New models predict short-term survival of HIV patients starting antiretroviral therapy in sub-saharan Africa

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The survival of HIV patients in sub-Saharan Africa in the first year of antiretroviral therapy (ART) can now be predicted using either of two new risk models, developed by Matthias Egger from the University of Bern in Switzerland and Dr Margaret May, University of Bristol, UK, and international colleagues, and published in an Article Online First and in this week's edition of *The Lancet*.

In high-income countries, prognostic models have been developed to help predict survival in HIV patients starting ART. Although death rates are higher in developing countries with fewer resources, especially in the first year of therapy, no prognostic models are available for patients in sub-Saharan Africa. Estimates of prognosis for patients starting antiretroviral therapy would be useful for clinical decision making, to counsel patients, and for the planning of health services and treatment guidelines.

The researchers identified risk factors for death in patients starting ART in four large ART scale-up programmes in Côte D'Ivoire, South Africa, and Malawi. They analysed clinical and survival data for over 11000 adult patients who started therapy between 2004 and 2007. CD4 cell counts fewer than 25 cells per µl, advanced disease (WHO clinical stage III-IV), low bodyweight (less than 45 kgs), and severe anaemia were associated with increased risk of death. Other independent predictors of poor outcome included low total lymphocyte count, older age (≥ 40

years), and being male.

Survival models were used to construct a prognostic model based on five clinical predictors—CD4 cell count, clinical stage, bodyweight, age, and sex (CD4 model).Because CD4 cell count and viral load are not routinely measured in many African clinics the authors also developed a second model which replaced CD4 cell count with total lymphocyte count and haemoglobin concentration in the blood (total lymphocyte and haemoglobin model).

During the first year after starting therapy, 912 (8%) of 11153 patients died and 822 were lost to follow-up. The likelihood of death at 1 year ranged from 0•9% for patients in the lowest risk category for all prognostic indicators, to 52•5% for patients at the highest risk with the CD4 model, and from 0•9% to 59•6% with the total lymphocyte and haemoglobin model.

The authors say: "Both our models had good discriminatory power. CD4 cell count is the best prognostic factor in HIV-1 infection…but CD4 counts can be replaced by haemoglobin and lymphocyte counts for prognostic purposes."

In an accompanying Comment, Olivier Koole and Robert Colebunders from the Institute of Tropical Medicine and the University of Antwerp in Belgium, discuss the state of ART in resource poor settings and conclude: "The challenges to treat all patients with HIV are enormous…As long-term funding for HIV is running flat and access to antiretrovirals is still a huge challenge, HIV research aimed at how to do more with less should be a top priority research issue for the coming years."

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