

Reply to Heise and Philpott: The paradoxical effects of using antiretroviral-based microbicides to control HIV epidemics

We thank Heise and Philpott for their interest in our modeling of antiretroviral (ARV)-based vaginal microbicides (1).

In our study we found that, paradoxically, ARV-based vaginal microbicides could (under certain conditions) benefit men more than women in terms of HIV infections prevented (IP) and IP per resistant case (2). Heise and Philpott (1) suggest that this result is neither surprising nor unwelcome. For men to benefit more than women they state that two conditions must occur: (i) microbicides must provide bidirectional protection (i.e., protect men who have sex with HIV-infected women as well as women who have sex with HIV-infected men), and (ii) drug-resistant strains must be difficult to transmit. Although these conditions appear necessary, we found that men benefited more than women even when neither condition occurred (see figure 2 in ref. 2). Hence, our result is surprising but we stress that it is not unwelcome.

To assess the risk of resistance we conducted two analyses, assuming either high or low systemic absorption of ARVs in ARV-based microbicides (2). The degree of absorption is currently unknown. We determined that, if absorption was high, moderate/high levels of resistance could emerge (2). We agree with Heise and Philpott (1) that absorption may be low;

if so, the risk of resistance will be small (2). In fact, resistance risks from ARV-based preexposure prophylaxis (due to a higher probability of absorption) may be significantly greater than from ARV-based microbicides.

Mathematical models, coupled with uncertainty and sensitivity analyses (3), can predict the unpredictable (4) and be very useful health policy tools. We hope that our results will help in guiding the successful implementation of microbicide-based public health interventions.

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The authors declare no conflict of interest.

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