High percentage of undiagnosed HIV cases within a hyper-endemic South African community

Alain Vandormael,1,2,3 Tulio de Oliveira,3,4 Frank Tanser,1,2,5,6 Till Bärnighausen,2,6,7,8 and Joshua Herbeck9

1School of Nursing and Public Health, University of KwaZulu-Natal, Durban, South Africa. 2Africa Health Research Institute (AHRI), KwaZulu-Natal, South Africa. 3KwaZulu-Natal Research Innovation and Sequencing Platform (KRISP), University of KwaZulu-Natal, South Africa. 4School of Laboratory Medicine and Medical Sciences, Durban, University of KwaZulu-Natal, South Africa. 5Centre for the AIDS Programme of Research in South Africa (CAPRISA), University of KwaZulu-Natal, South Africa. 6Institute of Epidemiology and Health Care, University College London, UK. 7Department of Global Health and Population, Harvard T.H. Chan School of Public Health, Boston, USA. 8Institute for Public Health, Faculty of Medicine, University of Heidelberg, Heidelberg, Germany. 9International Clinical Research Center, Department of Global Health, University of Washington, Seattle, Washington, USA.

Background

• Current treatment-as-prevention (TasP) strategies aim to reduce the size of the undiagnosed HIV population to the 10% level (or below) by the year 2020.
• Some mathematical models predict this target can be reached. However, real-world data is critically needed to evaluate progress.
• Using data from a population-based surveillance system, we calculated the percentage of undiagnosed HIV cases in a hyper-endemic South African setting between 2005 and 2016.

Results

• 65,473 adults aged 16–55 years were tested for HIV between 2005 and 2016.
• Of these, 38,661 adults had one or more valid HIV tests, of which 12,039 (31.1%) tested HIV+.
• The bottom panel shows the number tested, the HIV prevalence, and the percentage HIV undiagnosed.

Discussion

• Our results show that the percentage of undiagnosed cases was 18.9% in 2016, with an upper bound of 37.6%—much higher than the 10% target set by the Joint United Nations Programme on HIV/AIDS.
• A high level of repeat HIV testing is needed to minimise the time from infection to diagnosis.

Methods

• Following the Seattle method (Fellows et al. 2015. PLoS One), we assumed that the HIV infection occurred either one day after the latest HIV– date (upper bound) or at a random point between the latest HIV– and earliest HIV+ test dates (base case).
• From the distribution of infection times, we used a Poisson process to back-calculate the number undiagnosed infections per year.
• We then divided this result by the estimated number of HIV infections (diagnosed or not) per year.

The percentage of undiagnosed HIV infections between 2005 and 2016 in the study population