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Putting risk compensation to rest: Reframing the relationship between risk behavior and antiretroviral therapy among injection drug users

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Risk compensation, or 'risk homeostasis', first gained attention in the early 1980s as a theory to explain unanticipated adverse consequences of government policies to improve road safety (e.g. seat belt laws, speed limits), and is understood to be behavior change in response to alterations in perceptions of risk [1]. Since the advent of efficacious HIV prevention interventions, including widespread condom distribution, male circumcision, preexposure prophylaxis (PrEP) and provision of HAART, concerns have been raised that risk compensation - increases in HIV risk behavior stemming from decreases in perceived risk of transmission - could significantly undermine their effectiveness [2].

In this issue of AIDS, Fu et al.[3] provide further compelling evidence that fears of behavioral disinhibition and risk compensation in injection drug users (IDUs) are likely unfounded. In this long-term prospective cohort study of HIV-infected IDUs in Baltimore, HAART initiation was associated with a 75% reduction in the likelihood of unprotected sex (despite no change in overall sexual activity) and a 38% decrease in the odds of active injecting. Although syringe sharing among the subset of persistent injectors appeared to increase after HAART initiation, the fact that a prior history of injecting-related risk behavior was the strongest determinant of post-HAART risk suggests a return to typical behavior as opposed to new-onset syringe-sharing behavior attributable to HAART use. Major strengths of the study included a large sample size and lengthy follow-up period, which permitted an examination of behaviors up to 5 years after participants initiated HAART. Although behaviors and HAART initiation events were self-reported, the study nonetheless provides strong evidence that fears regarding risk compensation are largely unfounded among this population.

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CONFLICTS OF INTEREST

All authors declare there are no conflicts of interest.

Fu et al. point to two 'risk compensation' hypotheses that have been proposed with respect to HAART use. The first hypothesis is that knowledge regarding the reduced likelihood of HIV transmission while plasma HIV RNA is suppressed on HAART leads to riskier injecting and sexual behaviors. One meta-analytic review, which was not specific to IDUs, demonstrated that HAART use was not associated with higher sexual risk behavior, but found that unprotected intercourse was more common among patients who believed that receiving HAART and having an undetectable viral load protects against transmitting HIV to others, and among those who had reduced concerns about engaging in safer sex given the availability of HAART [4]. Similar findings have also been observed specifically among IDUs [5]. However, in studies measuring self-reported or actual HAART initiation and conducted in diverse settings including the United States [3,6], France [7], and Canada [8], initiating HAART has been shown to have either no effect on risk behavior or was associated with substantial declines in risky sexual and injecting activity.

The apparent discrepancy between attitudinal versus empirical investigations is not surprising. There are several straightforward explanations; however, the disparate results may arise entirely from the fact that studies measuring HIV treatment attitudes rarely account for the myriad of clinical, sociocultural, political, and economic factors that moderate the relationship between HAART use and engagement in HIV risk behavior [9]. Future research is needed to identify how best to ameliorate the adverse impact of social, economic, and cultural marginalization and therefore optimize treatment effectiveness for IDUs.

The second hypothesis described by Fu et al. is that successful HAART initiation results in improvements in clinical status and return to better health, which in turn leads to a resumption of engagement in high-risk behavior. Evidence supporting this hypothesis among IDUs comes from a study utilizing the same data as that described by Fu et al., suggesting that increases in CD4+ cell count following HAART initiation are associated with a return to engaging in sexual intercourse including unprotected sexual activity (although no relationship was observed between clinical improvements and injecting behavior) [10]. However, withholding HAART out of fear that improved health will result in a return to preinitiation levels of risk behavior is clearly not ethical or justifiable.

For the above reasons, we argue that the provision of HAART to IDUs should be reconceptualized as a critical opportunity to engage persons with a history of high-risk behavior in medical care, with the subsequent ability to intervene accordingly. Indeed, the finding of the Fu et al. study that practicing risk behavior in the year prior to HAART initiation was the strongest predictor of continuing these activities provides further evidence that research must now focus on identifying high-risk patients and developing best practices to support these persons to reduce risk behavior and achieve the highest standard of health for themselves and their partners.

Fu et al. compellingly argue that the results of their study support the 'aggressive expansion of HAART to all who need it' in light of powerful and definitive evidence that viral suppression with therapy dramatically reduces HIV transmission [11–13]. Indeed, there is a strong public health case to be made regarding finding individuals with HIV who are engaging in risk behavior and offering them HAART. In addition to the clear preventive role of HAART, the substantial reductions in risk behavior observed after the initiation of treatment also point to potential ancillary public health benefits. Notably, with the understanding that HAART is an effective intervention to engage marginalized persons in care and reduce risk behavior comes an ability to prevent a variety of other infectious diseases (e.g., hepatitis C, sexually transmitted infections) and therefore reduce non-HIV/AIDS morbidity in the long term. Although more research is needed to develop and evaluate

methods to improve the provision of HIV treatments for IDUs [14], concerns that risk compensation meaningfully undermines their effectiveness can and should be put to rest.

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