

# **The challenges of technological innovation in HIV**

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*Key words: HIV, biomedical technologies, innovation, relationality*

## The challenges of technological innovation in HIV

The challenges of transferring biomedical advances and non-biomedical technological innovations in HIV prevention and treatment to the field, are a theme of this year's XVII International AIDS Conference.

In the HIV field, innovations are often understood in exclusively biomedical or psychosocial terms. Related to these understandings are well-worn disciplinary distinctions. Thus vaccines and drug treatments are typically understood as biotechnological. They are seen as the proper preserve of laboratory studies and clinical trials that are charged with the creation of biotechnologies to protect human bodies from HIV infection or reduce damaging effects when infection has occurred. By contrast, innovations in safer-sex campaigns and other forms of behavioural prevention are generally considered the mainstay of the social sciences. Research from these fields is intended to provide insights into the beliefs and practices that might inform policy and programmes aimed at individual behaviours.

Interdisciplinary collaborations generally involve social-science study of human experiences of and responses to biomedical phenomena. Good examples are the studies of adherence to HIV antiretroviral drug treatments,<sup>1,2</sup> and studies of the effect of antiretrovirals on concepts of risk and risk behaviours.<sup>3</sup> In such studies, the innovation is often taken to be separate from the individuals that participate in it. The goal is to understand how the initiative affects or is experienced by participants.

However, recent interdisciplinary developments suggest a different way of understanding innovations. Rather than emphasising the separateness of human beings and technologies, or focusing only on how technologies affect human beings, an emphasis is placed on the relation between human beings and technologies.<sup>4–6</sup> Such a perspective has important implications for evaluating innovation and making interventions. One potent illustration of a more relational and dynamic perspective on innovation comes from research in contexts in which there is good access to anti retroviral treatments. HIV drug-resistance, iatrogenic disease, and changes in perceptions about HIV risk and risk practice have produced a scenario that was unanticipated at the time antiretrovirals were introduced.<sup>7</sup> The diagnostic provision of a surrogate measure of viral load in vivo and its optimum result of “undetectable” has given rise to diverse conceptions of risk across communities affected by HIV.<sup>8</sup> Within some prominent gay communities, this change in thinking has translated to changes in condom use with an increase in new infections.<sup>3</sup> In some instances, these new infections involve drug resistant virus.<sup>9</sup>

Another illustration, which highlights the benefits of an emphasis on relationality, comes from recent experiences with clinical trials of HIV prevention. The recent MIRA trial (Methods for Improving Reproductive Health in Africa) showed that women asked to use a diaphragm with a condom in sexual intercourse were less likely to sustain condom use than women recommended to use only condoms.<sup>10</sup> Condom use (by the participant's male partner) seems to have been affected by the participant's diaphragm use which, in turn, affected evaluation of the diaphragm's efficacy. One of the lessons here— similar to that of antiretroviral therapies—is that human behaviours and HIV-affected outcomes emerge in relation to technologies (medical and non-medical). Although the trial was not able to show conclusively whether a diaphragm offers protection against HIV because of absence of statistical power,<sup>10</sup> the study does

encourage assessment of technological innovation in relation to the specificities of a dynamic context rather than accepting a particular approach (in this case, condom use) as given and not relational to other technologies, including trial design in which the recommendation of condoms is an ethical imperative.

Important, then, to tackling the question of how to transfer technological innovation to the field is an emphasis on how innovations and human beings interact. We might think that we need to work together more collaboratively across science and social science. But any such collaboration will remain insufficient if we do not recognise how the seemingly distinct biological, social, and technological are tightly intertwined and affective, as already evident from the impact of antiretroviral drugs and the dynamics of clinical trials.

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We thank Zena Stein for her comments which contributed to our observations of the MIRA trial. We declare that we have no conflict of interest.

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