD4 counts and mortality more quickly, they may not transmit as much due to the shorter duration of infection. Allocation ART in this way may, however, maximise the therapeutic impact of ART. One trial (see below) will seek to test these hypotheses.

At many points during discussions, the issue of the data that will be available from future studies was raised. At least four trials will commence shortly. These studies (listed in Table 2) will test, to varying degrees, the hypothesis that expanded access to treatment can reduce HIV incidence in populations. They will also show the marginal benefit of expanding treatment to different people (all HIV-infected in the case of the PopART trial, or only those with the highest viral loads in the Mochudi study). The trials will also aim to furnish information on the many questions of acceptability and feasibility of these proposed interventions. Lastly, these trials provide an opportunity for model projections to be tested, and modelling groups were encouraged to take advantage of this.

Study	CDC/HSPH	JHU/USAID	PopART (HPTN 071)	TasP
Location	Botswana	Iringa, Tanzania	Zambia + South Africa	Hlabisa (KwaZulu-Natal), South Africa
Population size	Undecided	(a total of ~140000 in all clusters; ~10000 per cluster)	720,000 to 1,440,000	42,500
Cluster size	Undecided	~ 600-700	30,000 to 60,000	1,250
Sample Units	Undecided	14 clusters	Zambia: 15 clusters; SA: 9 clusters	34 clusters
Intervention	Enhanced Combination Prevention package ξ	Standard of care & combined prevention focused on: ART at CD4<350, MMC, and CCT¥	Arm A: Full PopART* (immediate ART); Arm B: Full PopART (ART at CD4 < 350)	Standard of care + TasP**
Control	Standard of care	Standard of care and prevention	Arm C: enhanced standard of care	Standard of care (WHO)
Primary Outcome	HIV Incidence	HIV Incidence at 2.5 years	HIV incidence at 2 years	HIV incidence at 2 years
Estimated annual incidence	~1.5%	1.5% (assumed)	1% (assumed)	2.50%
Estimated Impact on incidence and power	Undecided	50% reduction with 85% power	Arm A: 60%, Arm B: 30%; With 94% power	30% reduction with 90% power
Status	Planning	Pre-Trial	Pre-Trial	First Phase

Table 2: Main characteristics of Combination trials for prevention of HIV transmission

***** Full PopART = Universal voluntary testing + male circumcision to HIV negative (MC) + ART to all HIV positive

¥ Combined = MC (80%) + HIV testing and Counselling (90%) + Enhanced linkage and retention to all HIV + CD4 <350 + behavioural change counselling (80%) + Conditional cash transfers (80% of women aged 15 – 24).

** TasP = Immediate treatment to all tested positive irrespective of CD4 count with Atripla (Emtricitabine/tenofovir/efavirenz).

ξ Package = Increased test and counselling (20% -70%) + MC (17% -70%), retention (90%), PMTCT (95%). The final intervention package is still undecided.

3. Identify and prioritise research of most urgent programmatic importance

Following the discussions regarding the technical, theoretical and programmatic issues surrounding ART for prevention, the focus of the meeting turned to establishing priorities for future research. With the technical background of aspects mentioned throughout the meeting, and using as a programmatic framework the recommendations made by PEPFAR for the implications of the results of HTPN 052 on treatment programmes[2], representatives from UNAIDS, BMGF, Kenya NASCOP, OGAC, Makarere University, and the South Africa Treasury discussed the current needs for programme planning.

The main themes that emerged from this discussion were:

- Modelling groups should together identify the pieces of data or information from experiments that would contribute most to strengthening model projections, and then make a strong case that these are collected.
- Model the role of TB in an eventual scenario of ART as prevention, given that spill-over benefits of earlier treatment initiation on TB have not yet been included in models.
- Greater representation should be made in analyses of the overall benefits of ART, including direct therapeutic benefit and societal benefits in terms of productivity, education of children and reducing orphaning (especially double orphans).
- Model targeted strategies for delivering treatment for prevention. That is, how should any extra resources for ART expansion be best used? This could include prioritising certain groups for earlier initiation, or strengthening the health-care system so that, for instance, linkages for individuals testing to pre-ART monitoring and patient retention become more effective.
- Involve mathematical modelling in providing the vision for how to invest new funding. That is, in some settings we should not always investigate how to allocate a fixed amount of resources, but also explore what might be possible, and make strong cases with that evidence for further investment.
- 'Pessimistic modelling'. A need was also identified to examine when and how the most difficult choices would be made in the context of declining resources for HIV and AIDS treatment. That is, what resources are required to maintain current levels of access to treatment; under what circumstances would access to treatment become restricted; and what policies may result in treatment not being effectively prioritised to those in the most immediate clinical need for treatment.
- Models should be used to estimate the impact that actual treatment programs may have already have. Models seem to agree that existing programs would have already reduced HIV incidence but this may not be apparent in epidemic surveillance systems that rely on tracking HIV prevalence. Robust estimates of the impact of treatment programs could reinforce the case for continued investment in treatment programmes.
- Short term estimations should also be included in modelling work, as these can be more relevant to decision-making.

The need to improve the communication channels between biomedical researchers, epidemiologists and mathematical models in order to produce increasingly informative models for the use of policy makers was emphasised. In this regard, establishing an

[2] Recommendations available at http://www.pepfar.gov/documents/organization/177126.pdf

agreement (or even a guideline) for reporting modelling results with the intention of bringing mathematical modelling closer to the body of evidence that policy makers use would be useful.

It is a an important moment for modelling treatment as prevention, since valuable data from trials is already available and more evidence is coming. This is an opportunity to make the most of mathematical modelling for HIV prevention and improve its utility as a tool for improved decision making.

The Potential Impact of Expanded Access to Treatment for HIV Prevention in Sub-Saharan Africa
3 - 5 November 2011

Hosted by: DST/NRF South African Centre for Epidemiological Modelling and Analysis (SACEMA)

Stellenbosch Institute for Advanced Studies, Stellenbosch, South Africa

AIMS

1. Systematically compare existing mathematical models of expanded HIV treatment for prevention and identify the extent to which they agree and understand the reasons for any discrepancies in model predictions.

2. Identify and agree upon key epidemiological uncertainties, programmatic strategies and economic considerations that may not have been adequately addressed in existing modelling, and create a research agenda for incorporating these.

3. Identify and prioritise research focused on questions of most urgent programmatic importance.

OUTPUT

1. Technical report of meeting, including agreed statement about current state of knowledge and synthesis of existing modelling information, published on HIV Modelling Consortium website within 1 month of meeting.

2. Publication of materials by secretariat and modelling groups in scientific peer-reviewed journal.

3. Issuing one or more requests for funding applications for research on specific high priority topics in response to meeting conclusions.

2nd November

13:00 - 14:00: STIAS Lunchtime Seminar given by Nancy Padian & Nalinee Sangrujee: "Evaluation methods: Translating results to inform HIV AIDS Policy"

18:00 - 19:00: Welcome Plenary Lecture: Robin Wood.

19:00 - 20:30: Drinks reception at the Wallenberg Centre, Stellenbosch Institute for Advanced Studies

3rd November: TAKING STOCK

8:30- 8:45: Alex Welte, Timothy Hallett, & Jeff Eaton: Welcome and housekeeping business

8:45 - 9:00 Peter Ghys: Motivation of the problem

I. Model off! A systematic comparison of models of expanded HIV treatment in South Africa
Chair: David Serwadda

9:00 - 9:20 Brian Williams: Considerations for modelling impact of expanded access to treatment programmes for HIV prevention.

9:20 - 9:25 Tim Hallett: Introduction to model comparison exercise.

9:25 - 9:50 Leigh Johnson: Overview of model structures.

9:50 - 10:15 Jeff Eaton: Results of systematic model comparison.

10:15 - 10:30 Josh Salomon: Discussant

10:30 - 11:10 Discussion

11:10 - 11:30 Tea

II. Out of (South) Africa: expanded treatment interventions in other settings
Chair: David Wilson (World Bank)

11:30 - 12:00 Roundtable discussion: Considerations for modelling the impact of treatment in other African settings

- Marie-Claude Boily (Benin)
- Peter Vickerman
- Brooke Nichols (Zambia)
- Christophe Fraser (Zambia)
- Richard White (Uganda)
- Carel Pretorius (Kenya)

12:15 - 12:30 Discussion

12:30 - 13:30 Lunch

III. Missing pieces
Chair: Stephen Becker

13:30-13:40 William Miller: Evidence that existing models have underestimated the role of early HIV infection on the HIV epidemic in Southern Africa.

13:40-13:50 Brian Williams: Why early HIV infection is not a driver of the HIV epidemic in Southern Africa.

13:50-13:55 Miller: Response

13:55-14:00 Williams: Response

14:00-14.20: Discussion

14:20 - 14:35 Matthias Egger: Empirical data on adherence, viral suppression and programme retention from clinical cohorts.

14:35 - 14:50 Basia Zaba: Uptake of testing, linkage to care, and programme adherence in ALPHA cohorts.

14:50 - 15:05 Till Bärnighausen: A vision for how we test, link, treat, and retain a very high proportion of HIV infected individuals in treatment for prevention programmes.

15:05 - 15:30 Myron Cohen: Do ecological data from developed world provide validation for models of the potential impact of treatment for prevention? / What's next for HPTN 052 – the impact of early treatment in realistic programme conditions.

15:30 - 16:00 Discussion: implications for models

16:00 - 16:20 Tea

IV. Formulation of key data needs to improve treatment as prevention models in southern Africa
Chair: Geoff Garnett

16:20 - 16:30 Tim Hallett: Statement of purpose (Aim 2)

16:30 - 17:30 Discussion
- Strengths and weaknesses of existing models.
- Research agenda for structural tests of models.
- Are data available to support more detailed structural processes? What data needs to be collected or accessed?

19:00 - 21:00 Dinner - Decameron Restaurant, 50 Plein Street, Stellenbosch 7600

4th November: MOVING FORWARD

8:30 - 8:45 David Wilson: Motivation for what are the best roles for ART during an era of heterogeneous and diverging HIV epidemics and constrained resources?

V. Incorporating economic considerations into models of antiretroviral treatment scale-up
Chair: Damian Walker

8:45 - 9:45 Gesine Meyer-Rath and Mead Over
1. Basic concepts for economic evaluation of treatment scale-up.
2. Focusing on the cost function's role in economic evaluation of treatment scale-up.

3. Review of methods and results of cost and cost-effectiveness analyses of ART.
4. Some suggested next steps towards incorporating economic considerations.

9:45 - 10:05 Discussants: Nalinee Sangrujee, Eran Bendavid & Elisa Long

10:05 - 10:45 Discussion

10:45 - 11:00 Tea

VI. Prioritising treatment provision under constrained supply
Chair: Nalinee Sangrujee

11:00 - 11:15 Tim Hallett: ART in couples – low hanging fruit or epidemiologic dead end?

11:15 - 11:30 Wim Delva: The impact and cost-effectiveness of immediate ART initiation for HIV positive pregnant women and their partners.

11:30 - 11:45 John Blandford (presented by Nalinee Sangrujee): Comparing prioritisation strategies in key populations -- a PEPFAR analysis

11:45 - 12:00 Christophe Fraser: Theoretical considerations for prioritising ART based on viral load

12:00 - 13:00 Discussion: targets and models for using treatment more efficiently and effectively

13:00 - 14:00 Lunch

VII. Turning science into programmes
Chair: Alex Welte

14:00 - 15:00 Panel discussion, led by panelist representatives from:
- UNAIDS - Peter Ghys
- BMGF - Stephen Becker
- World Bank - David Wilson
- Kenya NASCOP - Nicholas Muraguri
- OGAC - Nancy Padian
- HPTN052 - Myron Cohen
- Makarere University - David Serwadda
- South Africa Department of Health
- South Africa Treasury

Discussion topics:
- What are the most urgent questions for programmers?
- What are realistic targets and timings for scaled up ART programmes?
- What strategies are feasible and relevant for programme planning?
- What would be the most useful thing for the consortium to focus on in the short and medium term?

15:00 - 17:00 Closing discussion:
- Next steps coming out of this meeting.
- On which of these do modellers have something to say?

- What data are needed to improve usefulness of models and to answer these questions?
- Collectively setting a research agenda.

(Tea to be available on side from 15:30 - 16:00)

18:30 - 22:00 Wine Tasting and Dinner - Louisenhof Wine Estate (R304, Stellenbosch)

5th November

IX. Scientific trials of the impact of treatment as prevention
Chair: David Burns

9:00 - 9:30 Nancy Padian: Next generation combined prevention trials--study designs, key outcomes, and timelines

Preliminary mathematical modelling used to inform trial design and planned analyses for during and at end of trial.
9:30 - 9:45 Frank Tanser (ANRS/Africa Centre)
9:45 - 10:00 Marie-Claude Boily (USAID/JHSPH)
10:00 - 10:15 Christophe Fraser (PopART/HPTN 071)
10:15 - 10:30 Rui Wang (CDC/Harvard)

10:30 - 11:15 Discussion:
- What additional information should trials collect and report to be maximally useful to impact modelling and programme planning?
- How can mathematical modelling be further leveraged to supplement trial results?

(Tea available on side from 10:30 - 11:00)

11:30 - 13:00 Steering committee meeting [Steering committee members only]
Chair: Geoff Garnett

11:30 - 16:00 Informal meetings

14:00-15:00 Follow-up to model comparison work. [SA model comparison participants]

Boxed lunch provided on site.

The Potential Impact of Expanded Access to Treatment for HIV Prevention in Sub-Saharan Africa

3 - 5 November 2011

List of Participants

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