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The role of the health system in HIV treatment-as-prevention

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Antiretroviral treatment (ART) of HIV infection has been considered a potential HIV prevention method since the early 1990s [1-2]. The 2009 modeling study by Granich et al. [3], which predicted that universal HIV testing of sexually active adults and immediate initiation of all HIV-infected individuals on ART could substantially reduce HIV incidence, has put treatment-as-prevention firmly on the HIV prevention agenda [4-5]. Trials of treatment-as-prevention will begin this year in New York and Washington, DC, and several research institutions are currently requesting funding to develop and conduct such trials in hyperendemic communities in sub-Saharan Africa [6].

While ART are of proven efficacy in reducing HIV viral load, and heterosexual transmission of HIV has been shown to decline with decreasing viral load [7-8], the effectiveness of treatment-as-prevention at the population level is uncertain because it hinges critically on the ability of the health system to identify HIV-infected persons soon after infection, to ensure that HIV-infected people enter HIV care and initiate ART immediately after they learn their status, and to retain HIV-infected individuals in treatment and care for the rest of their lives.

The results of the meta-analyses by Marks et al. in this issue of the journal provide important insights on the entry and retention in HIV medical care of people in the US after they have been diagnosed with HIV infection [9]. These findings are important because they provide baseline estimates against which to assess the need for health systems interventions to ensure the success of treatment-as-prevention strategies. Pooling data from 28 studies, the authors estimate that 69% of HIV-diagnosed persons entered HIV medical care within time intervals after a positive HIV test that ranged from four to twelve months across studies. Estimates of retention varied between 69% (in studies defining retention as two or more medical visits over six months) and 26% (in studies defining retention as visits in consecutive years over a period of three to five years) [9]. The estimated entry and retention fall short of the values used in the study by Granich et al. who assume that “all HIV-infected people started ART as soon as they were diagnosed HIV-positive”, “8% of people drop out immediately or soon after starting treatment”, and 1.5% of people drop out each year [6]. Future mathematical models should use the figures on entry and retention in HIV medical care estimated by Marks et al. to test the robustness of the finding that treatment-as-prevention will substantially reduce HIV incidence.

While the results in the study by Marks et al. will inform the debate on the feasibility of treatment-as-prevention, they may be biased estimates of entry and retention when HIV testing is universal and people who test HIV-positive are offered immediate initiation on ART. First, the individuals included in the 28 studies synthesized in the meta-analysis might have behaved very differently in the counterfactual context of a treatment-and-prevention program. For instance, it would seem plausible that the offer of immediate ART initiation would increase the motivation to enter medical care, because treatment might be perceived as more valuable than the laboratory tests and vaccinations that are currently offered when HIV-infected individuals first enter medical care [10].

Second, the samples in the studies included in the meta-analysis are likely to differ substantially from the total population of HIV-infected individuals who currently do not know their status and who treatment-as-prevention programs would need to reach. The individuals in the samples either actively sought HIV testing in community settings or were tested as part of the medical work-up in emergency or urgent care, sexually transmitted disease clinics, or general hospital care [9]. These samples are thus unlikely to represent random samples from the total population of the more than one million individuals who have been estimated to be HIV-infected in the US, 21% of whom currently do not know that they are HIV-infected [11]. Selective participation in the HIV testing necessary for entry of HIV-infected person into medical care may also pose a barrier to treatment-as-prevention. In particular, if, as recent studies in sub-Saharan Africa suggest [12-13], positive HIV status reduces participation in HIV surveys, the very individuals that need to join treatment-as-prevention programs may not consent to an HIV test in campaigns trying to achieve universal testing coverage.

Moreover, it is unlikely that the results from a meta-analysis of studies in the US can be generalized to the hyperendemic settings in sub-Saharan Africa, where improved HIV prevention is most urgently needed [4]. On the one hand, HIV-infected populations in the US belong largely to specific risk groups [11], while treatment-as-prevention in SSA would need to reach the general population. While Marks et al. report that “[r]etention in care did not differ appreciably between higher-risk samples (comprised of drug users, persons with mental health problems, recently released from prison, or persons unstably housed) versus more general samples”, even the “more general samples” in the study vary substantially from the overall population [9]. It would seem plausible that general populations are more likely to enter and remain in care than certain groups at high risk of HIV infection, such as sex workers and drug users, who may experience discrimination when accessing health care [14] or may find it difficult to express their needs to health workers [15]. On the other hand, patient management systems in SSA may be less effective than the systems in the US in referring people who tested HIV-positive to HIV medical care and in ensuring continuity of care over time [16].

The study by Marks et al. is an important starting point for future research on health systems interventions to ensure identification, entry into medical care, and long-term retention in care of HIV-infected individuals, as is required if treatment is to succeed as an HIV prevention strategy. The findings of the study suggest that treatment-as-prevention programs cannot rely on current health systems to fulfil these functions adequately, but will need to go hand in hand with systemic changes that improve entry and retention in HIV medical care.

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