HIV Modelling Consortium Initiative on Incidence Assay Characterisation

Workshop at Harvard University, Boston; 19-20 July 2012

Meeting Brief

Project Overview

In response to a request by the *HIV Modelling Consortium* steering committee, for collaborations to build consensus on aspects of cross-sectional HIV incidence estimation, the *South African Centre of Epidemiological Modelling and Analysis* (*SACEMA*) hosted a workshop on incidence assay characterisation. The workshop was led by Alex Welte (director of *SACEMA*), and took place on 19-20 July 2012, in Boston, with the support of Harvard University.

In the preceding months, *SACEMA* pulled together a number of key research groups (participants are listed below) in the area of cross-sectional incidence estimation, and the project scope and methodology were developed through a number of shared online resources and teleconferences. This workshop provided the first face-to-face detailed discussion of Phase I of this project.

Phase I aims to provide robust guidance on the appropriate use, and data needs, of a range of analyses to estimate the mean duration of recent infection (MDRI) – an assay characteristic that is essential for incidence estimation. In particular, phase I aims to:

- Produce consensus on the definition of the mean duration of recent infection (and incidence estimator)
- Review currently used and proposed analyses for estimation of the MDRI
- Empirically compare analyses through their application to simulated data – by using simulated data, the true assay characteristics are known, allowing for a true investigation of accuracy and precision
- Perform the investigations for a number of simulated scenarios, where a data generation mechanism is defined by specifying (i) a follow-up protocol / the study design, and (ii) the biological dynamics of the assay – this will allow for investigation of the analysis plans in different contexts and for different types of assays, so that general guidance can be provided
- Publicly disseminate the findings of the full exercise through a peer-reviewed publication

Phase II of the project will delve into topics relevant to the next level of application of this surveillance methodology, such as those relating to the false-recent rate and complete uncertainty propagation when producing final incidence estimates.

Workshop Outline

An outline of the two-day workshop follows. Thursday (19 July) largely consisted of structured discussions about the theoretical underpinnings, and the Phase I project scope and overall methodology; Friday (20 July) provided opportunity for informal discussions about each component of the overall project methodology.

Day 1, 19 July, morning sessions (AW and RW)

- Public Biostatistics seminar by Alex Welte, presenting the latest innovations in incidence estimation (measuring incidence using prevalence data and differential mortality (based on work by Mahiane et al) and cross-sectional incidence estimation (based on work by Kassanjee et al))
- Discussion of formal definitions of the MDRI and incidence estimator

Day 1, 19 July, afternoon sessions (PL and RK)

- Overview of project process: simulation methodology and implementation of analysis plans
- Review of preliminary outputs
- Further discussion of specific analysis plans and performance metrics
- Demonstration of data simulation tool and online interface

Day 2, 20 July

- Presentations on some published analyses and multi-assay algorithms (SLV, DDA, OL)
- Further review of preliminary outputs
- Listing specific analysis plans and contributions
- Discussion regarding possible bias arising from assuming a single exit from 'recent' infection
- Discussion about generation of simulated data: specification of biological dynamics and follow-up protocols
- Outlining publication structure and contents, and next steps
- Discussion of the scope of phase II

Teleconferences will be held every second Friday until project completion, with the first teleconference having taken place on 3 August 2012.

Workshop Participants

- Alex Welte, Reshma Kassanjee, Phillip Labuschagne (SACEMA)
- Rui Wang, Chris Barr, Miranda Lynch, Brian Claggett, Natalie Exner (Harvard)
- Daniela De Angelis, Brian Tom, Marian Farah* (Medical Research Council-UK)
- Ping Yan, Chris Archibald* (Public Health Agency of Canada)
- Oliver Laeyendecker (NIAID)
- Stephane Le Vu (French Public Health Institute)
- Debra Hanson*, Anindya De*, S. Michele Owen*, Bharat Parekh* (CDC)
- Barbara Suligoi* (National Institute of Health, Rome)
- Pai-Lien Chen* (FHI)

*unable to attend