

Statistical and epidemiological modelling towards Maximizing ART for Better Health and Zero New HIV Infections

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The contributions in this issue of the SACEMA Quarterly focus on different aspects related to TB and incidence of HIV. This editorial focuses on HIV treatment and prevention by presenting the MaxART project (Maximizing ART for Better Health and Zero New HIV Infections). SACEMA is part of the MaxART consortium, which is led by the Swaziland's Ministry of Health (MOH) and also includes the Clinton Health Access Initiative (CHAI), the Southern African HIV and AIDS Dissemination Services (SAfAIDS), the Swaziland National Network of People Living with HIV (SWANNEPHA), the National Emergency Response Council on HIV and AIDS (NERCHA), the Global Network of People Living with HIV (GNP+), and the University of Amsterdam (UvA) in the Netherlands.

The MaxART project is funded by the Dutch Postcode Lottery's Dream Fund. The project pursues the dream of reaching all people in Swaziland who are in need of treatment with an ultimate goal of preparing the country for the possibility of ending the HIV epidemic. MaxART comprises of a unique package of interventions aimed at addressing the remaining barriers to HIV testing, care and treatment and further strengthening the collective efforts of the many involved programmes and partners in the country. Examples of these interventions are: health days that focus on hard to reach groups like men and teenagers; strengthening rural laboratory services by rolling out point-of-care CD4 testing; mobilizing communities by increasing involvement, leadership, knowledge and awareness; and text messages to remind patients about clinic appointments. The project also supports a number of existing interventions and systems strengthening activities aimed at improving the health of the people of Swaziland.

SACEMA's mandate within the MaxART consortium concerns various modelling and analysis activities. We have developed a dynamic, mathematical model to simulate the expected impact of a nationwide Treatment as Prevention (TasP) programme on HIV incidence. The model was calibrated to epidemiological and programmatic data for Swaziland. In addition to the dynamic model, an excel spreadsheet was created to provide insight into the minimally required sample size of an implementation study that will pilot treatment access to all those who test HIV-positive in selected locations. The implementation study will assess the feasibility, acceptability, and scalability of using treatment not only to benefit the health of those in need, but also to prevent new HIV infections.

The implementation study will use Swaziland's currently used monitoring and evaluation systems as far as possible. However, as additional data will need to be captured, modifications to these systems may be necessary. With the statistical analysis of the data generated during the implementation study in the back of our mind, we are working with the monitoring and evaluation specialists at the Swaziland MoH to ensure that all variables necessary for the analysis will be recorded in the national data capturing and management systems.

Furthermore, we are providing technical support in the statistical analysis of the PHDP survey. This survey was conducted last year by SWANNEPHA and GNP+, and documents the experiences of people living with HIV in Swaziland in terms of Positive Health, Dignity, and Prevention in the context of national scale-up of HIV testing, care and treatment.

Lastly, SACEMA is involved in revisiting the currently used methods to estimate the coverage of HIV treatment in Swaziland, together with our MaxART partners. ART coverage crucially depends on the number of people in need of HIV treatment and the subset of people that are actually receiving it. ART coverage estimation requires aggregating data from all facilities that provide ART in Swaziland and running epidemiological models of HIV transmission and HIV treatment in Swaziland to infer the fraction of HIV-positive people that are in need of HIV treatment. The data management process may introduce bias during the steps of capturing, transfer, cleaning and merging of data. Furthermore, some of the demographic, immunological and programmatic assumptions made by the epidemiological model may be at odds with reality, and hence the model-based estimate of the fraction of HIV-positive people that is in need of ART, may be biased as well. By carefully scrutinising the data and model input, we aim to arrive at updated ART coverage estimates based on a transparent, validated method.

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